

No.

# **Ex-Post Evaluation Report of Japanese ODA Loan Projects 2009 (Philippines III)**

**December 2010**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**IC NET LIMITED**

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## Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2007. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

December 2010  
Atsuro KURODA  
Vice President  
Japan International Cooperation Agency (JICA)

## Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

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# Ex-Post Evaluation of Japanese ODA Loan Project 2009

## Table of contents

The Republic of the Philippines

Philippine-Japan Friendship Highway (Mindanao Section) Rehabilitation

Project, Phase I and II

1. Project Description	1-1
1.1 Background	1-1
1.2 Project Outline	1-1
2. Outline of the Evaluation Study	1-3
3. Results of the Evaluation	1-3
3.1 Relevance	1-3
3.1.1. Relevance with the Development Plan of Philippines	1-3
3.1.2. Relevance with the Development Needs in Philippines	1-4
3.1.3. Relevance with Japan' s ODA Policy	1-5
3.2 Efficiency	1-5
3.2.1. Project Outputs	1-5
3.2.2. Project Inputs	1-7
3.3 Effectiveness	1-8
3.3.1 Quantitative Effects	1-8
3.3.2 Qualitative Effects	1-9
3.4 Impact	1-11
3.4.1 Intended Impacts	1-11
3.4.2 Other Impacts	1-12
3.5 Sustainability	1-14
3.5.1 Structural Aspects of Operation and Maintenance	1-14
3.5.2 Technical Aspects of Operation and Maintenance	1-15
3.5.3 Financial Aspects of Operation and Maintenance	1-15
3.5.4 Current Status of Operation and Maintenance	1-16
4. Conclusion, Lessons Learned and Recommendations	1-17

4.1	Conclusion	1-17
4.2	Recommendations	1-17
4.3	Lessons Learned	1-18

## The Republic of the Philippines

### Lower Agusan Development Project

1.	Project Description	2-1
1.1	Background	2-1
1.2	Project Outline	2-1
2.	Outline of the Evaluation Study	2-2
3.	Results of the Evaluation	2-3
3.1	Relevance	2-3
3.1.1.	Relevance with the Development Plan of Philippines	2-3
3.1.2.	Relevance with the Development Needs in Philippines	2-4
3.1.3.	Relevance with Japan' s ODA Policy	2-6
3.2	Efficiency	2-6
3.2.1.	Project Outputs	2-6
3.2.2.	Project Inputs	2-11
3.3	Effectiveness	2-13
3.3.1	Quantitative Effects	2-13
3.3.2	Qualitative Effects	2-17
3.4	Impact	2-22
3.4.1	Intended Impacts	2-22
3.4.2	Other Impacts	2-25
3.5	Sustainability	2-28
3.5.1	Structural Aspects of Operation and Maintenance	2-28
3.5.2	Technical Aspects of Operation and Maintenance	2-29
3.5.3	Financial Aspects of Operation and Maintenance	2-29
3.5.4	Current Status of Operation and Maintenance	2-30
4.	Conclusion, Lessons Learned and Recommendations	2-32
4.1	Conclusion	2-32
4.2	Recommendations	2-32
4.3	Lessons Learned	2-33

## The Republic of the Philippines

### Rehabilitation and Maintenance of Bridges Project (Phase IV)

1. Project Description	3-1
1.1 Background	3-1
1.2 Project Outline	3-1
2. Outline of the Evaluation Study	3-2
3. Results of the Evaluation	3-2
3.1 Relevance	3-3
3.1.4. Relevance with the Development Plan of Philippines	3-2
3.1.5. Relevance with the Development Needs in Philippines	3-3
3.1.6. Relevance with Japan' s ODA Policy	3-4
3.2 Efficiency	3-5
3.2.3. Project Outputs	3-5
3.2.4. Project Inputs	3-7
3.3 Effectiveness	3-8
3.3.1 Quantitative Effects	3-8
3.3.2 Qualitative Effects	3-10
3.4 Impact	3-12
3.4.1 Intended Impacts	3-12
3.4.2 Other Impacts	3-14
3.5 Sustainability	3-15
3.5.1 Structural Aspects of Operation and Maintenance	3-15
3.5.2 Technical Aspects of Operation and Maintenance	3-15
3.5.3 Financial Aspects of Operation and Maintenance	3-15
3.5.4 Current Status of Operation and Maintenance	3-16
4. Conclusion, Lessons Learned and Recommendations	3-16
4.1 Conclusion	3-16
4.2 Recommendations	3-17
4.3 Lessons Learned	3-17

## The Republic of the Philippines

### Arterial Road Links Development Project (Phase IV)

1. Project Description	4-1
1.1 Background	4-1
1.2 Project Outline	4-1
2. Outline of the Evaluation Study	4-3

3. Results of the Evaluation	4-3
3.1 Relevance	4-3
3.1.1. Relevance with the Development Plan of Philippines	4-3
3.1.2. Relevance with the Development Needs in Philippines	4-4
3.1.3. Relevance with Japan’ s ODA Policy	4-4
3.2 Efficiency	4-5
3.2.1. Project Outputs	4-5
3.2.2. Project Inputs	4-7
3.3 Effectiveness	4-9
3.3.1 Quantitative Effects	4-9
3.3.2 Qualitative Effects	4-11
3.4 Impact	4-12
3.4.1 Intended Impacts	4-12
3.4.2 Other Impacts	4-17
3.5 Sustainability	4-17
3.5.1 Structural Aspects of Operation and Maintenance	4-17
3.5.2 Technical Aspects of Operation and Maintenance	4-18
3.5.3 Financial Aspects of Operation and Maintenance	4-18
3.5.4 Current Status of Operation and Maintenance	4-19
4. Conclusion, Lessons Learned and Recommendations	4-19
4.1 Conclusion	4-19
4.2 Recommendations	4-19
4.3 Lessons Learned	4-20

## The Republic of the Philippines

### Rural Road Network Development Project (II)

1. Project Description	5-1
1.1 Background	5-1
1.2 Project Outline	5-1
2. Outline of the Evaluation Study	5-2
3. Results of the Evaluation	5-2
3.1 Relevance	5-2
3.1.4. Relevance with the Development Plan of Philippines	5-5
3.1.5. Relevance with the Development Needs in Philippines	5-3
3.1.6. Relevance with Japan’ s ODA Policy	5-4
3.2 Efficiency	5-4

3.2.3.	Project Outputs	5-4
3.2.4.	Project Inputs	5-6
3.3	Effectiveness	5-7
3.3.1	Quantitative Effects	5-7
3.3.2	Qualitative Effects	5-8
3.4	Impact	5-10
3.4.1	Intended Impacts	5-10
3.4.2	Other Impacts	5-14
3.5	Sustainability	5-15
3.5.1	Structural Aspects of Operation and Maintenance	5-15
3.5.2	Technical Aspects of Operation and Maintenance	5-15
3.5.3	Financial Aspects of Operation and Maintenance	5-15
3.5.4	Current Status of Operation and Maintenance	5-16
4.	Conclusion, Lessons Learned and Recommendations	5-16
4.1	Conclusion	5-16
4.2	Recommendations	5-16
4.3	Lessons Learned	5-17



## The Republic of the Philippines

### Philippine-Japan Friendship Highway (Mindanao Section) Rehabilitation Project, Phase I and II

External Evaluator: Haruko Awano, IC Net Limited

#### 1. Project Description



Project Site



Road expanded to four lanes

#### 1.1 Background

Mindanao Island is the least developed region in the Philippines. The Government of the Philippines (GOP) has been assisting the development of Mindanao through the establishment of Brunei Darussalam-Indonesia-Malaysia-Philippines East Asian Growth Area, BIMP-EAGA<sup>1</sup>. The Philippine-Japan Friendship Highway (Mindanao Section) which traverses the eastern part of the island from Davao City, the largest city of Mindanao, to the north through Agusan River Basin which was expected to be developed as a rice production area, constructed in 1979 with the assistance of Japanese ODA Loans and played an important role in regional development<sup>2</sup>. However, as 17 years have passed since its completion, the pavements and shoulders of the highway have rapidly deteriorated due to the growing volume of traffic and natural calamities. Rehabilitation and improvement of the highway have become crucial in order to upgrade road efficiency and safety.

#### 1.2 Project Outline

The objective of this project is to establish a safe and efficient road network by improving and rehabilitating the roads and bridges, thereby contributing to the development of Mindanao through its agricultural, industrial, fishing, commercial and tourism activities. The specific objectives of the two phases are as follows.

##### (1) Phase I

- Rehabilitate priority sections based on the extent of deterioration of the road surface and bridge, which are the Tabon-Tabon - San Francisco segment (about 67 km), Langkilaan

<sup>1</sup> In 1992, then President Fidel V. Ramos of the Philippines proposed BIMP-EAGA for the expansion of economic cooperation in the border areas with Indonesia and Malaysia with Brunei Darussalam. BIMP-EAGA was formally launched in 1994. Its goal is to increase trade, investments and tourism in the subregion by facilitating the (i) freer movement of people, goods and services; (ii) development of vital infrastructure in the subregion; and (iii) coordination of the management of ecosystems and common resources to ensure sustainable development.

<sup>2</sup> The Philippine-Japan Friendship Highway is the major national highway with total length of 2,100 km which connects the three islands of Luzon, Visayas, and Mindanao from North to South of the nation. The highway was constructed with the assistance of Japanese ODA Loans of 10.8 billion yen.

Monkayo segment (about 19 km), and Tagum-Carmen segment (about 12 km) in Mindanao.

- Improve the system of maintenance and management of the Executing Agency, Department of Public Works and Highway (DPWH), by supporting the study on national roads and plans for maintenance and management of the roads.

(2) Phase II

- Continue Phase I by paving and improving the roads, building bridges for the remaining sections which were highly prioritized for rehabilitation, which are the Alegria-Santiago segment (about 23km), the Sanfransisco – Langkitaan segment (about 70km), and Monkayo Bypass-Tagum segment (about 62km).

Approved Amount/ Disbursed Amount	<ul style="list-style-type: none"> <li>▪ Phase I: 7,683 million yen / 7,460 million yen</li> <li>▪ Phase II: 7,434 million yen / 7,433 million yen</li> </ul>
Exchange of Notes Date / Loan Agreement Signing Date	<ul style="list-style-type: none"> <li>▪ Phase I: March 1997 / March 1997</li> <li>▪ Phase II: December 1997 / December 1999</li> </ul>
Terms and Conditions	<ul style="list-style-type: none"> <li>▪ Phase I: Interest Rate: 2.7%, 2.3% (consulting service) Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied</li> <li>▪ Phase II: Interest Rate: 1.8%, 0.75% (consulting service) Repayment Period: 30 years (Grace Period: 10 years), 40 years (Grace Period: 10 years) for consulting service Conditions for Procurement: General Untied, Bilateral Tied (consulting service)</li> </ul>
Borrower / Executing Agency(s)	The Government of the Republic of the Philippines / Department of Public Works and Highways (DPWH)
Final Disbursement Date	<ul style="list-style-type: none"> <li>▪ Phase I: June 2006</li> <li>▪ Phase II: March 2008</li> </ul>
Main Contractor (Over 1 billion yen)	<ul style="list-style-type: none"> <li>▪ Phase I: MAC Builders; Persan Construction; Toledo Construction Corp.; EEI Corporation; DIMSON Inc.; J.M. Luciano Construction Inc. (Philippines)</li> <li>▪ Phase II: China State Construction Engineering Corporation (China); Shinsung Engineering &amp; Construction Co., Ltd. (South Korea); DAEWOO Engineering &amp; Construction Co., Ltd. (South Korea)</li> </ul>
Main Consultant (Over 100 million yen)	<ul style="list-style-type: none"> <li>▪ Phase I: Katahira Engineering International (Japan)</li> <li>▪ Phase II: DCCD Engineering Corporation, DEMCOR Inc.; SCHEMA Konsult Inc. (Philippines); Katahira Engineering International (Japan)</li> </ul>
Feasibility Studies, etc.	Feasibility Study and Detail Engineering (by JICA, 1995 – 1996); Implementation Plan (by DPWH, 1995-1996)
Related Projects (if any)	SAPS (1993 – 1994)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator:

Haruko Awano, Senior Consultant, IC Net Limited

### 2.2 Duration of Evaluation Study:

Duration of the Study: January 2010 – December 2010

Duration of the Field Study: March 7, 2010 – March 31, 2010;

May 25, 2010 – June 23, 2010;

September 7, 2010 – September 13, 2010

### 2.3 Constraints during the Evaluation Study:

None in particular

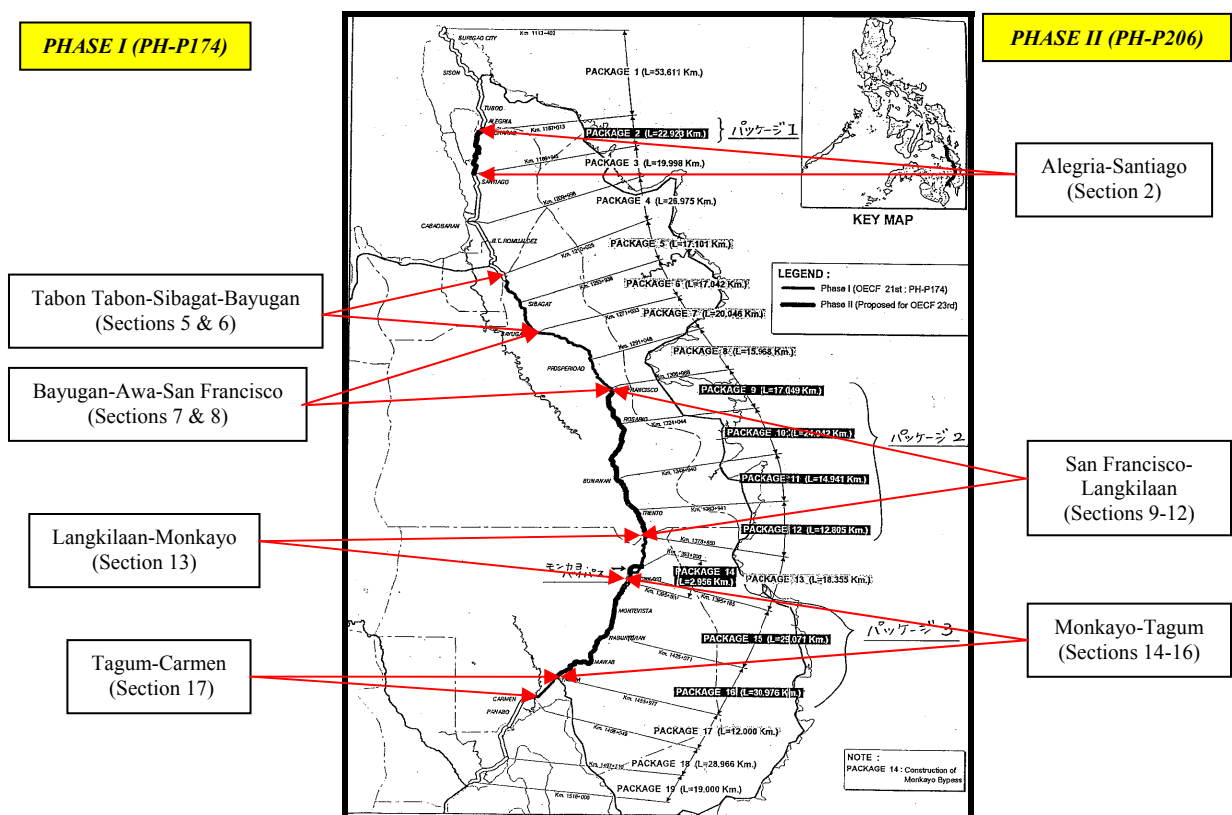


Figure 1: Project Map of PJHL-Mindanao Section

## 3. Results of the Evaluation (Overall Rating: B)

### 3.1. Relevance (Rating: a)

#### 3.1.1 Relevance with the Development Plan of the Philippines

The Medium-Term Philippine Development Plan (MTPDP) 1993-1998 included improvement of the arterial road network which connects the northern and southern parts of the country as well as the eastern and western areas under the transport sector policy. It envisioned increasing the pavement rate of the arterial national roads to 85% by 1998 and

constructing as permanent structures all the bridges along the national roads<sup>3</sup>. The Mid Term Public Investment Plan 1994-1998, too, planned to improve 480 km of artery and secondary road networks in five regions including four regions in Mindanao, in order to expand the road networks connecting markets and regional growth centers. At the regional level, the Mindanao Development Plan 2000 (1996-2000) recognized that infrastructure to physically integrate the island was imperative for regional development and put the highest priority on pavement and improvement of a road network, because the poor quality of roads increased transportation costs for agriculture, the region's main sector.

At the time of the ex-post evaluation, the following are the development goals and strategies in the infrastructure sector of MTPDP 2004-2010: 1) improve access to domestic and foreign markets; 2) strengthen peace and order in conflict affected areas by providing efficient transportation and commerce; and 3) enhance national and family unity and promote tourism by enabling faster, cheaper and safer movement by people. DPWH also worked out the strategy of infrastructure improvement which includes maintenance of existing facilities, rehabilitation of damaged facilities, and improvement and expansion of existing roads, particularly the ones with heavy traffic. At the regional level, the draft Mindanao Peace and Development Framework Plan 2020 (2010-2030) which is being formulated points out the low pavement rate of roads as a major challenge for development in the region. The plan's targets include improvement of infrastructure which supports distribution channels.

### 3.1.2 Relevance with the Development Needs of the Philippines

The Mindanao Section of the Philippine-Japan Friendship Highway (PJHL) played a major role in regional development as an arterial road connecting the northern and southern parts of the eastern area of Mindanao through Davao, the largest city in Mindanao, and the Agusan River basin which was to be developed as a rice growing belt. The Annual Average Daily Traffic (AADT) was about 700 – 8,000 which were significantly varied according to sections in 1994. The highway has taken significant damage after 17 years since its completion and its rehabilitation and improvement have become crucial.

The PJHL Mindanao Section serves two regions in Mindanao<sup>4</sup>: Regions XIII (includes sections from Tabon Tabon to San Fransisco of Phase I, sections of Alegria to Santiago and San Fransisco to Langkitaan of Phaes II) and Region XI (includes sections from Langkitaan to Monkayo, Tagun to Carmen of Phase I and sections from Monkayo Bypass to Tagum of Phase II). Recently, the regions' industry and service sectors have seen high growth. Under this background, the AADT of the target sections of this project increased on average to 1,853 ~ 10,566 in 2009. The number of vehicles registered in Region XIII more than doubled from 27,253 in 2005 to 61,367 in 2008.

For this project, JICA conducted the Feasibility Study (F/S) and Detailed Engineering Design and the DPWH formulated the Implementation Plan between 1995 and 1996. Conditions of all the sections of the highway were reviewed in the F/S. Six sections which had serious damage were selected for rehabilitation in Phase I and eight sections with the next priorities were selected for Phase II. In the Monkayo area, it was decided to construct a new bypass road in lieu of rehabilitating the existing Kalaw Bridge to protect the road network from frequent flooding. This decision was made based on the cost analysis that

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<sup>3</sup> Bridges with permanent structures are constructed with reinforced concrete, stones, or steels to increase durability.

<sup>4</sup> In Philippines' administrative divisions, there are 17 Regions under the national government and 79 Provinces under the Regions. In this project, the sections from Alegria in the north to Langkitaan in the central area of Mindanao are located in Region XIII and the sections from Langkitaan to Carmen in the southern area of Mindanao are located in Region XI.

considered the cost of alternative flood control measures such as cut-off channels and levee embankment. With a new bypass road, the old bridge of Kalaw which connected the Monkayo area and the south was to be abandoned. However, at the time of the Ex-Post Evaluation, the DPWH Regional Office XI decided to rehabilitate the Kalaw Bridge with a budget of PhP 114 million because there were strong demands by residents. The rehabilitation works for the Kalaw Bridge will begin in 2010. The Kalaw Bridge rehabilitation includes the raising of the bridge and its approaches and connecting roads above the maximum flood level with provision of at least one meter freeboard. The DPWH Regional Office XI observed that the flood will be prevented by the river training works done by this project and the river re-channeling by the DPWH District Engineering Office (DEO).

### 3.1.3 Relevance with Japan's ODA Policy

"Overseas Economic Cooperation Policy" issued by JICA (former JBIC) in 1999 included the strengthening of the economic structures of the GOP (Government of Philippines), poverty reduction which were considered as major constraints to the economic development of the country, and reducing the disparity among regions. In its Country Assistance Program 2000 for Philippine, the Government of Japan recognized the importance of improvement of economic infrastructure for sustainable growth. The program put emphasis on improvement of transportation infrastructure in view of economic development and reduction of regional disparity and proposed to review improvement and repair of road networks with a special focus on arterial and national roads.

As explained above, this project rehabilitated the trunk highway which connects the southern Mindanao to the north, which is the least developed area, and meets the policy of the GOP to improve the trunk road network, thus helps economic development and improvement of the peace and order in the conflict affected area. The needs for improvement of transport infrastructure, in particular the road network, have been high at the time of the appraisal and the ex-post evaluation. The project was also in line with the Japanese assistance policy for the Philippines to improve infrastructure thereby to decrease regional disparity. The scope and priorities of the project were fully reviewed at F/S and the selection of road sections to be reworked was deemed appropriate. Based on the above, it is evaluated that this project has been highly relevant to the country's development plan, development needs, and Japan's ODA policy. Thus the project's relevance is high. However, it is anticipated that the use of the new Monkayo Bypass Road constructed under the project may decrease after the old bridge of Kalaw is rehabilitated because many people will use the route of Kalaw Bridge in lieu of the bypass road<sup>5</sup>.

## 3.2 Efficiency (Rating: b)

### 3.2.1 Project Outputs

#### (1) Civil Works

Phase I is composed of four major road sections intermittently spread over the three provinces of Agusan del Sur, Compostela Valley and Davao del Norte. Phase II is composed of three major road sections also spread intermittently over the above three provinces and AGusan del Norte. The major works included improvement of the existing Portland Cement Concrete (PCC) pavement through re-blocking and Asphalt Concrete (AC) overlay, rehabilitation works on connecting bridges, improvement and construction of drainage

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<sup>5</sup> The DPWH DEO of Compostela Valley straightened the downstream river course from 1994 to 2007 and effectively reduced the flooding level at the Kalaw Bridge. Survey results revealed that the economic activity in the town proper of Monkayo was adversely affected by the bypass road since travelers no longer drop by the town proper and residents are clamoring for the restoration of the Kalaw Bridge as their main access to the town. Further consultations between PMO and DPWH DEO on the flood control measures could have been made but both of PMO and the consultant did not have the information on the measures done by DPWH DEO.

facilities, and slope protection works<sup>6</sup>, and flood control measures including embankment levee. The Table below shows the planned and actual outputs of civil works. Most of the outputs of civil works were delivered as scheduled, although there were several additional works such as increase from two lanes to four lanes in urban areas, increased number of rehabilitated bridges and slope protection, and expanded levee for flood control works. They were done based on either the current local status or requests from local governments and were deemed appropriate.

Table 1: Outputs of Phase I and Phase II of PJHL Project

Items	Phase I			Phase II		
	Plan	Actual	% of Plan	Plan	Actual	% of Plan
Road pavement improvement (km)	97.1	100.3	103%	155.6	155.7	100%
Rehabilitation bridges	24	20	83%	30	43	143%
Slope Protection	33	46	139%	29	37	128%
Flood Control (km)	7.5	9.5	127%	n/a	1.42	n/a

(2) Consulting Services

Man Month (M/M) for consulting services was significantly increased from 1,294 MM to 2,359 MM (182% of the plan) for Phase I and from 1,115 MM to 1,595 MM for Phase II (143% of the plan). The main reasons for increase were the need for a detailed study for additional scope of work, extension of the bidding and construction periods, and the prolonged Maintenance Management Study. The Maintenance Management Study under Phase I consisted of (a) a review of the O&M system of DPWH District Engineering Offices (DEOs) in charge of O&M of this project and recommendations, and (b) a study on the state of all the national roads where the DEOs are in charge and formulation of the Maintenance Management Plan. However, at the time of the ex-post evaluation, most of the DEOs and the Regional Offices of DPWH did not know about the Study Report and did not utilize it.

Table 2: Consulting Services

(Unit: Man-Month)

Category	Items	Phase I			Items	Phase II		
		Plan	Actual	% of Plan		Plan	Actual	% of Plan
Professional	Bidding / Supervision of Construction	596	1,054	177%	D/D Review / Bidding	38	66	174%
	Maintenance Study	91	139	153%	Supervision of construction	440	601	137%
Assistant Staff	Bidding / Supervision of Construction	527	1,024	194%	D/D Review / Bidding	35	94	269%
	Maintenance Study	80	140	175%	Supervision of construction	602	833	138%
Total	Bidding / Supervision of Construction	1,123	2,080	185%	D/D Review / Bidding	73	160	219%
	Maintenance Study	171	279	163%	Supervision of construction	1,042	1,435	138%

<sup>6</sup> Slope protection is to cover the slopes artificially constructed by digging or embankment as done for road construction with stones, concrete blocks, or lawn-grass to protect slopes from land slide.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period

The implementation period of this project was significantly longer than planned. Phases I and II had been planned to be completed in 105 months: Phase I in 50 months from December 1996 to January 2001; and Phase II in 55 months from July 1999 to January 2004. However, the total actual duration of the two phases was 214 months (204 % of the plan) with Phase I taking 115 months (230% of the plan) and Phase II, 99 months (180 % of the plan). In particular, the actual duration of Phase I was more than double the planned one, and delayed by almost six years.

Table 3: Planned and Actual Project Implementation Schedule

Phase	Plan	Actual	% of Plan
Phase I	Dec. 1996 to Jan. 2001 (50 months)	Mar. 1997 to Sept. 2006 (115 months)	230%
Phase II	July 1999 to Jan 2004 (55 months)	Dec. 1999 to Feb. 2008 (99 months)	180%
Total	105 months	214 months	204%

The main reason for the long delay was the suspension of the construction in Sections 7 and 8 in 2002 because the contractor could not implement the work due to the undesirable economic conditions and the peace and order problem, which resulted in renegotiation with the original bidders. This issue led to suspension of the overall civil works in the sections for five years. Here are the other major reasons for the delay of Phase I: (a) prolonged process of qualifications of bidders in some sections (6 months); (b) significant increase in rainfall due to typhoons; and (c) additional scope of work requested by the local governments. Meanwhile, the major reason for the delay of Phase II is prolonged discussions between the DPWH and JBIC on the bidding process due to the changes in the procurement process of the GOP (delayed by 23 months).

#### 3.2.2.3 Project Cost

The total project cost was estimated at JPY 19,190 million at the time of the appraisal, while the actual total project cost was JPY 17,942 million, or 93 percent of the estimated cost. In peso terms, the actual project cost was PhP 8,031 million or 145% of the PhP 5,543 million estimated cost. The appreciation of the yen was a major cause of the cost increase<sup>7</sup>. Here are the other reasons for the cost increase in peso: (a) increased cost for civil works and consulting services due to the changes in scope such as change from two to four lanes and increased number of bridges rehabilitated and slope protection which were done based on the traffic volume, actual situation, and request from local governments, and extension of the works; and (b) increased cost for land acquisition due to the expansion of road lanes and increased value of land (From PhP 24 million to PhP 64 million in Phase I and from PhP 10 million to PhP 36.6 million in Phase II).

Table 4: Planned and Actual Project Costs

Project	Cost (Unit: Million Yen)			Cost (Unit: Million Yen)			Loan Amount (Unit: Million Yen)	
	Plan	Actual	% of Plan	Plan	Actual	% of Plan	Loan Amount	Disbursed
Phase I	10,244	8,303	81%	2,561	3,688	144%	7,683	6,744

<sup>7</sup> The yen appreciated from JPY4/peso (for Phase I) and JPY3/peso (for Phase II) at the time of the appraisal to an average of JPY2.25 and 2.22/peso during project implementation.

Phase II	8,946	9,639	108%	2,982	4,342	150%	7,434	7,842
Total	19,190	17,942	93%	5,543	8,031	145%	15,117	14,586

As explained above, although the project period was significantly longer than planned, the project cost was lower than planned, therefore efficiency of the project is fair.

### 3.3 Effectiveness (Rating: a)

#### 3.3.1 Quantitative Effects

##### 3.3.1.1 Results from Operation and Effect Indicators

##### (1) Annual Average Daily Traffic Volume (AADT)

In 2009, three to five years after the completion of the sections of Phase I, the AADT reached a total of 28,782, which is 129% of the estimated number. In Section 5 where heavy transport of lumber and agricultural products was observed, and Section 17 which is near Davao City, the AADT surpassed the target volume substantially. On the other hand, the volumes in other sections were 71-89% of the expected numbers. The AADT of Phase II reached a total of 23,083 in 2009, which is 106% of the total estimated number. A high growth of volume was observed in Section 16 which is close to Davao City. However, in the sections of 2, 9-12, and 15, the volume remained at 48-97% of the target.

Table 5: Annual Average Daily Traffic Volume of PJHL (Unit: Vehicles/Day)<sup>8</sup>

Phase I (Section Number, Section Name)		Plan				Actual	% of Plan
		1994	2000	2004 (3rd year)	2006 (5th year)	2009	
5	Tabon-tabon-Sibagat	847	1,388	1,817	2,031	<b>5,821</b>	287%
6	Sibagat-Bayugan	1,868	2,948	3,897	4,372	3,884	89%
7	Bayugan-Prosperidad	1,996	3,161	4,179	5,705	3,261	78%
8	Prosperidad-San Francisco	2,409	3,886	4,824	6,230	3,694	77%
13	Langkilaan-Monkayo	753	1,273	1,642	2,196	1,556	71%
17	Tagum - Carmen	1,691	2,725	3,552	4,793	<b>10,566</b>	220%
Total		9,564	15,381	19,911	25,327	<b>28,782</b>	129%
Total of estimate of target years for comparison					22,394		
Phase II (Section Number, Section Name)		Plan				Actual	% of Plan
		1994	2000	2006 (2nd year)	2008 (4th year)	2009	
2	Alegria-Santiago	1,640	2,518	2,959	3,842	1,853	48%
9	San Francisco-Rosario	1,856	2,978	3,449	4,391	3,261	95%
10	Rosario-Bunawan	1,217	2,007	2,308	2,910	2,238	97%
11	Bunawan-Kapatungan	1,476	2,399	2,768	3,505	2,238	81%
12	Kapatungan-Langkilaan	1,926	3,170	3,194	3,243	2,238	70%
14	Monkayo By-pass	914	1,525	1,750	2,199	<b>2,112</b>	121%
15	Monkayo - Nabunturan	1,228	1,992	2,294	2,897	2,112	92%
16	Nabunturan - Tagum	1,167	1,908	2,192	2,759	<b>7,031</b>	321%
Total		11,424	18,497	20,914	25,747	23,083	106%
Total of estimate of target years for comparison				21,796			

Source: PED, Planning Service

Note: Numbers include cars, jeeps, buses, tracks, and tricycles.

<sup>8</sup> Volumes of AADT were compared based on the completion year of each section as follows. Phase I: For Sections 5, 6, 13, and 17 where civil works were completed in 2004, the volumes are compared with the target of the fifth year. For Sections 7 and 8 where civil works were completed in 2006, the volumes are compared with the target of the third year. Phase II: For Sections 2 of where civil works were completed in 2005, the volume is compared with the target of the fourth year. For remaining sections where civil works were completed in 2007, the volumes are compared with the target of the second year. The volumes to be compared are colored in grey in the table 5.



(2) Traffic Accident

The number of traffic accidents increased from 2005 to 2008 in Sections 13, 15, 16 and 17 that are close to Davao City, which is considered to be affected by a rapid increase of traffic. On the other hand, the number of accidents decreased in the remaining sections.

Table 6: Number of Traffic Accidents in Sections of PJHL Project

Phase I (Section)		Year					Phase II (Section)		Year					
		2005	2006	2007	2008	2009			2005	2006	2007	2008	2009	
5	Tabon Tabon - Sibagat	17	7	0	2	1	2	Alegria - Santiago	No Road Traffic Accident					
6	Sibagat - Bayugan	23	6	2	1	1	9	San Francisco - Rosario	14	6	1	0	2	
7	Bayugan - Prosperidad	18	7	2	0	1	10	Rosario - Bunawan	11	1	1	0	0	
8	Prosperidad - San Francisco	10	4	0	0	1	11	Bunawan - Kapatungan	4	2	0	0	0	
13	Langkilaan - Monkayo	0	0	12	12	4	12	Kapatungan - Langkilaan	1	0	0	0	1	
17	Tagum - Carmen	28	53	51	65	46	14	Monkayo Bypass	No data					
Total		96	77	67	80	54	15	Monkayo - Nabunturan	39	71	49	58	46	
								16	Nabunturan - Tagum	26	12	12	32	17
								Total		95	86	62	90	64

Source: DPWH

Traffic Accident Recording Analysis System (TARAS)

3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)

The Economic Internal Rate of Return (EIRR) was re-calculated for both Phases I and II of the project, using the same conditions as at the appraisal<sup>9</sup>. EIRR increased from 21.6% to 23.5% for Phases I and from 25.6% to 35.9% for Phase II, presumably because the growth of the total AADT was more than expected and the benefit surpassed the negative effects of cost increase and schedule extension.

Table 7: EIRR of Phases I & II of PJLH Project

Phase	At Appraisal	At Ex-Post Evaluation
Phase I	21.6%	23.5%
Phase II	25.6%	35.9%

3.3.2 Qualitative Effects

To determine the effect and impact of the project, a beneficiary survey was conducted with the residents, commuters, passengers, and the business and transport sectors for a total of 462 samples<sup>10</sup>.

(1) Access, Traffic Volume, Travel Time and Accidents

Almost all the respondents (99%) reported that their access to places and facilities was improved after the project and there was a high frequency of road utilization. Of the total respondents, 40 % are using the roads daily and 29% weekly. Twenty six percent (26%) of the residents reported that they procured or started operating the vehicles after the project. The result was an increase in traffic volume as observed by 87% of the respondents. On the other hand, 95% said that their travel time decreased significantly, with about 40%

<sup>9</sup> Since detailed calculation methods were used at the appraisal, a simple method was applied at the ex-post evaluation using actual costs, and benefit was calculated using DPWH base indicators.

<sup>10</sup> The survey samples for both phases were divided into four major categories covering the residents with 302 samples, commuters or passengers with 39, the business sector with 101 and the transport sector with 20 for a total of 462 samples. The samples were distributed to all the sections of Phases I and II. More than 80% of the respondents have been either residing or operating business in the area since the year 2000 or earlier, and are very familiar with the situation of the area before the project.

reporting travel time cut by more than half<sup>11</sup>. All the respondents said that the time reduction was mainly attributed to the project. However, 65% reported an increase of accidents after the project due to reckless driving and speeding partly caused by lack of road safety signs and lightings and overloaded trucks. There are gaps between the statistical data on accident and the results of beneficiary study, probably because many accidents were not reported to the proper authorities.

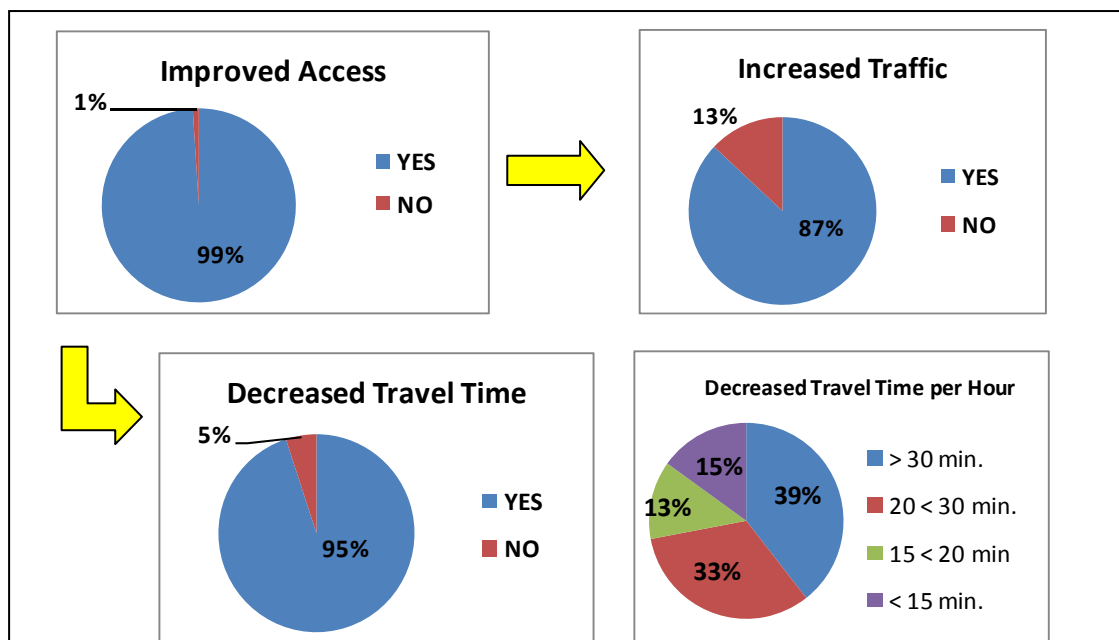


Figure 2:

Improved Access to Traffic, Increased Traffic and Time Savings for Phases I and II

In addition, most of the respondents reported other effects such as increased traffic loads, savings on vehicle maintenance cost, decreased floods and landslides, and improved comfort of transport. As for traffic loads, 98% of the respondents observed that heavier loads are now transported across the roads and bridges. Under Phases I and II, several flood control measures were undertaken, such as improvement of the drainage system of roads, raising of road and bridges, and construction of cut-off channel and embankment, as well as slope protections in all the sections. Many respondents reported the decrease in flood and landslides and blockages of roads due to those natural calamities, indicating that flood mitigating measures and slope protection works were effective. Improvement on comfort in traveling by land transportation is also an indication that the road surface has improved much and is in good condition, as well as the start of operation of large air conditioned buses.

Table 8: Other Effects Reported by Beneficiaries

Phase	Increased traffic loads	Savings of vehicle	Savings of fuel	Flood decreased	Decreased land slide	More confortability of
I	98%	78%	78%	92%	74%	87%
II	97%	80%	80%	88%	76%	91%

<sup>11</sup> Thirty nine percent (39%) of the respondents responded that time saved for the travel per hour was more than 30 minutes, 33% from 20 to 30 minutes, and 13% from 15 to 20 minutes.

As explained above, for this project, the total AADT of all sections surpassed the original plan and EIRR was increased. The results of the beneficiary survey also indicated improved access, reduction in travel time, and other effects such as reduction of floods and landslides for which several measures were implemented under the project. Thus, this project has largely achieved its objectives, therefore its effectiveness is high.

### 3.4 Impact

#### 3.4.1 Intended Impacts

The project aimed to help improve market access by road rehabilitation and create an efficient distribution system, thereby developing the regional economy such as the increase of agriculture production, new businesses and investment, and employment creation. The table below shows the annual growth rates of Gross Regional Domestic Product (GRDP) and value added to the transport and agriculture sectors of Regions XI and XIII. The average growth rates of GRDP from 2005 to 2008 were steady at 5.4% and 5.9%, respectively. Region XIII achieved a high growth of 8.6% in 2007.

Table 9: Growth Rates of GRDP, Value Added to Transport and Agriculture Sectors

Sector	Region	2005	2006	2007	2008	Average
GRDP	XI	5.0%	5.3%	7.1%	3.8%	5.3%
	XIII	4.0%	6.0%	8.6%	3.0%	5.4%
	Mindanao	4.3%	5.4%	7.0%	4.0%	5.2%
Transport	XI	7.3%	6.3%	8.3%	4.2%	6.6%
	XIII	3.1%	6.7%	8.9%	1.9%	5.1%
Agriculture	XI	2.0%	3.8%	4.8%	3.2%	3.5%
	XIII	5.5%	-1.4%	3.8%	-0.5%	1.9%

Source: NSO

Note: At constant 1985 prices, the averages in the right column show the averages of annual average growth rates from 2005 to 2008.

The transport sector of Region XI where Davao, the biggest city in Mindanao is located, experienced higher average growth rate of 6.6% than the average growth rate of 5.3% of GRDP. It is presumed that the start of the operation of large buses and increased demand for transport of commodities such as lumber, bananas, and copra contributed to the growth of the sector. Although the growth of the agriculture sector is much lower than the average GRDP due to stagnant production of rice and corn in the area, such other major products as bananas experienced a rapid growth. For example, in the provinces of Compostera Valley of Region XI, the production of bananas increased by 17.5% and the production of palm oil grew by 50% on annual average from 2006 to 2009. In Region XIII, lumber production increased by 105% during the time. The provincial governments in the regions reported that the improved access to transportation after the project contributed to the increased production of these products. Gold mining in the municipality of Monkayo also reportedly expanded after the project.

Other positive impacts on business and investment were seen, such as newly established businesses and supermarkets in the cities along the highway. The number of businesses registered in Region XI and XIII increased on annual average by 8% and 11% from 2006 to 2009, while investments recorded a growth of 72% (Region XI) and 25% (Region XIII) during the period from 2006 to 2008. In particular, the provinces of Davao Del Norte and Agusan del Sur, where many sections of the project are located, experienced very high investment growth rates at 483% and 753%, respectively. The number of tourists also increased on annual average by 6-8% during the period in both regions. In three out of the four beneficiary provinces, tourists increased by 40-50% a year from 2007 to 2008.

Table 10: Investment Status of Region XI and XIII (Unit: Million Pesos)

	2006	2007	2008	Growth Rates from 2006-2008
<b>Region XI</b>	4,929	8,617	8,472	72%
Compostela Valley	162	228	173	7%
Davao Del Norte	515	1,329	3,004	483%
Davao City	3,727	6,226	3,811	2%
<b>Region XIII</b>	2,474	2,108	3,097	25%
Agusan del Norte	1,186	744	738	-38%
Agusan del Sur	131	338	1,117	753%

Source: NSCB and Provincial Governments

In the beneficiary survey, more than 90% of the respondents declared an increase of products, mostly agricultural and fishery, being transported to the local markets from other districts in the province, and products from other provinces and cities also started increasing, such as fish and marine products and household wares. Expansion of local agricultural products sold to outside markets was likewise observed by 90% of the respondents. Common destinations include the cities of Butuan, Cagayan de Oro, Davao and even as far as Cebu, Visayas and Manila. As a result, about 70% of the respondents stated that there was an increase in prices of local products due to these activities.

Table 11: Impact Reported by Beneficiaries

Phase	Increased Employment	Increased Income/Profit	Market Expansion		
			Products from the province	Products from outside of the province	Expansion of Market for Local Products
I	59%	83%	97%	92%	92%
II	58%	80%	93%	94%	88%

Job generation effect was also observed since residents started miscellaneous businesses such as retail stores and gasoline stations. The transport business also increased with additional units of passenger vans, small buses and motorcycles plying the highway. This was declared by about 60% the respondents in Phases I and II where these generated employment among the local residents. As a result, about 80% of the respondents declared that there was an increase in family income and business profit. Reasons for increase in income and profit ranges from business and market sites being more accessible, time and cost savings in mobility, expansion of market, and general increase in scale of business. However, only 20% reported that income and profits increased significantly.

### 3.4.2 Other Impacts

#### (1) Impacts on the Natural Environment

For Phase I, the Department of Natural Resources and Environment (DENR) of Region XI issued the exemption of Environmental Compliance Certificate (ECC) in 1997 and for Sections 13 and 17 ECC was issued by the DENR in 2000. DENR conducted ECC monitoring for Sections 5, 6, 7, and 8 in 2001 but no major problems were reported. For Phase II, the DENR conducted ECC monitoring for Section 2 in 2005, but no major problems were reported except the issue of garbage.

According to the beneficiary survey, about a half of the respondents in Phase I, and 78% and 65% of those in Phase II, respectively, stated that the air quality and the noise level worsened

during the construction. However, after the project, more than half of the respondents reported the improvement of air quality and noise level.

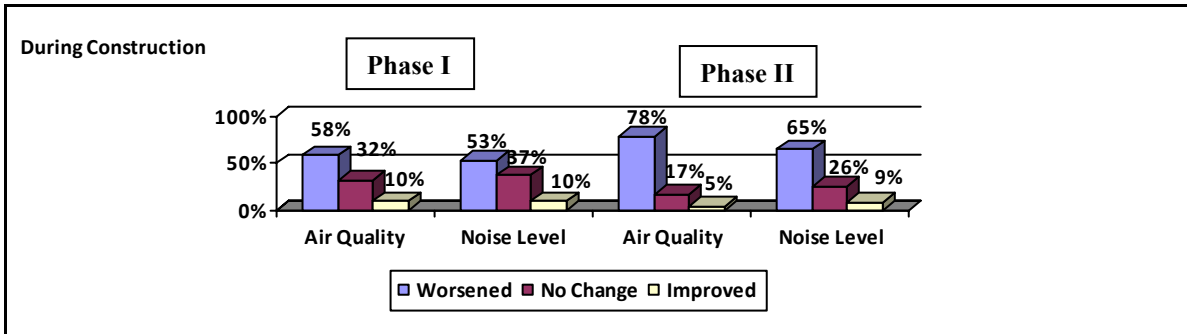


Figure 3: Responses on Environment Impact during Construction (Phases I and II)

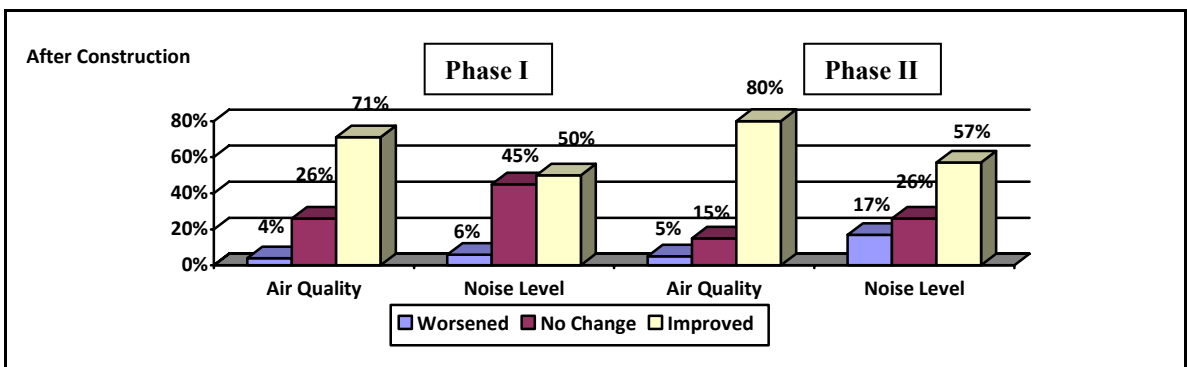


Figure 4: Responses on Environment Impact before and after Project Period (Phases I and II)

### (2) Land Acquisition and Resettlement

The project was to rehabilitate the existing roads and bridges. However, a total of 94 households were to be relocated and a resettlement area was to be developed for reconstruction of bridges and construction of a new bypass road. It was planned to acquire the land of 22.3 ha for Phase I and 4.6 ha for Phase II. The resettlement area became subsequently unnecessary and was cancelled in Phase I. For Phase II, monetary compensation based on the market price was made to the residents who were relocated due to the construction of the new Monkayo Bypass. The beneficiary survey revealed that the residents that were said to be adversely affected by the road shoulder improvement. Since the areas were previously acquired and the residents were actually occupying the Road Right of Way (RROW), hence were simply required to move out from their existing occupancy. These residents were not compensated since they should have not resided in those locations<sup>12</sup>. As a whole, there was no major problems were observed on the land acquisition and resettlement.

### (3) Unintended Positive/Negative Impact: None in particular

This project was completed in September 2006 for Phase I and February 2008 for Phase II. Therefore, it is a little early to measure the impact based on available data. However, it is considered that the project contributed to the growth of the transport sector, increased the production of major agricultural products such as bananas, palm oil, and lumber, and increased investment. In the beneficiary survey, as economic impacts brought about by improvement of

<sup>12</sup> The DEO, particularly Agusan del Norte, observed that the squatters started to return and occupy the road shoulders again after project completion.

access by the project, a majority of respondents indicated the expanded market and improvement of income and business profit. No major problems were observed on the environment, resettlement and land acquisition.

### 3.5 Sustainability (Rating: b)

#### 3.5.1 Structural Aspects of Operation and Maintenance

The responsible organization for the O&M of the PJHL is the District Engineering Offices (DEOs) and DPWH Regional Offices of Regions XI and XIII. DEOs are under the direct supervision of the DPWH Regional Offices. DEOs conduct daily O&M and small repair works with the cost of less than PhP 50 million, while the regional offices supervise the DEOs and also conduct repair works along these roads with the cost of PhP 50 – 200 million.

Table 12: Responsible DEOs of DPWH for Each Section of PJHL

Section	Region	Responsible DEOs of DPWH	Section	Region	Responsible DEOs of DPWH
2	XIII	Agusan del Norte DEO	13, 14-16	XI	Compostela Valley DEO
5&6, 7&8, 9-12	XIII	Agusan del Sur 1 <sup>st</sup> DEO	17	XI	Davao del Norte DEO

DEOs of the DPWH maintain a number of permanent staff members including four to six civil engineers and one to eight foreman, one to six operators, and 11-112 workers including part-time or casual workers. No major problems were observed in terms of staffing.

However, the system to properly regulate the overloaded trucks is yet to be established, although rampant overloading violations and significant damages on the roads were observed, particularly in Section 5<sup>13</sup>. There is an arrangement in which the DPWH operates the weighbridge to check overloaded trucks and reports to the Land Transportation Office (LTO) who penalizes the violators with fines. The Regional Office XIII recognizes the problems and consulted with the LTO and other stakeholders. However, neither the DPWH nor the LTO was able to take any specific measures to enforce the regulations against illegal overloading. Here are the major reasons for the difficulties for the DPWH and the LTO to take strict measures:

- 1) Political pressures from those engaged in transport and lumber industries
- 2) Difficulties in preventing too many unauthorized checkpoints from operating along the highway which increase the costs for transporters and leading to overloading to make up for the cost<sup>14</sup>.
- 3) The current penalty for overloading violations is so small as 300 to 500 peso per truck and affordable to truck owners that they simply pay the penalty and keep violating the regulations.

<sup>13</sup> According to the Monthly Weighbridge Summary Reports at Weighbridge Station Ampayon, Butuan City, out of 3,480 vehicles checked, 2,308 vehicles (66%) were overloaded in March 2010. (DPWH Regional Office XIII)

<sup>14</sup> Checkpoints are set up along roads by police or military to inspect vehicles in order to prevent trafficking of illegal products such as drugs and/or for security such as to control anti-government organizations. 12 transporters of lumbers interviewed in the area reported that there were 11 checkpoints between Bayugan and Butuan City. Total payment to these check points for one travel cost is in the range of 1,450 – 1,650 peso, which is about 8-14% of an ordinary transport fees by a large truck ranging from 12,000 to 18,000 pesos. When they carry illegal lumbers, which were reported between Sanfransisco or Prosperitad to Butuan City, the payment amounts to from 25,000 to 30,000 peso. All the transporters responded that the payments to checkpoints lead to overloading. Reasons for payment are forced payments, voluntary payment expecting for easy passage, and fear from penalty for overloading or carrying illegal lumbers. The checkpoints which issue the formal receipt was said to be only Provincial Tax Force Monitoring.

### 3.5.2 Technical Aspects of Operation and Maintenance

DEOs of the DPWH employ four to six civil engineers. DPWH Head Office and Regional Offices conduct training sessions regularly for the DEO officers. In addition, those offices are actively utilizing the Road and Bridge Information System (RBIA) developed and assisted by JICA for systematic management of road conditions. However, all the DEOs claimed an dilapidated equipment and insufficient quantity of equipment for maintenance works<sup>15</sup>. It is also reported that since As-Built Plan and other information on project design were not shared with DEOs, they had no detailed knowledge of rehabilitation works done in the project including related structures such as drainage that could have helped them in their maintenance activities.

### 3.5.3 Financial Aspects of Operation and Maintenance

The tables below show the O&M budgets for DPWH DEOs and Regional Offices of Regions XI and XIII, which are responsible for O&M of this project. The reduction of budget in 2010, in particular due to substantial decrease in the Motor Vehicle Users' Charge (MVUC), is observed. The budgets of Regional Offices of XI and XIII were decreased by about 65% from 2009, 350 million peso and 300 million peso, respectively. The budget for O&M for flood control and drainage system along the national highways from General Appropriation Act (GAA) has not been allocated since 2008. DEOs also reported the insufficient budget for O&M based on the Equivalent Maintenance Kilometerage (EMK) values of road sections under each region's jurisdiction<sup>16</sup>. The significant decrease of O&M budget is posing a risk to proper maintenance of their assets including PJHL by DPWH Regional and District Offices.

Table 13: Maintenance Budget of DPWH DEOs which are responsible for O&M of the project

DEO	2007	2008	2009	2010
Agusan del Norte	n.a	6,886	10,977	7,791
Agusan del Sur 1st	n.a	12,534	23,294	14,894
Compostela Valley	17,362	32,384	27,739	n.a
Davao del Norte	11,565	22,150	21,374	n.a

Source: DEOs (Unit: Thousand Pesos)

Table 14: Maintenance Budget of DPWH Regional Offices which are responsible for O&M of the project and Head Office (Bureau of Maintenance (BoM)) (Unit: Thousand Pesos)

Region	2007	2008	2009	2010
XI	455,755	509,868	537,570	187,406
XIII	582,874	684,061	453,932	154,357
BoM	20,255,750	22,453,520	25,831,900	n.a.

Source: DPWH Regional Offices and BoM

<sup>15</sup> DEOs reported the shortage of equipment, especially in addressing emergency situations like landslides and erosions during times of calamity.

<sup>16</sup> The DPWH Central Office Bureau of Maintenance (BOM) is the main office that releases O & M budget to DPWH regional and district offices. Its basis for allocating maintenance budget for each region depends on the Equivalent Maintenance Kilometerage (EMK) values of road sections under each region's jurisdiction. EMK is computed for specific road section. DPWH road and bridge maintenance is broken into the following three major categories: i) Routine Maintenance funded by GAA and MVUC; ii) Preventive Maintenance funded by GAA, MVUC and Foreign Funding Institutions (FAPs); and iii) Long Term Performance - Based Maintenance, funded by the World Bank.

### 3.5.4 Current Status of Operation and Maintenance

The following problems were observed at the time of the evaluation.

#### 1) Phase I

Section	Problems and Causes
5 Tabon- Tabon – Sibagat – Bayugan	<ul style="list-style-type: none"> <li>• Series of shattered pavement on right lane along Sibagat-Tabon Tabon section going to Butuan City due to high traffic volume of overloaded trucks.</li> <li>• Major reconstruction work is being done at Tabon Tabon road slip by DPWH Regional Office XI. The slip was triggered by run-off water passing through a dis-aligned old existing cross drainage structure<sup>17</sup>. The reworking is due for completion in August 2010.</li> </ul>
13 Lankilaan – Monkayo	Early signs of deterioration (raveling, loss of texture, polishing) of Asphalt Concrete Overlay allegedly due to poor performance of the contractor <sup>18</sup> .
17 Tagum – Carmen	Continuing re-blocking works and transverse cracks on existing PCCP due to soft foundation along Bincungan mangrove road section. This is also attributed to the fact that, during re-blocking works, the foundation of the adjacent good block is disturbed by passing vehicles loosening its base, resulting in traffic load damage on the old blocks after a period of time from project completion.

#### 2) Phase II

Section	Problems and Causes
2 Alegria – Santiago	Section along Brgy. Cuyago flooded up to knee deep from November to January due to overflowing of silted Puyo River and insufficient capacity of roadside flood drainage interceptor canal.
9 San Francisco –Rosario	Accident prone section at Brgy. San Isidro, San Francisco due to sudden reversal of transverse slope along super-elevated down sloping curve <sup>19</sup> .

It was also observed that some road sections have no appropriate warning and road safety signs and are prone to accidents. It was reported that many signs had been stolen after the completion of the project. The suggestions from beneficiaries include the provision of road traffic and safety signs and lightning in dangerous and very dark sections of the road.

Regarding the damage caused by overloaded trucks, DPWH XIII undertakes re-blocking works on damaged sections every time that a budget is available. At the time of the evaluation, many overloaded trucks carrying lumber and copra were observed. This will continue unless and until the proper authorities are able to address the violations effectively. It is estimated that annual costs for re-blocking of the damaged area in Section 5 will amount

<sup>17</sup> It was mentioned that the project only rehabilitated the inlet and outlet sections of the existing cross drainage structure and further investigation could have been made to discover that the pipeline was dis-aligned and required replacement as well.

<sup>18</sup> The PMO and the Interagency Monitoring Group (IMG) of the project considered that this was due to the fact that appropriate processes were not taken during the construction (such as works during rainy days and at night). (Based on the interview with PMO and Mindanao Development Agency which was the member of IMG of the project.)

<sup>19</sup> The super-elevation along that section could have been extended further outside the carriageway to prevent overshooting passing vehicles to be thrown by centrifugal force.



to PhP 17.6 million, while the economic life of the road section without rework will be shortened from 15-20 years to seven years<sup>20</sup>.

As explained above, some problems have been observed in terms of structural and financial aspects; therefore sustainability of the project is fair. In particular, there is the lack of an effective enforcement system against overloaded trucks although they were significantly affecting the O&M of the roads rehabilitated. Also, decreased budget for O&M is posing a risk for proper maintenance of the highway. Therefore the sustainability of the project is fair.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

The project aimed to contribute to developing the regional economy in Mindanao, one of the least developed regions in the Philippines, by rehabilitating the deteriorated trunk highway. Therefore, the project meets the development policy and needs of the Philippines as well as Japanese assistance policy. At the time of the ex-post evaluation, both the total AADT of the sections rehabilitated and EIRR surpassed the target. It was observed that improved access by the project contributed to the growth of the market in the area. In terms of efficiency, while the project cost was within the planned budget, the project period was significantly longer than planned. For sustainability, there are concerns on a lack of system to restrict overloaded trucks and decreased budget for O&M for DPWH offices in charge.

In light of the above, this project is evaluated to be fairly satisfactory (B).

### **4.2 Recommendations**

#### (1) Recommendations to Implementing Agencies

- It is necessary to establish an effective system to regulate overloaded vehicles, in order to sustain the development effects from the project, since overloaded vehicles accelerate the abrasion of roads. The DPWH should discuss the issue with other relevant agencies such as the LTO, Local Government Units (LGUs), and related industries and take actions. Raising the amount of penalty for overloading violations could serve as a deterrent to erring truck drivers/owners coupled with cancellation of vehicle registration<sup>21</sup>. Strict measures against unauthorized check points which are reported to relate to overloading also should be taken.
- DPWH PMO and Regional Office should provide As-Built Plans and other turn-over documents to DPWH District Engineering Offices (DEOs) to effectively monitor and maintain the facilities.
- The DPWH should secure a necessary road maintenance budget. This is a particularly pressing issue after reduction of the budget from the MVUC. Budget allocation system for road maintenance should be reviewed since the problems in fund allocation by MVUC was reported<sup>22</sup>.
- Conduct inventory check and provide traffic warning and road safety signs especially in accident prone areas.

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<sup>20</sup> Estimate by the local civil engineer. The annual rework cost was calculated as follows. (a) Total length of the road section 5:13.27km, Length of 1 block: 4.50m, (b) Number of blocks on Right Lane going to Butuan City =  $13,270/4.5 = 2,944$  blocks, (c) Number of blocks damaged each year =  $2,944 \times .10 = 294$  blocks assuming only 10% of these (very conservative estimate) is damaged each year, (d) Re-blocking cost per block = PhP60,000 per block, (e) Re-blocking cost per year =  $\text{PhP}60,000 \times 294 = \text{PhP}17,640,000$

<sup>21</sup> On this issue, AusAid conducted a study and proposed the revision of a related act under the Partnership for Economic Governance Reform (PEGR). JICA also plans to assist through such as the provision of weighbridges.

<sup>22</sup> For example, the parliament of GOP discussed on the issue of misuse and unequal budget allocation of MVUC fund in 2008.

## (2) Recommendations to JICA

Considering the expected increase of traffic on the highway rehabilitated by this project, there are high possibilities that overloaded trucks will cause damage on the roads, resulting in the following consequences: reduction of road durability and useful economic life; obstruction of smooth traffic due to repeated reworking and trucks driving very slowly; increased traffic accidents; and above all, expensive reworking costs. Therefore, it is recommended that JICA help the DPWH and other related agencies establish a system to restrict overloaded trucks, by means such as strengthening coordination functions of related organizations, setting up a joint task force by DPWH/LTO/Philippines National Police (PNP), and strengthening crackdowns and highway patrol by PNP.

### 4.3 Lessons Learned

- In this project, several problems could have been avoided if DEOs of the DPWH and LGUs were more actively involved from the design stage<sup>23</sup>. Therefore, in similar projects, full consultation with DPWH DEOs and LGUs from the planning to implementation stages is recommended. Such consultation will enable a project to obtain detailed information on the roads and the environment in the regions and reflect it in the project design. Further, additional requirements on the project scope from LGUs and the resulting cost increase and schedule extension could be reduced. DPWH DEOs may also be able to assist in project monitoring during project implementation to complement the PMO and the consultants. Any future project should also include the necessary costs to cover reproduction expenses of design documents, As-Built Plans and other turn-over documents for distribution to DEOs<sup>24</sup>.
- The project was delayed significantly from the original plan. The most significant cause of the delay was the poor capacity of the contractors that led to the suspension of civil works. A strict Pre-Qualification (PQ) process is required to appraise the capacity of bidding contractors, in particular their financial capacity.

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<sup>23</sup> The problems include possible decrease of users in a new bypass road after the rework of the existing bridge and additional scope required by LGUs. This issue was pointed by several DEOs of DPWH. For example, the consultation on flood control measures could have been done with DEO of DPWH when the construction of the new Monkayo Bypass was designed and constructed. However, the consultant in charge did not get the information on flood control works done by DEO of DPWH.

<sup>24</sup> PMO reported the shortage of cost for reproduction prevented them from distribution to DEOs.

### Comparison of the Original and Actual Scope of the Project

< Phase I > Item	Original	Actual
1. Project Outputs		
1) Civil Works Road rehabilitation (km)	97.1	100.34
Briges rehabilitation	24	20
Slope Protection	33	46
Flood Control Measures (km)	7.5	9.5
2) Consulting Services (MM)	1,294 MM	2,359 MM
2. Project Period	Dec. 1996 - Jan 2001 (50 months)	Mar. 1997 - Sept. 2006 (115 months)
3. Project Cost		
Amount paid in Foreign	5,482 million yen	3,197 million yen
Amount paid in Local currency	4,762 million yen (1,191 million peso)	5,107 million yen (2,269 million peso)
Total	10,244 million yen	8,303 million yen
Japanese ODA loan portion	7,683 million yen	6,744 million yen
Exchange rate	4 peso = 1 yen (as of May 1996)	2.251 peso = 1 yen (Average between 1998 and 2006)

< Phase II > Item	Original	Actual
1. Project Outputs		
1) Civil Works Road rehabilitation (km)	155.6	155.69
Briges rehabilitation	30	43
Slope Protection	29	37
Flood Control Measures (km)	n/a	1.42
2) Consulting Services (MM)	1,115MM	1,595 MM
2. Project Period	July 1997 - Jan 2004 (55 months)	Dec. 1999 - Feb. 2008 (99 months)
3. Project Cost		
Amount paid in Foreign currency	4,740 million yen	5,581 million yen
Amount paid in Local currency	4,206 million yen (1,402 million peso)	4,058 million yen (1,828 million peso)
Total	8,946 million yen	9,639 million yen
Japanese ODA loan portion	7,434 million yen	7,842 million yen
Exchange rate	3 peso = 1 yen (as of Jan. 1999)	2.22 peso = 1 yen (Average between 2001 and 2008)

**Third Party Opinion**  
**Philippine Japan Friendship Highway**  
**(Mindanao Section) Rehabilitation, Phase I and II**

Dante B. Canlas, School of Economics, University of the Philippines

**Introduction**

This road project is crucial for enhancing economic integration of Mindanao. It raises the efficiency levels of firm production and household consumption. It allows even low-income families and small enterprises to share in the fruits of growth observed at the macro level.

The evaluation at hand is based on project completion reports, interviews with key informants, small ex-post project surveys, and on-site observations. This is helpful for assessing project outcomes, but for investigating long-term impacts on the ground, specialized multi-purpose surveys are needed. The GOP is well advised to adopt impact analysis in project monitoring and evaluation.

**Main Findings**

The external evaluation gives the project at hand a rating of B. This is above a rating of C (satisfactory) on a scale of A (highest) to D (lowest). I agree with this rating.

Overall, the high rating of the project stems from the high ex-post internal rates of returns (IRRs) for the two phases. The significant increase in traffic volume overcame the time delays and peso cost overruns of the project to post the B rating. The demands, however, of some local government units (LGUs) for additional scope posed a risk to the economic viability of the project. Acceding to such unplanned requests of LGUs could have delayed project completion and might have cause cost overruns without necessarily creating commensurate benefits.

In addition, the huge increase in traffic volume that raised the ex-post IRRs has downsides. One is the increase in traffic accidents, although this is not supported by official statistics. In any event, the GOP must ensure road safety and maintenance after project completion. The other is the accelerated depreciation of the highway amid the failure of road regulators and law enforcers to stop overloading.

Qualitatively, survey respondents expressed satisfaction with the time savings in travel, enhanced access of households to health clinics, schools, and centers of cultural activities, while firms were pleased with their improved access to markets and suppliers of raw materials.

**Recommendations**

- The time overruns highlight the importance of harmonizing country systems on government procurement. The GOJ and GOP, for instance, must agree early on about prequalification of potential bidders and design of bidding procedures. However, it may be noted that with the GOP's recent enactment of the *Government Procurement and Policy Act*, and subsequently, the reaching of an agreement between DPWH and JICA on implementing the project at hand, many of the causes of those time overruns may not be problematic anymore in the future.
- Cost overruns in pesos mandate the use of market-based hedging instruments against foreign-exchange risks. These instruments are not costless, but given the sizeable cost overruns, the price may be worth it.
- Local government units that demand additional scope of work must shoulder the added cost. This pricing instrument may be relied on to minimize excess demand for variation orders.
- Penalties must be increased for truckers with overloaded cargo and over speeding drivers. Enforcement of traffic rules on overloading and reckless driving must be strengthened. On the third violation, a driver's license should be suspended over a reasonably long period of time, penalized thereby by a significant amount of foregone earnings.

# The Republic of the Philippines

## Lower Agusan Development Project

External Evaluator: Haruko Awano, IC Net Limited<sup>1</sup>

### 1. Project Description



Project Site



Flood Sluice Gate constructed by the Flood Control Component



Main Irrigation Canal constructed by the Irrigation Component

#### 1.1 Background

The Agusan River flows from south to north in the eastern part of Mindanao, leading to Butuan Bay. Its basin covers an area of 11,400 km<sup>2</sup> and is the third largest river basin in the Philippines. The lower Agusan River area is blessed with abundant rainfall and fertile plain and has a big potential for agricultural development. In its west bank is Butuan City, the center of economic activities of northern Mindanao. However, repeated flooding by overflowing of the Agusan River hindered economic activities, affected agricultural production, damaged properties, and endangered the population.

#### 1.2 Project Outline

The objectives of the Project are: i) to mitigate flood damage by constructing an earth embankment levee along the banks of the Lower Agusan River, conducting dredging works, and improving urban drainage systems of Butuan City, and ii) to increase rice production by constructing irrigation facilities, thereby contributing to improvement of living standard and regional development.

The Project has two components, i.e., flood control and irrigation, and consists of the three-loan phases of Flood Control Phase I (FC I), Flood Control Phase II (FCII), and Irrigation.

Approved Amount / Disbursed Amount	<ul style="list-style-type: none"><li>▪ FC I: 3,372 million yen / 2,798 million yen</li><li>▪ FC II: 7,979 million yen / 7,317 million yen</li><li>▪ Irrigation: 4,040 million yen / 3,899 million yen</li></ul>
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<sup>1</sup> This project was jointly evaluated with National Economic and Development Agency of the Philippines government.

Exchange of Notes Date / Loan Agreement Signing Date	<ul style="list-style-type: none"> <li>▪ FC I: December 1987 / January 1988</li> <li>▪ FC II: March 1997/ March 1997</li> <li>▪ Irrigation: July 1995 / August 1995</li> </ul>
Terms and Conditions	<ul style="list-style-type: none"> <li>▪ FC I: Interest Rate: 3% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied, Partial Untied (consulting service)</li> <li>▪ FC II: Interest Rate: 2.5%, 2.1% (consulting service) Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied</li> <li>▪ Irrigation: Interest Rate: 2.7%, 2.3% (consulting service) Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied</li> </ul>
Borrower / Executing Agency(s)	<p>Borrower: Government of the Republic of the Philippines</p> <p>Executing Agencies:</p> <ul style="list-style-type: none"> <li>▪ F C I &amp; II: Department of Public Works and Highway (DPWH)</li> <li>▪ Irrigation: National Irrigation Administration (NIA)</li> </ul>
Final Disbursement Date	<ul style="list-style-type: none"> <li>▪ FC I: December 1999</li> <li>▪ FC II: February 2007</li> <li>▪ Irrigation: June 2006</li> </ul>
Main Contractor (Over 1 billion yen)	<ul style="list-style-type: none"> <li>▪ FC I: G.G. Reyes Const. / Universal Dockyard Ltd./ HOME Const./JPL Const.; (Philippines) (JV)</li> <li>▪ FC II: Ciriaco Corporation (Philippines) F.F. Cruz &amp; Co. (Philippines) Kajima Corporation (Japan) China International Water &amp; Electric Corporation (China)</li> <li>▪ Irrigation: C. M. Pancho Construction Inc. (Philippines) Kubota Corporation (Japan)</li> </ul>
Main Consultant (Over 100 million yen)	<ul style="list-style-type: none"> <li>▪ FC I: Nippon Koei Co., Ltd. (Japan)</li> <li>▪ FC II: PKII Engineers (Philippines); TCGI Engineers (Philippines); Nippon Koei Co., Ltd. (Japan)</li> <li>▪ Irrigation: Nippon Koei Co., Ltd. (Japan)</li> </ul>
Feasibility Studies, etc.	F/S: 1981 DPWH
Related Projects (if any)	E/S (D/D): 1983 E/S loan

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Haruko Awano, Senior Consultant, IC Net Limited

\* Jointly evaluated with the National Economic Development Agency (NEDA) of the Philippines

### 2.2 Duration of Evaluation Study:

Duration of the Study: January 2010 – December 2010

Duration of the Field Study: March 7 – 31, 2010; May 25 – June 23, 2010;  
September 7 – 11, 2010

### **2.3 Constraints during the Evaluation Study:**

None in particular.

## **3. Results of the Evaluation (Overall Rating: Flood Control-C, Irrigation-D)**

### **3.1. Relevance (Rating: Flood Control - a; Irrigation - b)**

#### 3.1.1 Relevance with the Development Plans of the Philippines

##### (1) Flood Control

The Cotabato-Agusan River Basin Development Program (CARBDP) Office was established under DPWH in June 1978 through a Presidential Decree to develop the basin of the Cotabato River and the Agusan River, the two major rivers in Mindanao, and address the problems posed by frequent flooding. In the previous Medium-Term Philippine Development Plans (MTPDP 1987-1992 and 1993-1998), flood mitigation through flood control structures was identified as one of the priority programs. This involved the construction and improvement of flood control systems in the major river basins covering large fertile areas to increase agricultural productivity and minimize loss of lives and property. The Government of the Philippines (GOP) prioritized the implementation of flood control and drainage projects along the 12 major rivers in the country, including the Lower Agusan River Basin.

In the current Medium-Term Philippine Development Plan (2004-2010), the GOP expressed an intention to provide flood control and drainage facilities in all flood-prone areas, as well as to rehabilitate and improve existing facilities. Moreover, the Medium-Term Public Investment Program 2005-2010 of the DPWH included the Flood Control Project Phases I & II aiming for the protection of a total of 13,700 ha in the coverage area.

##### (2) Irrigation

In the MTPDP 1993–1998, the GOP prioritized promotion of food security through the provision of irrigation facilities and aimed to increase provision of irrigation facilities from 1.55 million ha to 1.93 million ha. Furthermore, the Agriculture and Fisheries Modernization Act (AFMA) of 1997 prioritized the self-sufficiency in rice and corn production and the promotion of food security. For this objective, the GOP aimed to promote the development of irrigation systems that are effective, affordable, appropriate and efficient.

The current MTPDP 2004-2010 also focused on self-sufficiency in rice production by increasing production efficiency and competitiveness. One strategy is to improve the access to irrigation services. In support of the MTPDP, the Rice Self-Sufficiency Plan envisioned a 100% self-sufficient rice production by 2010 through improved rice productivity and increased income of rice farmers. The focused interventions include the improvement of irrigation systems' effectiveness and efficiency through rehabilitation, repair and construction of new facilities

On the other hand, the Land Use Plan of Butuan City from 1973 to 1996 envisaged converting 2,000 ha of rice paddy, which is equivalent to one fourth of the target irrigated area (7,930 ha) of the Project, to residential and industrial areas. However, at the time of Detailed Design Study (D/D) in 1983, it was argued that the full development of this area will take longer time and therefore, this can still be included in the proposed irrigation area. The city officials are also

affirmative with this inclusion<sup>2</sup>. Although the Project was appraised in 1995, more than 10 years after D/E, the appraisal documents refer to neither this Land Use Plan of Butuan City nor the risks of land conversion. The following Land Use Plan of Butuan City from 1997-2010 expanded the area to be developed for industrial and residential areas. However, no information was obtained on how the NIA reviewed the land use plan of Butuan City at the time of project implementation. Butuan City is currently formulating a new land use plan from 2011 but no information on how the new plan will deal with the Firmed-Up Service Area (FUSA) under the Project was available.

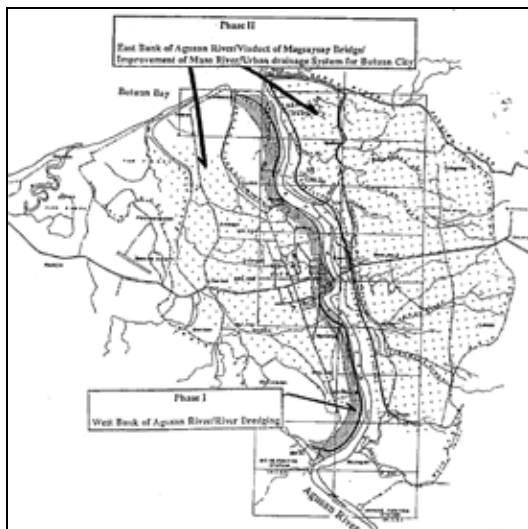


Figure 1: Project Area of Flood Control (Butuan City in Northern Mindanao, Shading and dotted areas show the project area)

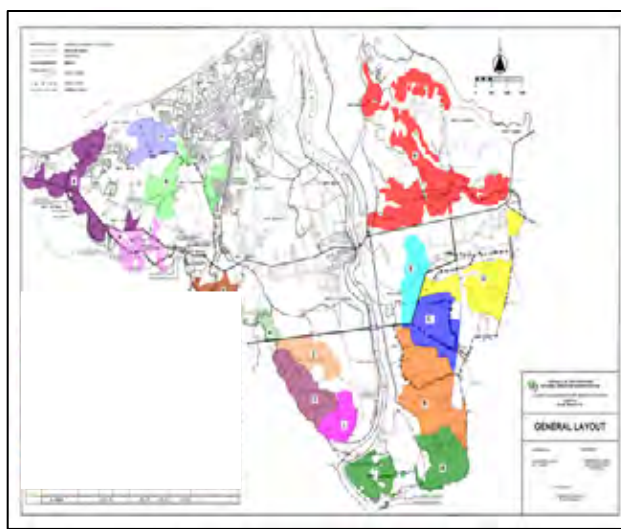


Figure 2: Project Area of Irrigation (Butuan City in Northern Mindanao, Colored areas show the project area. Different colors indicate the areas categorized by Irrigation Associations.)

### 3.1.2 Relevance with the Development Needs of the Philippines

#### (1) Flood Control

Since the discharge capacity of the Agusan River was 1,800m<sup>3</sup>/sec, which equals the actual maximum flow every year (the maximum flow from 1990 to 1995 was in the range from 1,500 to 3,000 m<sup>3</sup> per second), flood occurred almost every year and continued for about two months. The damage by flood in 1981 included an inundated area of 8,000 ha, an inundation period of 60 days, 40 people killed, and 18,400 inundated houses, amounting to PhP 84.8 million in total. The damage caused delays in development and stagnant economic activities in the area.

As the center of economic and social activities in the Province, Butuan City's population has been steadily increasing over the last four decades and more than doubled from 131,000 in 1970 to 308,000 in 2009. As the population grows in the area, the need for flood prevention and mitigation becomes more imperative. In 1999, as the flood control project was yet to be

<sup>2</sup> In terms of the consultation with the city at the time of D/E, NIA explained that Agriculture Officers of Butuan City participated in the workshop. Other information was not provided.



completed, a major flood with the maximum flow of 4,500 m<sup>3</sup>/sec occurred, and caused significant damages as 8,700 ha was inundated.

## (2) Irrigation

Although rice is a staple in the Philippines, the growth of its production had been sluggish due to the slow increase of yield and cropping areas. From 1985 to 1995, the yield per hectare increased by 8% from 2.6 ton to 2.8 ton, cropping areas increased by 11% from 3.4 million ha to 3.76 million ha, and the total production increased by 20% from 8.81 million ton to 10.54 million ton. (Refer to the charts below.) The major challenge was low productivity due to flooding, insufficient improvements in irrigation development, and high cost of agricultural inputs. It was necessary to improve irrigation facilities, develop and disseminate various agricultural technologies, and promote mechanization. From 1999 to 2007, the yield was increased and the total production of rice reached 16 million ton. However, the import of rice is increasing due to growing per capita consumption. The amount of rice import more than doubled from 0.83 million ton in 1999 to 1.8 million ton in 2006.

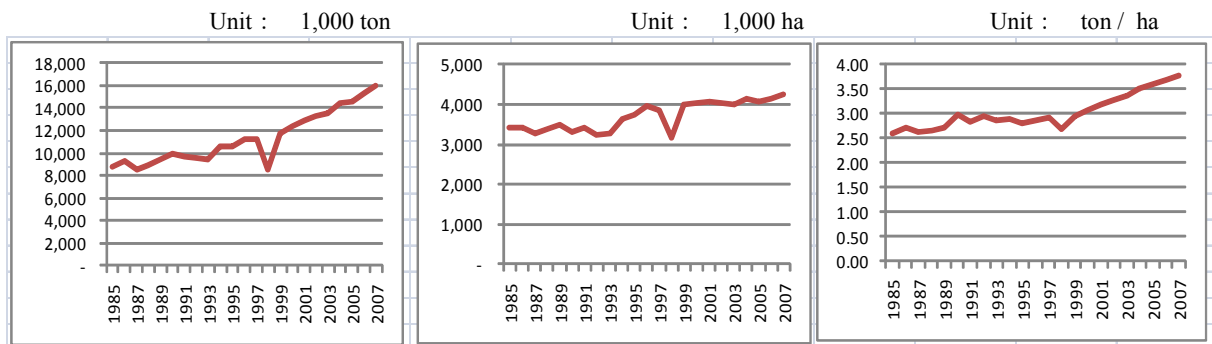


Figure 3: Philippine Rice Production

Figure 4: Rice Cropping Areas

Figure 5: Rice Yields

Source : FAOSTAT Database, 2008. FAO, Rome. 22 Sep 2008

In Butuan City, promotion of agriculture had become important because its major industry of forestry had been stagnant. At the time of the appraisal, out of the total area of 15,881 ha which could be irrigated in the city, only 20% was irrigated. In addition, in 1990, the province of Agusan der Norte faced a rice shortage of 22,109 tons against the demand for 45,529 tons. Since then, the urbanization of Butuan City led to the decrease of farmland and the possible area for irrigation also decreased to 9,546 ha in 2008<sup>3</sup>. At the time of the ex-post evaluation, the conversion of a portion of the project area to a housing area was also observed.

The concept of the Project (both of Flood Control and Irrigation Components) originated from the Water Resource Development Plan by the CARBDP, which prioritized the development of the Lower Agusan River Basin. In 1980, the Feasibility Study (F/S) of the Project was conducted and the proposed project included a flood control component mainly consisting of levee embankment and a drainage system and an irrigation component covering 8,000 ha. The F/S put priority on the flood control component as a basis for the development project. Following the

<sup>3</sup> Out of the area, 4,967 ha was irrigated and 4,579 ha was yet to be irrigated.

F/S, a Detailed Design Study (D/D) was conducted in 1983, and it was proposed to implement the flood control component in two phases in view of the massive construction cost and difficulties in land acquisition and compensation. Considering the importance of protection of the most populated Butuan city center, the priority was given to the west bank area.

As for the irrigation, after the F/S in 1980 and D/D in 1983 were conducted, the Implementation Plan was made in 1995. Meanwhile, it was evaluated if a diversion dam or pumping irrigation was necessary and pumping irrigation was selected as the more appropriate method from both the technical and economic perspectives. However, there is no evidence that Butuan City was actively involved in determining the area to be irrigated when NIA was formulating the Implementation Plan.

### 3.1.3 Relevance with Japan's ODA Policy

"Overseas Economic Cooperation Policy" issued by JICA (former JBIC) in 1999 supported poverty reduction efforts of the GOP by providing assistance including environmental conservation and disaster prevention. In its Country Assistance Program 2000, the Government of Japan aimed to support the GOP's efforts towards alleviating poverty and redressing regional disparities and recognized the importance of providing assistance on rural infrastructure to achieve agricultural and rural development. The focus areas of assistance included disaster prevention.

Given the above, the flood control component of the project has been highly relevant with the Philippines' development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high. The irrigation component is also relevant to the country's development plan to and needs to increase rice production through the provision of irrigation facilities as well as Japan's ODA policy to focus on assistances for agriculture and rural development. While the Land Use Plan of Butuan City (1973-1996) envisaged that one quarter of the target area would be diverted to other purposes, at the time of D/D, the officials of Butuan City agreed the inclusion of the area in the project target and the relevance was confirmed. However, the following Land Use Plan of Butuan City (1997-2010) which was formulated after the appraisal in 1995, the planned industrial and housing areas were further expanded. Since the relevance with the city land use plan is critical to determining the target area and the implementation of the project and the reduction of agriculture area by urbanization was observed at the time of ex-post evaluation, the component's relevance is fair.

## 3.2 Efficiency (Rating: Flood Control – b; Irrigation – c)

### 3.2.1 Project Outputs

For both components, several modifications to the original scope at the time of appraisal were noted. In particular, for the two phases of the flood control, many changes of scope were done during the detailed design review and the construction period.

#### (1) Flood Control

##### Civil Works

Flood Control Component consists of Phase I which constructed levees and other facilities in West Bank and Phase II which included the construction of levees in East Bank, construction of Magsaysay Viaduct, rehabilitation of PIER E4 of existing Magsaysay Bridge and improvement of urban drainage system in West Bank. In Flood Control (FC) Phase I, most of the target project outputs were delivered except for utilities such as electricity and water facilities of the

resettlement area. Several changes in scope of work were noted such as reduction of embankment and dredging<sup>4</sup>, and increase in length of concrete flood wall. These changes were due to right-of-way (ROW) problem on land acquisition and in consideration of actual situation of developed urban areas. A floodgate<sup>5</sup>, which was not part of the original plan, was constructed to allow free flow of water from the Agusan River to Agusan Pequeño and vice versa. The changes were deemed appropriate and have no adverse effect on the project objective, except for the followings.

- The cancelled utilities at the resettlement area have delayed resettlement of affected residents.
- Expected flood control effects at the downstream end of the river were not fully achieved because of the cancellation of embankment in the area which was due to the objections from fishpond owners against land acquisition.

Table 1: Planned and Actual Project Outputs (Flood Control I)

Projects / Outputs	Plan	Actual
Embankment Levee	12.3 km; Height 4 m	10.3 km; Height 4 m
Concrete Floodwall	2.1 km; Height 4 m	5.4 km; Height 4 m
Dredging	900,000 m <sup>3</sup>	700,000 m <sup>3</sup>
Urban Drainage System	1,100 m	880 m
Floodgate	None	1 (addition)
Spoil Bank Yard Treatment	171 ha	20 ha

For FC Phase II, which consisted of four contract packages, several changes from the original scope were noted in the three packages as below. Major reasons were i) increase in cost of civil works brought about by economic crises; ii) objections from local residents against the land acquisition; and iii) to meet actual field conditions such as the needs for access by fisher folks, environment protection, and availability of existing roads. However, a few changes affected the intended project effects.

- Package 1 (Improvement of the East Bank): (a) intended spillways were not constructed due to negative reactions from the residents and sluice gates were introduced<sup>6</sup>; (b) levee was shortened due to lesser development status of downstream area and the consideration that adjacent spoil bank yard could already serve as a barrier to flooding backwater; (c) cut-off channel<sup>7</sup> was reduced because of the ROW problem and removal of the intended cut-off channel maintenance road.
- Package 2 (Construction of Magsaysay Viaduct): There were no major changes.
- Package 3 (Banza River Improvement): (a) reduction of land improvements for resettlements; (b) change from lease to purchase of the spoil bank yard; and (c) removal of

<sup>4</sup> Dredging is an excavation activity or operation usually carried out in shallow seas or fresh water areas with the purpose of gathering up bottom sediments and disposing of them at a different location. This technique is often used to keep waterways navigable.

<sup>5</sup> Floodgates are adjustable gates used to control water flow in reservoir, river, stream, or levee systems. In the project, the floodgates were constructed to control backwater flow from Agusan River during high water level.

<sup>6</sup> A spillway is a structure used to provide for the controlled release of flows from a dam or levee into a downstream area. A sluice gate is a wooden or metal plate which slides in grooves in the sides of the channel. Sluice gates are commonly used to control water levels and flow rates in rivers and canals.

<sup>7</sup> A cut-off channel is a channel made to straighten a stream.

the East Bank drainage interceptor canal. Primary reasons for the modifications include the urgency to provide immediate relocation site and insufficiency of funds. The cancellation of the East Bank drainage interceptor canal where the levee was constructed resulted in negative effects on flooding caused by heavy rains. For the resettlement area, the DPWH later purchased another land of about 70 ha and Butuan City developed part of the area for relocation of residents.

- Package 4 (Masao River and Urban Drainage System Improvement): (a) increased dredging (deepening) along the Masao River and deleting levee and embankment ; and (b) cancellation of some drainage system improvement due to ROW issues (i.e., Langihan-Agusan Pequeño creek) and because some drainage improvements were already undertaken by the DPWH regional office. The increased dredging activities and cancellation of the levee were deemed appropriate, while the cancellation of the Langihan-Agusan Pequeño drainage system resulted in continued flooding in adjacent areas. DPWH understood the importance and necessity of this drainage component but it was difficult to undertake due to serious ROW problem. Dialogue with the City resulted to an agreement to undertake other section (additional scope of work) which is the Sosompit channel while the City will implement Langihan – Agusan Pequino Drainage in the future.

Table 2: Planned and Actual Project Outputs (Flood Control II)

Projects / Outputs	Plan	Actual
<b>Package 1: Agusan River Improvement</b>		
Levee	Length 14.5 km; Height 4 m	Length 12 km; Height 4 m
Related structures	Spillway 300 m; irrigation canal crossing; drainage sluice and siphon	Mahay sluice; Banza navigational sluice; Maug sluice; 8 RCPC cross drains
Cut-off channel	5.7 km	5.5 km
Cut-off channel maintenance road	1.2 km	Cancelled
Dike	7.3 km	Cancelled
Dredging	300,000 m <sup>3</sup>	Cancelled
Excavation	740,000 m <sup>3</sup>	693,375 m <sup>3</sup>
Tumampi Bridge	Pedestrian bridge	Vehicular bridge, 3 spans and 48 m in length
<b>Package 2: Construction of Magsaysay Viaduct</b>		
Construction of Viaduct	628 m	628 m
Cut-off channel bridge	90 m	90 m
Approach road	135 m	135 m
<b>Package 3: Banza River Improvement</b>		
Dike (Left Bank only)	6.2 km	Deleted
Dredging	1,212,000m <sup>3</sup> :	2,180,905 m <sup>3</sup> :
Spoil bank yard	170 ha	90 ha
Land improvement	30 ha out of the spoil bank yard; provision of water, electricity, roads, and drainage facilities, construction of 415 housing	7.83 ha was purchased and developed, provision of water, electricity, roads, and drainage facilities, construction of 415 housing.
East bank drainage	15.3 km	Deleted

<b>Projects / Outputs</b>	<b>Plan</b>	<b>Actual</b>
Additional		Banza Pedestrian Bridge of 72 m (added)
<b>Package 4: Masao River and Urban Drainage System Improvement</b>		
Masao River Improvement:	Levee 11.7 km; excavation (193,000 m <sup>3</sup> ); and dredging (185,000 m <sup>3</sup> )	Levee was cancelled, Excavation (408,700 m <sup>3</sup> ) and dredging (408,700 m <sup>3</sup> )
Improvement of Urban Drainage System	Total = 30km in 6 areas	a) Urban Creek Improvements: Total 19.1 km in 7 areas (including Sosompit Drainage Channel: Total 1.4 km (added)) b) Drainage Channel Sluices & Culverts (added)

(1) Irrigation  
Civil Works

In the Project's Irrigation Component, most outputs were delivered but with the following changes in scope and specifications: (a) reduction of the target service area by 43 percent (from 7,930 ha to 4,492.76 ha); (b) construction of regulating ponds for both Bit-os and Aupagan; (c) reduction of lateral canals; (d) reduction/cancellation of sub-laterals; (e) reduction of drainage canals in Aupagan by 50 percent; (f) addition of concrete canal lining; and (g) addition of related facilities such as turnouts. Most of the adjustments were deemed appropriate, in consideration of O&M, topography and site requirements. However, some of the changes resulted in cost increases, particularly the addition of concrete canal lining and regulating ponds. Related structures such as turnouts were added, but in four out of 11 irrigated areas surveyed it was found that some facilities were not strategically located, for example, they were constructed in the low level paddy areas and did not deliver water efficiently<sup>8</sup>. For construction of these terminal facilities, NIA usually employed local farmers. However, some terminal facilities of the project were done by the farmers outside of the area, which resulted in the above problem<sup>9</sup>. This factor in the construction process has become one of the reasons for inefficient delivery of irrigation water.

Conversion of agricultural land into residential, commercial, and industrial areas was the primary reason for the significant reduction in service areas. The possible conversion of the planned service areas, although identified in Detail Design Study in 1983, was not indicated in the Appraisal Documents as a potential risk to the Project. The flood control and road improvement projects in the target area also facilitated the land conversion. Due to reduction in service areas, the constructed irrigation facilities such as main canals became too large and affected efficiency and sustainability of water provision. As indicated in the table below, the

<sup>8</sup> Based on the site observation, interviews with Irrigation Associations (IAs), and beneficiary study. FUSA is divided to 15 areas and 11 areas were functional due to the problems of irrigation facilities as explained later. The situation of all the turnouts of FUSA could not be checked at the ex-post evaluation, but it was found that there are the turn-outs with the problem in the four areas.

<sup>9</sup> According to NIA, since the local farmers were not available during the time, they had to hire the farmers outside of the area. Even when outsiders constructed the facilities, they could have done with consultation with local farmers to meet their needs. However, according to IAs, such consultation was not made. .

water discharge capacity and water depth of the constructed main canals are much greater than the values required by current FUSA. In addition, since actually irrigated and planted area was only one third of the current FUSA, the amount of irrigation water was much smaller than the required amount, leading to lower water level. However, it was hard to adjust the scope of civil works based on the reduced service areas since the land conversion began when 75% of the facilities were already built<sup>10</sup>.

Table 3: Planned and Actual Project Outputs (Irrigation)

<b>Irrigation Project</b>	<b>Plan</b>	<b>Actual</b>
Service Area	7,930 ha	4,493 ha
Pump House	<ul style="list-style-type: none"> <li>In Bit-Os and Aupagan, two-floor concrete buildings (254 m<sup>2</sup> and 266 m<sup>2</sup>);</li> </ul>	<ul style="list-style-type: none"> <li>Split level concrete building (327 m<sup>2</sup>);</li> <li>Split level concrete building (396 m<sup>2</sup>).</li> </ul>
Regulating Ponds and Intake Structures	Not part of original design	<ul style="list-style-type: none"> <li>2 regulating ponds (53,500 m<sup>2</sup> for each)</li> <li>Intake structures each for Bit-Os and Aupagan.</li> </ul>
Main Canal	Bit-Os: 19.48 km; Aupagan: 21.11 km	Bit-Os: 17.55 km; Aupagan: 21.85 km
(Discharge Capacity)	N/A*	Bit-Os 4,955 m <sup>3</sup> , Aupagan 7,922m <sup>3</sup> (Required by current FUSA: ** Bit-Os 2,935 m <sup>3</sup> , Aupagan 4,523 m <sup>3</sup> )
(Water Depth)	N/A	Bit-Os 1.32 m, Aupagan 1.64m (Required by current FUSA: ** Bit-Os 1.05m, Aupagan 1.26m)
Laterals	Bit-Os: 21.84 km; Aupagan: 21.11 km	Bit-Os: 20.34 km; Aupagan: 16.97 km
Sub-laterals	Bit-Os: 2.91 km; Aupagan: 7.65 km	Bit-Os: 0.45 km; Aupagan: 0 km
Concrete canal lining	Not part of original design	Added 33.18 km of concrete canal lining
Road Network-Service Roads	Not part of original design	Constructed 60.22 km of service roads
Drainage Canals	Bit-Os: 33.00; Aupagan: 36.30	Bit-Os: 33.00; Aupagan: 17.04
Structures	Not part of original design	Added 30 units of structures
Related Structures	403 units	509 units

<sup>10</sup> The constructed canals were based on the original design to irrigate the original target of nearly 8,000 hectares hence the canal cross-sections (bottom and top width and depth) were too large for use in irrigating the current irrigated area which is only about 20% of the original target. NIA does not deliver the water required for the original FUSA but based on the current irrigated and planted area. However, the necessary irrigation water needs just for this reduced area is much smaller than the planned water amount, resulting to water depth in the canal that is too shallow to reach the turn-out levels to flow to the farm ditches (terminal facilities). Therefore, irrigation water cannot be delivered to the several areas, in particular along the lower stream of the river. In some irrigated and planted area, there are also the problem that the level of water is not sufficient. Therefore, illegal water tapping was rampant in the low stream areas. .

Project Facilities	13	14
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Note:

\* Since main canals were constructed based on the designed values of discharge capacity and water depth, the design values should be similar to the actual values.

\*\* Based on calculation by the local expert.

### Procurement of Equipment

Originally eight pumps were to be procured but the number was increased to ten to maintain additional two pumps as stand-by units when a pump would break down during normal operation or when a pump is shut down for maintenance. However, two pumps became unnecessary due to reduction of FUSA and are to be transferred to another project. 95 units of construction and maintenance equipments and tools and vehicles were also procured.

#### (1) Consulting Services for the Three Project

Under FC II, a study on watershed management was conducted but one on the flood forecast and warning system was cancelled. A Resettlement Plan was formulated as additional scope after the large flood occurred in 1999. As shown in the table below, a substantial increase of Man Months (M/M) for consulting services was seen in the flood control components from 1,573 M/M to 2,133 M/M, mainly due to prolonged implementation schedule, additional scope of civil works, and delayed resettlement program.

Table 4: Consulting Services (Man-Months)

Projects		Plan	Actual	% of Plan
FC I and II	Foreign	555	682	123%
	Local	1,018	1,451	143%
Irrigation	Foreign	130	126	97%
	Local	99	127	128%

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period<sup>11</sup>

The flood control structures were to be constructed within 143 months in total. However, the actual duration was almost doubled to 268 months. The percentages of actual period against the plan were 203% for FC Phase I and 172% for FC Phase II. Here are the major reasons for the delay of FC I: (a) delay in the selection of the consultant and contractors (delayed by 22 months); (b) poor performance of contractors resulting in a three-year litigation and work suspension; and (c) ROW problems. In particular, the problem of contractors and subsequent litigation processes took three years. On the other hand, the delay of FCII was due to the following: (a) delay of pre-construction works because of upgrading of design and restructuring of Packages 1 and 3, and resettlement issues, in particular pre-construction works for Package 2 were delayed by 59 months; (b) changes in scope and additional dredging for Package 3 (21 months); (c) additional study and changes in scope for Package 4 (35 months); and (d) bad weather.

<sup>11</sup> Project period is calculated from the month of Loan Agreement to the completion month of civil works.

Table 5: Planned and Actual Project Implementation Schedule

Projects	Plan	Actual	% of Plan
FC I	Jan. 1988 to Dec. 1993 (72 months)	Jan. 1988 to Feb. 2000 (146 months)	203%
FC II	Jan. 1997 to Jan. 2003 (71 months)	Mar. 1997 to April 2007 (122 months)	172%
FC I and II	143 months	268 months	187%
Irrigation	Aug. 1995 to June 2002 (83 months)	Aug. 1995 to Aug. 2006 (133 months);	160%

On the other hand, the irrigation component was to be implemented for 83 months, but it lasted 133 months, i.e., 160% of the plan. Here are the major reasons for the delay: (a) delays in bidding out and awarding of a few major civil work contracts (by 6 months); and (b) delays in civil works (by 43 months) mainly due to the following: (i) problems of ROW including litigation (by 7-11 months), (ii) bad weather (by 8-19 months), and (iii) changes in design of irrigation canals (by 9 months).

### 3.2.2.3 Project Cost

While the total project cost for the flood control component was estimated at JPY 14,664 million at the time of the appraisal, the actual total project cost was JPY 14,524 million, or 99 percent of the estimated cost. The total disbursed amount of ODA Loan was JPY 10,115 million or 89 percent of the total approved amount. In peso terms, the actual project cost was PhP 5.553 billion or 172 percent of the PhP 3.237 billion estimated cost. The appreciation of the yen was a major cause of the cost increase<sup>12</sup>. Here are the other reasons for the cost increase in peso: (a) changes in scope such as additional flood wall for FCI, and addition of maintenance road, drainage canal, dredging, etc., for FCII Package 4 (by PhP 414 million); (b) inflation; (c) increase in the price of land acquired (by PhP 161 million for FCI and by PhP 667 million for FCII); (d) extension of consulting services (by PhP 73 million for FCI).

Table 6: Planned and Actual Project Cost

Component	Cost (Unit: Million Yen)		% of Plan	ODA Loans
	Plan	Actual		
FC I	4,026	3,696	91%	Approved – JPY3,372 M; Disbursed – JPY2,798 M
FC II	10,638	10,828	102%	Approved – JPY7,979 M; Disbursed – JPY7,317 M
FC I and II	14,664	14,524	99%	Approved– JPY11,351 M; Disbursed – JPY10,115 M
Irrigation	5,387	5,765	107%	Approved – JPY4,040 M; Disbursed – JPY3,899 M

For the irrigation component, the total funding requirement was estimated at JPY 5,387 million funded from a loan amounting to JPY 4,040 million. The actual expenditures amounted to JPY 5,765 million or 107 percent of the estimated cost with the total loan disbursement of JPY 3,899 million. In the peso equivalent, the actual project cost was PhP 2.3 billion or 176 percent of the PhP 1.304 billion estimated cost. The yen appreciation from JPY 4.13/PhP to JPY 2.47/PhP

<sup>12</sup> There were significant changes in the rates from JPY 7/PhP (for FCI) and JPY 4/PhP (for FCII) at the time of the appraisal to an average of JPY 3.2 and 2.46/PhP at project implementation, respectively.



during project implementation affected the increase of cost in peso. Here are the other reasons for the cost increase: (a) additional civil works such as concrete lining and realignment of the main canal (by PhP 416 million); (b) design changes of pump stations such as the additional regulating ponds and intake structures (by PhP 274 million); (c) increase in the cost of procured equipment such as increased number of pumps (by PhP 200 million); and (d) additional administrative cost due to extended implementation (by PhP 168 million).

As explained above, the flood control components' actual implementation period was significantly longer than planned but the actual project cost was lower than planned. Thus the Project's efficiency in the components is fair. For the irrigation component, the actual implementation period was much longer than planned and the actual cost was slightly more than planned. Thus the efficiency of the Project in the irrigation component is low.

### **3.3 Effectiveness (Rating: Flood Control -- a; Irrigation -- c)**

#### **3.3.1 Quantitative Effects**

##### **3.3.1.1 Results from Operation and Effect Indicators**

###### **(1) Flood Control Components I & II**

###### Flood Data

Butuan City is composed of 86 barangays<sup>13</sup> of which 27 are classified as urban. A substantial portion of this urban population resides along and adjacent to the banks of the river and was highly and directly affected by flooding at the pre-project period. The projects were designed to protect people, housings, agriculture and infrastructure from the major flood which would occur once in 30 years period by increasing the discharge capacity of the Agusan River from 1,800m<sup>3</sup>/sec to 6,000m<sup>3</sup>/sec. The table below shows the flood data from 1999 to 2009 in the city. During the 1999 flooding of the Agusan River, all the barangays of Butuan City were affected, which was before the Flood Control Project Phase I was fully completed. Flood Control II was completed in April 2007 and no major flood has occurred since then. In addition, neither Butuan City nor the DPWH maintains the data such as inundated area and time. Therefore, it is difficult to evaluate effects based on operation and effect indicators. It also should be noted that there are still 12 barangays with 4,500 households (including the households which were not included in the original resettlement plan) remaining within the floodway that are unprotected from flooding of the river. However, since there was no damage on agriculture and infrastructure in the floods after 2007, it is fair to say that this is the effect of the flood control components<sup>14</sup>.

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<sup>13</sup> A barangay is the smallest administrative division in the Philippines and is the native Filipino term for a village, district or ward.

<sup>14</sup> It could not be confirmed if the ten barangays affected by 2009 flood include those in the floodway.

Table 7: Flood Data of Butuan City from 1999 to 2009

No	Date of Occurrence	Type of Disaster	Maximum Flow (m <sup>3</sup> /Sec.)	Annual Highest Water Level (m)	No. of Affected Barangays*	Affected Population*		Damaged Houses	Casualties	Total Cost of Damages (000 peso)		
						Families	Persons			Agriculture	Infra-structure	Total
1	1999 Feb.	Flashflood due to La Nina	4,500	3.97	86	57,451	288,477	0	14	53,130	79,540	114,670
2	2000 Feb	Flashflood	2,200	2.6	26	11,464	54,464	0	0	686	25,300	25,986
3	2001 Feb	Flood due to continuous heavy rains	1,500	1.96	15	3,780	17,875	0	0	4,355	8,000	12,355
4	2001 Dec-2002 Jan	Flashflood due to continuous heavy rains	1,600	2	50	12,064	54,453	7,425	0	33,820	29,240	63,060
5	2003 Oct.	Flashflood due to Continuous heavy rains	200	0.69	41	17,511	72,473	20	0	457	10	467
6	2004 Feb.	n.a	1,200	1.64	29	11,668	51,555	4	0	1,170	0	1,170
7	2006 Feb	Flooding due to Monsoon rains	3,300	3.2	31	13,250	68,347	0	5	17,016	50,960	67,976
8	2007 Jan	Flooding due to Monsoon rains	2,000	2.34	22	8,218	34,759	0	0	0	0	0
9	2009 Jan	Continuous heavy rains due to the tail-end of a cold front	1,500	1.95	2	n.a.	n.a.	0	0	0	0	0
10	2009 Nov	Continuous heavy rains for five (5) days	1,500	1.95	8	2,649	13,495	14	0	0	0	0

Source: CARBDP, Office of Civil Defence of Region XIII, CSWD of Butuan City

## (2) Irrigation Component Irrigated and Planted Area<sup>15</sup>

The irrigation component has an original target service area of 7,930 ha. 100% of the service area was to be irrigated and planted with rice in three years after the completion of the Project<sup>16</sup>. However, at the time of the ex-post evaluation, the actual irrigated and planted area is about 1,440 ha, representing only 18% of the target area at the time of appraisal and 38% of the current Firmmed-Up Service Area (FUSA) of 4,493 ha. The Table 8 below shows the breakdown of these areas.

<sup>15</sup> The areas related irrigation are defined as follows. 1) Firmmed up Service Area, FUSA: The service area to be covered by irrigation facilities, 2) Functional Area: The area where irrigation facilities operate. The area that irrigation is not functional due to the broken facilities is deducted from FUSA, 3) Irrigated and planted area: The area actually irrigated and planted with rice.

<sup>16</sup> Based on the calculation of EIRR at the time of appraisal.

Table 8: Firmed-Up Service / Functional / Irrigated Area (ha)<sup>17</sup>

Area	Plan	Actual				
	Irrigated/Planted Area	FUSA	Functional Area		Irrigated/Planted Area	
			Before brokages	After brokages	Before brokages	After brokages
Aupagan	4,760	2,725	2,725	1,681	n.a	<b>898</b>
Bit-Os	3,170	1,768	1,768	1,355	782	<b>542</b>
Total	7,930	4,493	4,493	3,036	n.a	<b>1,440</b>
Total / Plan	100%	57%	57%	38%	n.a	<b>18%</b>

Source: NIA

Note: Before/After brokages mean before/after brokages of siphon in Aupagan and the main canal in Bit-Os

The actual irrigated and planted area was much smaller than planned. Here are the major reasons.

- 1) Reduction of FUSA from 7,930 ha to 4,493ha due to land conversion to housings and others
- 2) Reduction of the functional area from 4,493ha of FUSA to 3,036ha (1,456ha reduction) due to the totally damaged siphon<sup>18</sup> in the Aupagan area and the incomplete canal lining and bench flume along Lateral D in the Bit-Os area. The NIA plans to rework these broken facilities and plans to complete the reworks by 2011.
- 3) Out of the 3,036 ha of the functional area, 1,440ha is actually irrigated and planted while 1,597 ha remains un-irrigated and not planted due to the following reasons.
  - The current facilities such as irrigation canals are too large for the current irrigated and planted area to be provided the required amount of water, resulting in a low water level for the turnout to draw water in some areas. Where related facilities such as turn-outs are not appropriately located, it is necessary to improve the structures to provide irrigation water.
  - Farmers do not have capital to develop their land.
  - There are absentee land owners or owners expecting the land development for other purposes.
  - Some areas such as along the Second Magsaysay Bridge and Bypass Road were already converted to residential areas<sup>19</sup>.

<sup>17</sup> Based on NIA reports during the ex-post evaluation. Actual data of FUSA, irrigated / planted areas and functional areas after the collapse of the siphon and the main canal are as of Ex-Post Evaluation. The data of irrigated/planted area before the collapse of the main canal in Aupagan was not available because the problem started much earlier.

<sup>18</sup> A siphon is a tube, in an inverted U shape, which allows a liquid to flow over an obstacle and then discharge at a level lower than the surface of the original reservoir.

<sup>19</sup> The area is estimated about 200-250ha based on the map provided by NIA. The area along the bypass was planned for development for industrial and residential use in the Butuan City Land Use Plan 1973 and for institutional, commercial, and residential use in the city's Land Use Plan 1997. For land conversion of FUSA for other purpose other than agricultural, the land owner will request from the Department of Agriculture (DA) for a certification that his land is no longer suited for agricultural use and from NIA that it is not an irrigable area before he can apply for conversion from the Department of Agrarian Reform (DAR). In reality, the FUSA is being converted illegally by dumping gravel and other materials on the land to make it unsuitable for agriculture use before requesting from the DA and NIA for certifications hence naturally the land will no longer be suitable for agriculture. DA, NIA and DAR seem to have no appropriate countermeasures against the problem.

There are factors beyond the control of the NIA such as lack of capital by farmers, existence of absentee land owners, and conversion of FUSA or expectation for the conversion. Although the NIA submitted the rework plan to increase irrigated and planted areas, to implement the plan, the NIA needs to address several issues such as securing funds for the rework of irrigation facilities and linking with financial institutions for farmers to obtain funds for land improvement, some of which the NIA cannot resolve by itself. While the NIA plans that 100% of FUSA be irrigated and planted in five years, the rework plan includes areas which were already converted to residential areas. Therefore, further scrutiny of the plan is needed

#### Rice Production Yield

The Project was to provide irrigation facilities to the area most of which had not been irrigated. In the irrigated and planted area of the project, rice production increased steadily and achieved the target yield both in dry and wet seasons in 2009 as below.

Table 9: Yield of Rice in the Project Area (Unit: ton/ha)

At appraisal				Plan		Actual 2009	
Non-irrigated paddy		Irrigated paddy		Rainy	Dry season	Rainy	Dry season
Rainy	Dry season	Rainy	Dry season				
2.5	2.2	3.1	2.5	3.8	4	4.3	4.3

Source: Appraisal Documents and NIA

#### Water Charge Collection Rate, Rate of Project Income / O&M Cost<sup>20</sup>

The collection rate of the water charge was 57-65% in 2009, which is higher than the national average rate of 55% (based on the NIA document) but much lower than the target rate of 90% by the NIA to achieve financial sustainability of this project. In addition, the rate of water fee collected against the O&M expenses is very low at 18.5% and the NIA depended on the subsidy. While 12 Irrigators' Associations (IA) are formed, the data on the rate of water users joined in the IAs against the total water users was not obtained. According to the available information from the two IAs interviewed, 20-25% of the beneficiary farmers did not join the IAs. Reasons for not joining include lack of awareness on IAs and dissatisfaction with irrigation water delivery.

Table 10: Water Charge Collection Rate and Rate of Project Income / O&M Cost

Collection rate of water charge (%)				Rate of Project Income / O&M Cost (%)			
Year	2007	2008	2009	Year	2007	2008	2009
Rainy Season	16.1	71.1	56.6	Income / Expense	23.4	24.9	98.1
Dry Season	51.2	63.6	65.4	Water charge / Expenses	15.6	17.2	18.5

Source: NIA

<sup>20</sup> JICA uses the Sufficiency Rate of Operation and Maintenance Cost (O&M cost / Planned O&M cost) as the Operation and Effect Indicator. However, since the data for the indicator was not available, the alternative indicators which show how much of O&M costs were covered by the income from the project and by the collected water fees were used. This was because NIA adopted the policy to cover the O&M cost by the income from water fee collection.

### 3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)

The Economic Internal Rate of Return (EIRR) was re-calculated for both the flood control component and the irrigation component using the same method at the appraisal<sup>21</sup>. Results are as follows.

Table 11: EIRR of Flood Control and Irrigation Projects

Project	At appraisal	At ex-post Evaluation
Flood Control Projects I & II	9.7% **	25.39%
Flood Control Projects I & II with Irrigation Project	16.5%	16.43%
Flood Control Projects I & II with Irrigation Project (Scenario 1)*		22.30%
Irrigation Project	11.6%	0.25%
Irrigation Project (Scenario 1)*		2.54%

Note: \* Irrigation Project (Scenario 1) is based on the assumption that the current planted area will be increased by 5% annually to reach 80% of FUSA.

\*\* EIRR 9.7% for Flood control projects was calculated at the appraisal time of phase 1.

The EIRR of the flood control components is 25% which substantially increased from 9.7% at the time of the appraisal of Phase 1. The benefit consists of reduction of damage on agriculture, livestock, fishponds, buildings, housing, and infrastructures. The increase of the EIRR is attributed to the increased protected area based on the renewed data by the CARBDP and the growth of the numbers of residences and buildings<sup>22</sup>.

On the other hand, the EIRR of the irrigation component based on the current irrigated and planted area is very low at 0.25%<sup>23</sup>. The substantial decrease of the EIRR from the time of the appraisal is due to reduction in the planted area and cost increase.

The EIRR of the three components based on the current irrigated and planted area is 16% and almost the same as the rate at the time of the appraisal of Flood Control Phase II. Since the total investment cost (economic price) of the flood control components accounts for 71% of the total investment cost of the three components, the low EIRR of the irrigation component is largely compensated by the high EIRR of the flood control components.

### 3.3.2 Qualitative Effects

To measure the effect and impact of the flood control and irrigation components, a beneficiary survey was held with 100 sample Butuan City residents and 200 sample farmers in the irrigated area<sup>24</sup>.

<sup>21</sup> For the flood control components, the area to be protected was calculated at the time of appraisal as 7,947 ha which was based on the affected area by the flooding in 1981. But the protected area was increased to 9,442ha based on the flood hazard hydraulic modeling for the 30-year flood frequency by CARBDP in 2004. The re-calculation at the ex-post evaluation used the same area as CARBDP in 2004.

<sup>22</sup> In the F/S, the ratio of benefit from buildings, residences and infrastructures at the 30-year flood frequency level was 77%. However, the ratio increased to 94% at the ex-post evaluation.

<sup>23</sup> Even if calculated based on the assumption that the FUSA will increase by 5% until 80% of the FUSA is irrigated and planted, the EIRR is 2.54%.

<sup>24</sup> 100 samples were taken randomly from the residents list of the barangays who reside 1) outside but adjacent to the embankment levees and floodwall and were directly affected by flooding from the river before (40 residents each from the

(1) Flood Control Components

1) Flood frequency, time, area and damage

Most of the respondents reported the effect of flood reduction by the project. After the completion of the flood control components, 81% of the city respondents declared that the flooding of their area from the Agusan River is gone and 84% said that the flooded area also decreased considerably. In terms of flooding time, 78% responded that flooding was gone. Moreover, 73% reported that damage to properties like house appliances, personal effects, and crops also decreased considerably. The Figures 3 and 4 below show the distribution of responses for these four parameters.

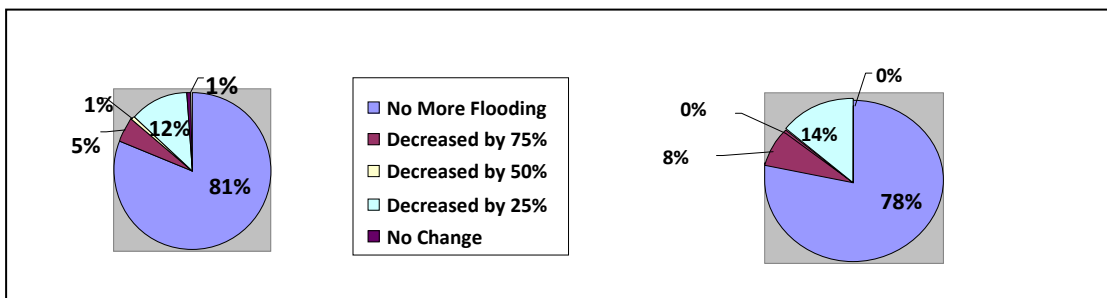


Figure 6: Annual Number of Flooding

Figure 7: Annual Flooding Time

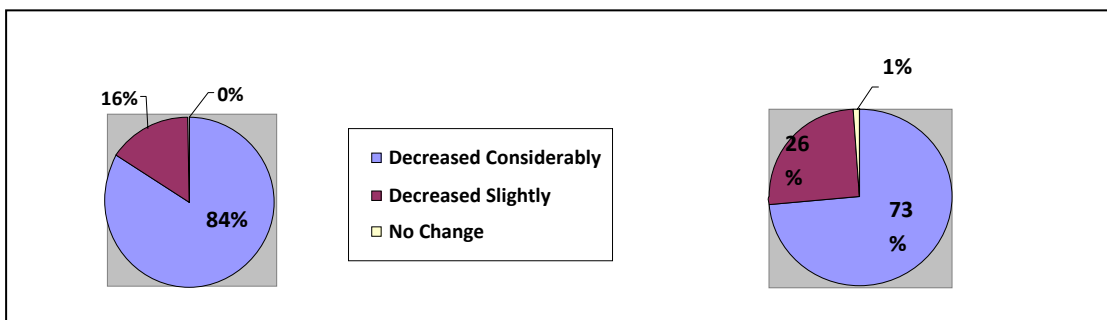


Figure 8: Flooded Area

Figure 9: Flood Damages

However, 44% of the respondents declared that they are still being flooded not from the Agusan River but due to heavy rains that could not be drained because city drainage was either clogged or insufficient or no drainage existed at all. A number of the respondents pointed out the overflowing of the East cut-off channel and city canals at the West as a cause of flooding by heavy rains. While the Project helped improve the urban drainage, it concentrated on the improvement of the Masao River and about 19.1km of existing and newly excavated channel, to serve as an outlet for the primary drainage channel in the city proper to drain local run-off water. However, not all the urban barangays benefitted from the outlet due to the cancellation

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East and West Banks from 5 barangays each), and 2) at the western part of the city proper which is expected to have benefitted from the urban drainage system improvement (20 samples from 2 barangays). For the irrigation component, sample beneficiaries were selected randomly from the list of farmers who were billed by the NIA for the dry season of 2009/2010. 200 farmers in the currently irrigated area were covered by the survey, 100 in the West Bank and 100 in the East Bank. The areas where irrigation services were not provided due to broken siphon (downstream of the East Bank) and lateral canal (some area of the West Bank) were excluded from the samples.

of improvement of some drainage systems, and the rest of the existing insufficient city drainage facilities not being included in the improvement<sup>25</sup>.

In the project, the synergy effects of two components of flood control and irrigation were expected. However, only 13% of beneficiaries of the irrigation component stated that their farm had been affected by flooding from the Agusan River before the flood control components. These areas are mostly at the upstream end of the service area and those nearest the Agusan River. Most of the farmers who experienced flood before responded that the flooding of their area from the Agusan River is gone and crop damage by flood has ceased after the projects and there is no crop damage.

No other service areas have been affected by Agusan River flooding even before the flood control components apparently due to either being too far from the river banks or located on a relatively high ground<sup>26</sup>. On the other hand, half the farmers interviewed are still affected by flood due to factors other than the Agusan River, such as overflowing of creeks and an insufficient drainage system. A negative effect of the Project was observed in Lower Tagabaka along the East Bank. The farmers reported that the embankment trapped rainwater in the absence of a drainage interceptor and caused flood. The reason for the flood is the removal of the planned drainage canal along the levee by the flood control components due to budget constraints.

The flood control components protected the irrigation facilities constructed and showed the flood control effects in some irrigated areas. However, synergy effects of the flood control and irrigation component are limited.

## 2) Effects of Technical Assistance

The technical assistance sub-components under the flood control component included the following: a) transferring technology to DPWH staff; b) O&M manual; and c) water resource management study. Transferred technical skills such as construction supervision and quality control were utilized in other flood control projects by DPWH staff members after the completion of the projects<sup>27</sup>. However, the O&M manual produced by the Project is not used by the PMO as designed due to budget constraints and the DPWH district office and Butuan City who are responsible for O&M do not know about the manual. Moreover, the utilization of the results of the water resource study was not observed and the latest Agusan River Basin Development Plan by the Department of Environment and Natural Resources (DENR) does not refer to the study. Therefore, it can be said that the effects of technical assistance are limited.

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<sup>25</sup> The Asian Development Bank is reviewing the assistance to improve remaining drainage system in Butuan City and complementing effects with this project is expected.

<sup>26</sup> Had the original total target area at the West Bank been achieved, a substantial service area would have benefitted from the flood control projects, in particular those located on lower ground adjacent to Agusan River bank. However, these areas were deleted from FUSA due to conversion to other purposes. In addition, there could have been more samples from the downstream of the East Bank that were affected by flooding before but are not currently irrigated due to the damaged siphon. These areas were affected by flood but not included in the survey.

<sup>27</sup> The staff trained in the project was engaged in supervision of Pinatubo Hazard Urgent Mitigation Project (PHUMP) or Project for flood Disaster Mitigation in Camiguin Island. Laboratory Technicians who gained adequate knowledge in Quality Control was assigned in PHUMP, authorized to use nuclear density gauge acquired during the implementation of FC Phase II.

(2) Irrigation Component

1) Sufficiency of Irrigation Water Supply

The figures below show responses on sufficiency of irrigation water and indicate major improvements from before the Project. Before the Project, about half the respondents cited total water depletion in the dry season, and a similar number mentioned insufficient water supply. After the Project, the trend reversed with 51.5% in the dry season and 64.5% in the wet season reporting sufficient water supply. However, about one third of the farmers complained that water supply is still insufficient in the dry season<sup>28</sup>. On the other hand, 11.5 to 20 % of farmers stated that there was excessive water. The main reason for excessive water during the wet season is lack of drainage to address rainwater surface run-off, while the reason in the dry season is draining of excess irrigation waste water from adjacent farms.

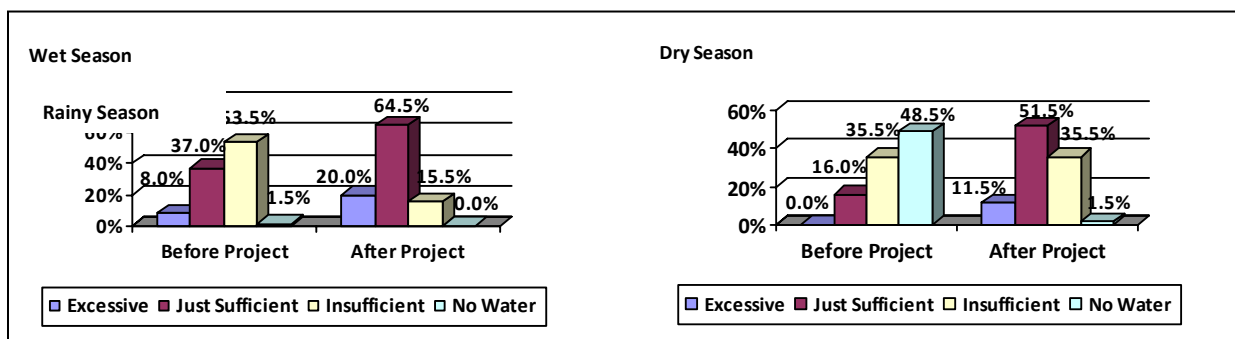


Figure 10:

Comparative Responses on Sufficiency of Irrigation Water at Before/After Project Period

Analyzing responses by location, i.e., Upstream, Midstream, and Downstream, the farmers in the Upstream and Midstream areas benefited the most especially in the dry season. More than half of them cited total depletion of water before but now they state that water is sufficient. On the other hand, 44% of the downstream farmers claimed that the water is still insufficient in the dry season.

<sup>28</sup> Here are the major reasons for this:

- i) Only one pump is operating at each station to save the high power cost due to lack of O&M budget. Coupled with the larger canals compared to the FUSA, the water level is too low to deliver the water through turnouts. Therefore, water does not reach a few areas.
- ii) The location of turnouts and farm facilities does not meet the actual needs of the farms.
- iii) Rampant illegal water tapping is due to the insufficient depth of irrigation water in the canal.



Table 12: Water Sufficiency Rate by Stream (%)

Season	Stream	Before				After			
		Excessive	Just Sufficient	Insufficient	No Water	Excessive	Just Sufficient	Insufficient	No Water
Rainy	Up Stream	9	34.5	<b>53</b>	3.5	24	<b>58</b>	18	0
	Mid Stream	7.5	39	<b>53.5</b>	0	13	<b>73.5</b>	13.5	0
	Down Stream	8	36	<b>56</b>	0	24	<b>68</b>	8	0
Dry	Up Stream	0	16.5	29	<b>54.5</b>	13.5	<b>54</b>	30.5	2
	Mid Stream	0	10.5	32	<b>57.5</b>	11	<b>50</b>	38	1
	Down Stream	0	31	<b>69</b>	0	12	44	44	0

2) Cultivated Area and Production Yield of Rice

The Project aimed to assist farmers to increase the cultivated area through provision of irrigation facilities to the areas that had not been irrigated. 25 % (rainy season) and 31% (dry season) of farmers interviewed in both banks increased their cultivated area for rice. On average, these farmers increased the cultivated area by two to four times. The common reasons for farmers cannot expand their cultivated area are as follows: 1) lack of area for expansion; and 2) lack of capital to acquire land.

Table 13: Change in Rice Cultivated Area Before and After the Project

Area	Change	Rainy Season Average				Dry Season Average			
		% Resp.	Before	After	Change	% Resp.	Before	After	Change
			(ha)	(ha)			(ha)	(ha)	
West	Increase	23	0.91	1.9	209%	11	0.69	1.59	230%
	Decrease	11	1.19	0.77	65%	0	-	-	-
	No change	66	1.2		-	89	0.92		-
East	Increase	27	0.7	1.72	246%	51	0.49	1.9	388%
	Decrease	23	3.49	1.51	43%	7	1.86	0.71	38%
	No change	50	1.29		-	42	1.15		-

In terms of rice production yield, 69% and 72% of the farmers interviewed increased it by an average of 26% in the rainy season and by two to three times in the dry season. In addition to the availability of irrigation water, the change in farm practices helped increase production because 85% of the farmers introduced new farming practices such as mechanized farming, organic fertilizer, and improved product quality. Moreover, after the construction of a service road by the Project and embankment roads in the flood control components, government agricultural technicians visit the area more often to provide technical services, helping the farmers boost production. However, 15-19% of the farmers experienced a decrease in production.

Table 14: Change in Production Yield of Rice Before and After the Project

Area	Change	Rainy Season Average				Dry Season Average			
		% Resp.	Before	After	Change	% Resp.	Before	After	Change
			(kg/ha)	(kg/ha)			(kg/ha)	(kg/ha)	
West	Increase	82	3,556	4,452	125%	68	1,585	3,657	231%
	Decrease	15	3,814	2,993	78%	19	2,380	1,220	51%
	No Change	3	4,430		-	13	3,909		-
East	Increase	76	3,821	4,843	127%	89	1,491	4,392	295%
	Decrease	15	2,011	1,950	97%	0	-	-	-
	No Change	9	3,124		-	11	2,410		-

As explained in the above, for the flood control components, positive effects of flood control measures such as reduction of damage by flood as well as flood frequency were observed. With increasing population, households, and businesses in Butuan City, the expected benefit to residences and buildings increased, which resulted in the increase of the EIRR to 25%. The flood control components have thus largely achieved their objectives, and their effectiveness is high.

However, the irrigation component faced different outcomes. Although the component helped bring about substantial improvements such as increase in water sufficiency and rice production among the beneficiary farmers, the total irrigated and planted area was only 18% of the original plan and the effects were limited to a smaller number of farmers than expected. The EIRR is also very low at 0.25%. The Project has achieved its objectives at a very limited level. Therefore its effectiveness is low. The NIA is currently rehabilitating the facilities and the increase of irrigated and planted area is expected.

### 3.4 Impact

#### 3.4.1 Intended Impacts

##### (1) Benefits of improving living standards by implementing flood control projects

In terms of gaining relief from the concerns of the Agusan River flooding, all the respondents of the beneficiary survey reported that they now feel assured that they will no longer be affected; with 60% highly assured. Their assessment of the risk of flooding hindering their livelihoods was high before the Project with 71% of the responses citing it as a significant hindrance. But, more than half (55%) of the residents responded that the said risks to their livelihoods were highly reduced after the Project. With regard to the increase of income after the Project, 77% said that the reduction of risks resulted in an increase in income. The reasons given for the increases in income are: 1) they are now able to continuously look for jobs and other means of support for their livelihood without interruptions; 2) they were able to diversify their economic activities into small businesses, like opening a sari-sari store (a small convenience store), or raising livestock for example. However, given the small scale of diversification, only two

percent said that there was an increase in employment that was generated from the flood control projects.

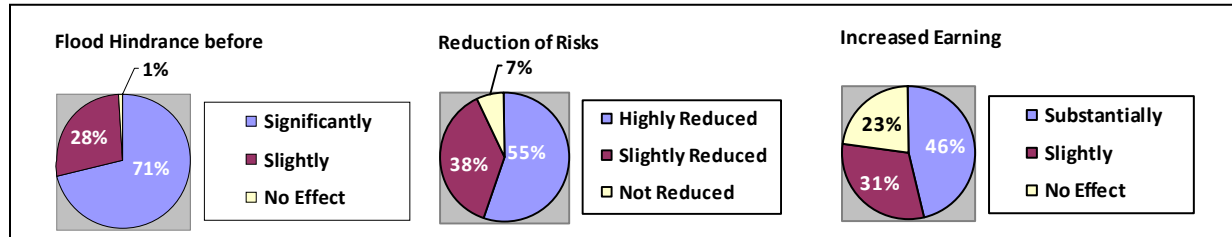


Figure 11: Flood Hindrance to economic activities before, Risk Reduction and Increased Income

For the health and sanitation, majority of respondents (86%) said that there was an improvement after the flood control projects were completed. They reasoned that water-borne illnesses like bilharzias were highly reduced. However, 14% of the respondents reported no improvement; especially those who live in areas where drainage systems were not improved said that they were still prone to diseases like dengue from mosquitoes breeding in stagnant water. 86% of the respondents reported that access to markets, farm inputs and basic services also improved due to the earth embankments, levee roads and bridges. In terms of the overall quality of life, 73% reported an improvement, such as better living conditions in newly built houses, better education for children, and opportunities to engage in backyard gardening.

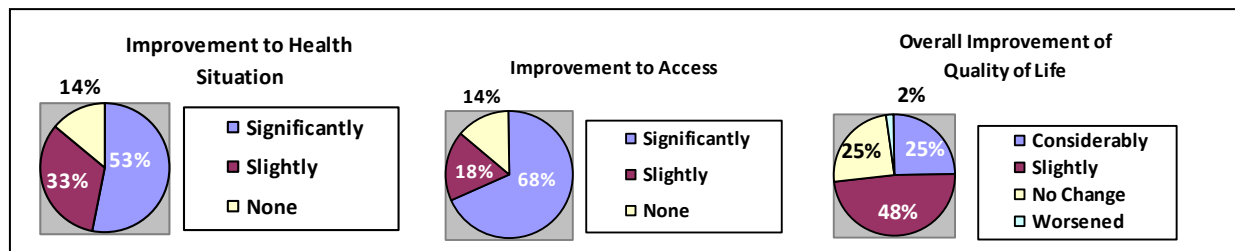


Figure 12: Improvement to Health Situation, Access and Quality of Life

Although the number of farmers who benefited from flood control is limited, they reported the same impact.

(2) Improvement of living standards as a result of the irrigation project

Almost all respondent farmers realized a significant increase in their annual farm income by more than three times, which was triggered by the introduction of the irrigation water supply resulting from the project. This gave farmers the opportunity to plant rice twice a year for double the crop even during the dry season. Annual production costs also doubled on average, but the increase was less than income growth, resulting in a big increase of the net income from rice production. The cost increase was due to hiring farm labor during the planting and harvesting of rice as well as the cost of fuel and oil for farm machinery, especially for those adopting mechanized farming. Another factor that contributed to better income for farmers was the presence of service roads (rural roads) constructed by the Project and, flood control embankment roads that triggered the entry of rice traders to the area, since farmers no longer have the difficulty of ferrying their harvest themselves.

There were also reports on the overall improvement in the quality of life with 26% of the farmers reported significant improvement. The positive impacts reported include: 1) improvements in housing, 2) purchases of appliances and motorcycles, 3) food security for the family, 4) better education for children, 5) purchases of prime commodities, and 6) access to credit from traders.

Table 15: Average Farm Income/Cost (Peso) and Improvements in Quality of Life for Irrigation Farmers

Area	Annual Income (peso)			Annual Cost (peso)			Improvement in Quality of Life		
	Before	After	Increase	Before	After	Increase	Considerably	Slightly	No Change
West	49,028	168,450	244%	13,000	31,072	139%	30%	63%	6%
East	63,980	204,007	219%	17,823	33,505	88%	23%	69%	8%

### (3) Changes in Land Use Patterns and Land Prices

More than half (57%) of the city respondents observed a change in land use patterns after the completion of the flood control component. The common change was the conversion of agricultural land into housing, while some reported cultivation of idle land and fish pond development. As a consequence, almost half (46%) said that land prices increased by two to three times after the Project.

### (4) Overall Impact on the Regional Economy

In Butuan City, the development of housing projects and increases in the establishment of businesses were observed. Because of the recent completion in 2007 of the flood control projects, it is difficult to evaluate the impact based on the available data. However, all the stakeholders interviewed including Butuan City government officials reported that these developments were apparently triggered by the flood control component and road improvements such as the Magsaysay Bypass Highway which was also assisted by JICA.

Table 16: Economic Indicators of Butuan City

Year	Population (1000)	# of Household	Business Establishment	No of farm families	Agriculture land harvested		Agriculture production (MT)	Fishpond area developed	Livestock population (heads)	
					1st Cropping	2nd Cropping			Commercial	Backyard
2001	271	51,287	5,840						222,060	119,478
2002	275	52,159	5,892	20,899	14,406		43,464	944	159,100	282,102
2003	280	53,056	6,119		12,223		54,125	738	97,132	157,080
2004	285	53,948	7,244	23,160	19,194		97,964	1,333	200,701	128,195
2005	290	54,865	7,598	30,687	n.a		n.a	1,307	427,958	95,246
2006	295	55,798	6,540	21,556	n.a		n.a	1,307	110,185	212,335
2007	298	56,085	6,916	25,488	19,791		n.a	1,307	153,860	107,364
2008	303	60,755	7,411	32,756	16,218	14,425	205,124	1,171	283,068	102,448

Source: Butuan City Note: Decrease of business establishments in 2006 was due to a major fire

In terms of the regional economy, the GRDP of Region XIII was accelerated with the growth rate increasing from 0.9% in 2003 to 8.7% in 2007. Although it is difficult to directly link the growth to the results of the projects, there most likely was some contribution by the projects, since Butuan City is the largest city as well as a center of economic activity in the region.

### 3.4.2 Other Impacts

#### (1) Impacts on the natural environment

For flood control components, the Environmental Compliance Certificate (ECC) was approved in 1996 by the Department of the Environment and Natural Resources (DENR) and Environment Assessment Monitoring was conducted in 2001 and 2005. DENR regularly inspects the water quality of the Agusan River and the latest results were within the acceptable level. However, academics and other stakeholders showed concerns over mercury contamination in the river due to gold mining which takes place upstream. With regard to the perceptions of city residents, 39% noted environment changes, most of which are positive such as improved water quality resulting in an increase of fish and fish ponds, clear water from pumps, and more creeks with less garbage. However, negative impacts were also reported such as creeks drying and natural vegetation being cut. At the site inspection, it was observed that some drainage canals were clogged with garbage and smelled badly.

For the irrigation project, the ECC was approved in 1998. Conditions included the provision of a regulating pond, the development of mini forest, the establishment of the Environment Monitoring Fund, and the Environment Guarantee Fund, and planting activities by the NIA and the DENR. Environmental Assessment Monitoring was conducted from 1998 and the water quality of the Agusan River and the Masao River was monitored. The DENR has requested the report on the mercury levels in the regulating pond from the NIA. No environment problems were observed at the site except for some residents who were swimming in the regulating pond.

As for the perceptions of the beneficiary farmers, about 40% reported noting changes in the environment, including both positive and negative. Positive changes include increased flora cover where idle grasslands were converted to rice paddies, and improved water. On the other hand, the reported negative changes were 1) water in some creeks having dried up, 2) the swamps were drained, and 3) the decrease in brush land which affected some wild birds.

(2) Land Acquisition and Resettlement

With the implementation of the flood control components, a number of the city’s residents were either directly or indirectly affected, hence the need to be relocated to appropriate resettlement sites. The former were those along the proposed embankment levee of both banks while the latter were those who were located within the floodway upon completion of both levees. To address the needs for relocation, the Project planned to acquire several sites for them and develop land and housing for the resettlement of the directly affected residents. However, after a large scale flood occurred in 1999, it became necessary for the Project to formulate the resettlement plan not only for those directly affected but for those indirectly affected as well.

Under Phase I, 51 ha of land were developed in Pagapatan and 785 households (HHs) were relocated. Under Phase II, 415 housings and utilities were provided on the site of 7.8 ha in Baan where 405 HHs relocated, and an additional 287 HHs moved to the resettlement site of Mahay which was acquired by the Project. In FCI, cancellation of the utilities for the resettlement area delayed the relocation of the affected residents<sup>29</sup>.

Although 4,015 HHs had been planned to be resettled to the areas to be developed under the flood control projects, only 1,479 households (less than 40% of the plan) were actually relocated. The lack of a cohesive relocation plan, the reduction of the resettlement area and planned facilities, and the delayed development of the resettlement area affected the overall processes and resulted in the reduction of the number of households relocated. While compensation was paid to land owners, squatters who resettled are to make installment payments on the land and housing to the city but the payment has not yet started due to a delay in the transfer of ownership of the land from the DPWH to the city. As of the ex-post evaluation, there are still about 4,500 households including those who were not included in the original plan that are living within the floodway and are subject to floods more severe than before. However, Butuan City, which is responsible for their resettlement, explained that it would take about 7-10 years for them to complete the resettlement work due to funding constraints on the development of the land.

Table 17: Resettlement Plan, and Actual Implementation of Flood Control Projects<sup>30</sup>

Project Phase	Land Acquired			Households to Be Relocated		
	Plan	Actual	% of Plan	Plan	Actual	% of Plan
Flood Control I	201 ha	81 ha	40%	3,600	785	22%
Flood Control II	30+100 ha	78.7 ha	61%	415	694	167%
Total	331 ha	159.7ha	48%	4,015	1,479	37%

Source: CARBDP

<sup>29</sup> The facilities were later provided by Butuan City and an NGO.

<sup>30</sup> In FC II, the study on residents who lived in waterways was conducted after the large flood in 1999 and confirmed 3,509 households in the East Bank and 2,392 households in the West Bank. In the Resettlement Plan formulated after the study, it was planned to acquire additional 100ha (30ha will be purchased by Butuan City) for the residents in the floodway to be resettled. After 1999 flood, additional 100ha was to be acquired of which 30ha was to be acquired by the Butuan City.

Given this, the survey was conducted in three existing resettlement sites with 60 respondents. In terms of procedures in land acquisition and resettlement, 38% of the respondents assessed it as satisfactory, while 30% reported unsatisfactory. Reasons for unsatisfactory ratings include unaffordable housing units, a lack of assistance provided during transfers, and being forced to resettle. It was observed that residents in the areas that worked with the assistance of the city and NGOs showed more satisfaction with the procedures. In terms of the compensation package, 72% of the respondents said that there was none provided either for land or housing, because they were considered squatters or located on government property<sup>31</sup>. For those compensated, 54% said that the amount was low, while 46% were contented with the compensation amount. Although more than 60% of the respondents declared better living conditions, 68% reported encountering problems at the sites. The highest complaints on their list were fewer job opportunities, public disturbances like robbery and theft, and the greater distances from schools and places of work.

On the other hand, there were several problems on ROW land acquisitions during project implementation<sup>32</sup>. In FC I, some land affected by ROW was expropriated through the courts. In FC II, due to ROW problems, part of the drainage improvement plan was changed. During the construction of the Magsaysay Viaduct, landowners barricaded the site and the Project sought police assistance. These disturbances affected the overall schedule of the projects considerably. The lack of documents confirming land ownership, the delay of fund disbursement by the Department of Budget and Management (DBM), and the long legal process for expropriation were among the reasons for the delay.

For the irrigation component, only a few households were relocated in the pump station area in Bit-Os and no major relocation of residents occurred in the construction of irrigation canals and drainage systems. The NIA planned to complete its land acquisition and relocation of residents before it began the contract for civil works. However, the prolonged processes on land acquisition due to ROW delayed the schedule of canal construction.

### (3) Unintended Positive/Negative Impacts

There were positive impacts observed for children such as better education and decreased water-borne diseases. No negative impacts were found.

As explained above, there was a substantial impact to the residents and farmers who were the direct beneficiaries of the Project which came from both the flood control and irrigation components of the Project. Major impacts included the elimination of concerns and risks from flooding, increased income due to reduced disturbances on economic activities by flooding, increased agriculture production, and improved living standards. Flood control projects are also contributing to the development of Butuan City. However, 4,500 HHs still remain in the flood zone. These residents are exposed to flooding more severely than before. Therefore, it is expected that the Butuan City

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<sup>31</sup> However, some said that the swapping scheme was done instead (no compensation was provided but instead, the appraised value of their property was deducted from the cost of units in relocation sites).

<sup>32</sup> ROW is defined as a strip of land where public infrastructure is built for the beneficial use of the general public. If the land is a private property, it has to be acquired by the government by paying to the owner an amount based on the agreed compensation package. If the owner and government will not agree on the compensation package, the government can acquire the property through expropriation or legal means.

government will make further efforts to ensure their resettlement.

### **3.5 Sustainability (Rating: Flood Control – c; Irrigation – c)**

#### 3.5.1 Structural Aspects of Operation and Maintenance

##### (1) Flood Control Components

The organizations responsible for the O&M of the flood control systems and urban drainage facilities are the DPWH District Engineering Office (DEO) and the City Government of Butuan. A Memorandum of Agreement (MoA) was signed between the DPWH and the Butuan City Government in February 2008 defining the responsibilities of O&M as follows:

- The Butuan City Government will maintain the Sluices and other structures, Embankment Levees, Channels (Cut-off and Urban Drainage) and all other structures/works not along the national roads.
- The DPWH Butuan City DEO will maintain the Magsaysay Viaduct, Cut-off Channel Bridge, and Box Culverts along the national roads and highway.

However, as of this evaluation, the CARBDP's PMO in Butuan City is still undertaking periodic maintenance activities on a very limited scale since there are no clear responsibilities for O&M between the city government and the DPWH. It was internally agreed within the city government that the City Engineering Office (CEO) would do repair works on drainage and levee structures and the City Environment and Natural Resources Office (ENRO) would be in charge of vegetation control and the de-clogging of drainage facilities. Despite the agreement, the city expects O&M to be implemented by the PMO and does not make any plans, for example, to replace stolen facilities. The DEO of the DPWH was therefore obligated to undertake some maintenance activities of the related structures including some urban drainage facilities along the national highways, although these are supposed to be done by the city.

With regard to staffing, no major problems were observed. The Maintenance Section of the DEO of the DPWH employs 12 staff including 3 engineers and 30 laborers. The City government Engineering Office employs 49 staff members including 2 engineers, while the City ENRO employs 22 staff members (16 for drainage improvement and 6 for vegetation control). The CARBDP Office also maintains 18 staff members including a project director, a project manager, and 3 engineers.

##### (2) Irrigation Component

The field project offices of the NIA are responsible for the O&M activities of the irrigation system. The Irrigation Management Office (IMO) of Agusan del Norte Province of the NIA directly supervises the project offices while the NIA Regional Office XIII provides oversight to all irrigation systems in the region. The field offices have 23 staff members including 5 engineers and 4 operators and no major problems were observed for staffing.

While the NIA is responsible for the O&M of the main canals and pumping stations, the Irrigators' Associations (IAs) are to undertake O&M functions over lateral canals. Under the Irrigation Operation and Maintenance Transfer (IOMT) Program of the NIA, there are three types of O&M arrangements between the NIA and the IAs, which are:

- 1) Type I: IA undertakes routine maintenance of a certain length of the irrigation canal



system<sup>33</sup>

- 2) Type II: IA undertakes system operations and collection of ISF from its members
- 3) Type III: IA owns and assumes full management of O&M of system<sup>34</sup>

The type of contract between the NIA and the IA depends on the maturity and capability of the IA based on the NIA's organizational assessment. For this project, only 2 IAs out of 12 signed the contract for Type I. There are another 2 IAs that signed the contract for Type II to collect Irrigation Service Fees (ISF) from members. The transfer of O&M activities of lateral canals to IAs has been delayed due to the unsatisfactory delivery of irrigation water. Their concerns are also of the sustainability of the system given the high cost of power, and the insufficient capacity of the IAs. The delay of O&M responsibilities being turned over to IAs resulted in less involvement by IAs in facility maintenance, for example checking for illegal water tapping.

### 3.5.2 Technical Aspects of Operation and Maintenance

#### (1) Flood Control Components

Both the City government offices and the DEO of the DPWH employ the necessary technical staff, and no major problems were reported in terms of the technical capacity of O&M. However, the city is constructing a park facility within the floodway, which may pose an obstruction to the flood flow<sup>35</sup>. There is a need for the city to consult with the DPWH on O&M and the possible effects of the facilities over all. The O&M equipment procured by the projects has yet to be transferred from the DPWH to the City, while City ENRO claimed a shortage in the equipment necessary to clean the drainage system. The O&M plan and manual produced by the Project has to be reviewed and confirmed with DPWH DEO and the City, since these plans and manuals were not shared with them.

#### (2) Irrigation Component

The staff of the NIA field offices includes five engineers and the officer in the NIA Provincial IMO who oversees the O&M of the system was trained in Japan under the Project. They are using the O&M manual developed by the NIA and no major problems were observed in terms of the NIA's technical capacity on O&M. However, the lack of management and maintenance capacity of the IAs was observed. This resulted in unattended on-farm facilities, and the prevalence of illegal water tapping. IAs need further training to enhance their management capacity.

### 3.5.3 Financial Aspects of Operation and Maintenance

#### (1) Flood Control Components

The DPWH Central Office Bureau of Maintenance (BOM) released the O&M budget of PhP4 million to the CARBDP PMO in 2007 but there were no funds released in 2008 and 2009. Under this situation, the PMO conducted remedial measures on minor works. The CARBDP PMO mentioned that there were no more funds allocated to provide for the specific maintenance of

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<sup>33</sup> For the irrigated paddy of 50 ha, IA conducts O&M of the canals of average 1km.

<sup>34</sup> This is for an area of less than 1,000 hectares. IAs will amortize the investment and rehabilitation cost of the whole or part of the system not exceeding 50 years. In this case, both of the ownership and all the responsibility of O&M are transferred to IAs.

<sup>35</sup> This is the Millenium Development Goals (MDG) Park Development Project and Regional Development Committee of Region XIII asked for cancellation of the project. They requested the study on impact by the project to flood control and approval from DPWH. (Based on the letter from RDC to the mayor of Butuan City as of August 2010)

flood control facilities. The DEO of the DPWH also experienced a significant reduction of its budget as shown in the table below. From 2009 to 2010 there were no budget allocations from the Motor Vehicle Users' Charge (MVUC) to the DEO, which affected their overall budget.

Table 18: Budget for the DPWH District Office (unit: million peso)

Year	2005/06	2007	2008	2009	2010
Amount	16 m	8 m	16 m	7 m	6 m
Source	GAA	MVUC	MVUC	GAA	GAA

While the current budget allocations for the City Engineering Office and the ENRO are very limited, the city government plans to allocate funds for the O&M of the project facilities for 2011. Their financial status turned positive in 2007.

As above, both the DPWH and the City government are currently not allocating the sufficient funds for the O&M of the project facilities. This has led to insufficient O&M. However, Butuan City plans to allocate the budget from 2011.

## (2) Irrigation Component

Significant challenges facing the financial sustainability of the Project were observed, due to the high cost of power for pumping irrigation. The high cost of power was pointed out at the appraisal and introduction of off-peak electricity fee, efficient water delivery, and strict water fee collection were recommended<sup>36</sup>. The Rate of Project Income (including the subsidy) against the O&M Cost increased to 98% in 2009 but this was due to a national government subsidy which was 68% of the total expenses. It is anticipated that the 2010 sufficiency rate will decrease since the subsidy will stop in 2010. The NIA prepared the sustainability plan aiming to achieve financial sustainability by 2015 by raising the ISF and collection rate and expanding the current irrigated and planted area. But half of the farmers already consider the current ISF to be high. Therefore, to achieve the target, the NIA is required to exert further efforts to convince the farmers to pay a higher fee by improving their water delivery. The overall financial status of the NIA turned positive in 2008, but this was due to the increase of subsidies.

### 3.5.4 Current Status of Operation and Maintenance

#### (1) Flood Control Components

At the time of evaluation, several problems were observed. One issue was theft at the facilities such as the flood gate lifting device control mechanism at Agusan Pequeño, drainage outlet gates along the urban drainage channel, and so on, all of which have yet to be replaced. The PMO keeps all the drainage outlet gates to prevent from further stealing. Other problems include thick vegetation along the drainage channels, and the heavily silted east cut-off channel and drainage channel at San Vicente. There is also thick vegetation observed along the mid and downstream stretch of the embankment levees, and also the presence of potholes along the embankment levee service roads. These problems are all attributed to insufficient maintenance. They have already negatively affect the Project's efficacy leading to problems such as flooding due to trapped rain water run-off and, backwater flow to existing city drainage systems during high tides and floods.

<sup>36</sup> The lower cost of off-peak electricity fees could have been adopted by the NIA and recommended at the time of appraisal. But off-peak hours usually coincide with low tide when the NIA is not operating the pumps due to problems of siltation and low water levels at the pump stations. Therefore, NIA has yet to adopt the off-peak electricity fees.

## (2) Irrigation Component

At evaluation, it was observed that the following problems are affecting the irrigated and planted area and operations. These are attributed to the reduction of the service area, the construction processes, and natural calamity.

- Of the total 10 pumps, only two pump units are operating on rotation for each pumping station (one pump at a time for each station) due to the efforts to save power costs, heavy siltation at pump stations from the Agusan River, and an insufficient level of river water during low tide, resulting in insufficient water delivery to farms<sup>37</sup>.
- The part of lateral canal in the east bank of Bit-Os is not operational due to an eroded section along a soft soil formation which was not identified during investigation before the start of civil works. This resulted in non-irrigation of 413 ha. The NIA started concreting the section but stopped due to budget constraints; the NIA is in the process of bidding to complete the remaining works;
- In the west bank of Aupagan, the siphon and the adjacent box culvert along the main canal was totally damaged by a flood. This resulted in non-irrigation of 1,034 ha of functional areas. It was reported that the risk of a broken siphon and culvert was anticipated and noted by the residents at the time of construction but the design did not change<sup>38</sup>. The NIA is in the bidding process for rework ;
- Constructed canals are too large since these were based on the original target service area which was reduced to half, hence they could not attain the water depth they were designed for and many turn-outs cannot draw water from the canal. There are also the areas that high locations and the absence or inappropriate location of Main Turnouts (terminal facilities) resulted in inappropriate water delivery to paddies. These leading to rampant illegal water tapping, in particular by downstream users.
- In the west bank of Bit-Os area, there was the constant collapse of a 100 m stretch of the canal embankment slip due to continuous erosion by water run-off from the side hill along the canal and from the intermittent spring in that hill. NIA reworked the embankment but it needs a permanent solution or unexpected sudden collapse of this section especially during wet season will happen resulting to sudden cut-off of irrigation water supply. This was due to natural conditions and it is difficult for NIA to forecast the problem beforehand.
- Highly silted drainage canals flooding adjacent rice paddies due to insufficient maintenance;

As explained above, for the flood control components, the unclearly specified responsibilities between the CARBDP of DPWH and Butuan City resulted in insufficient budget allocations and O&M activities. For the irrigation component, the financial sustainability is very low due to the high burden of power costs of the pumps and limited revenue from water charge due to the reduced irrigated and planted area. The low management capacity of the Irrigators' Associations that results in delays in the transfer of O&M activities to them are also challenges. In light of the above, this Project has serious problems both structurally and financially for flood control. The irrigation component also faces serious problems with its finances, as well as challenges both technical and structural in nature.

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<sup>37</sup> Two pumps out of ten are to be transferred to the other project.

<sup>38</sup> This is based on the interview with residents. The residents advised the possibilities of collapse of the siphon and the culvert to the contractor but the contractor explained they could not change the design which was already fixed. NIA did not review the issue because they were already in the construction phase.

Therefore, the sustainability is low for both the flood control and the irrigation components.

## **4. Conclusion, Lessons Learned and Recommendations**

### **4.1 Conclusion**

The flood control component has been highly relevant against a high demand for flood mitigation in Butuan City and it has achieved most of the planned effects such as eliminating flood damage and increased EIRR. There are already observed positive impacts such as reduced risk by flood and the economic development of the city. However, it took much longer to complete than the planned schedule and has incurred serious problems in the structural and financial aspects of O&M. In light of the above, this Project is evaluated to be fairly satisfactory (C).

On the other hand, addressing the Irrigation Component, there were discrepancies between the target area and the Land Use Plan of Butuan City, which has led to the reduction of FUSA. Although significant effects and impacts on the beneficiary farmers were reported, such as increased rice production and an improved living standard, the effects are very limited due to the significant reduction of irrigated and planted areas, which remains less than 20% of the target. The efficiency of the Project is low due to the prolonged implementation schedule and increased cost. In addition, the Project faces serious challenges in its financial sustainability. In light of the above, this Project is evaluated to be unsatisfactory (D).

### **4.2 Recommendations**

#### (1) Recommendations for Implementing Agencies

##### < Flood Control >

- The DPWH should have a meeting without delay with the new administration of Butuan City to clarify the responsibilities of O&M for the project facilities and to proceed with the transfer of maintenance equipment to the city. Butuan City needs to allocate the necessary budget for O&M and establish the implementation system. Until the city can fully implement O&M, the DPWH needs to assist the city.
- It is recommended that Butuan City secure the necessary funds and proceed with the resettlement of total 4,500 HH who are still inside the flood way, including 2,000HH which were not included in the original design. The DPWH needs to accelerate the ownership transfer of the land for the resettlement area to the city and assist ongoing resettlement processes by Butuan City.
- Butuan City and barangays should consider introducing measures to prevent the stealing of FC facilities and parts, such as utilization of a neighborhood watch group.

##### < Irrigation >

- The NIA should secure the necessary budgetary funds and implement the rework of the irrigation facilities as planned in order to increase the irrigated and planted areas. Training sessions to IAs have to be implemented to facilitate understanding on the increase of water fees, to increase the collection rate of water fees and to transfer the O&M of lateral canals to them. The NIA is recommended to coordinate with financial institutions and the Department of Agriculture to facilitate loan provisions and agriculture extension services to farmers.
- The NIA will share the data on the past conversion of the FUSA to residences and other purposes with the new administration of Butuan City, the Department of Agrarian Reform (DAR), and the Department of Agriculture and Fishery (DAF) to discuss measures to prevent

further conversion of the FUSA<sup>39</sup>. It will be a more practical approach for NIA to discuss with these stakeholders and decide as to which part of the FUSA should no longer be converted, striking a balance between the area to be protected for irrigation and the area to be converted to other purposes, referring to the Land Use Plan of the city, actual development status, and the possible development effects by conversion of FUSA to other purposes. After this has been decided, these entities should take strong measures to prevent and not allow any conversion on the finalized FUSA.

(2) Recommendations for JICA

- JICA should hold discussions with the top management of the DPWH and Butuan City, and confirm and monitor the processes of transferring O&M responsibilities of FC Facilities from the CARBDP/PMO to the City.
- It is recommended that JICA assist the beneficiary farmers and IAs with training and guidance for the improvement of their capacity in O&M and to increase water fee collection rate.
- The financial sustainability plan produced by the NIA is based on the assumption that 100% of current FUSA is to be irrigated and planted. However, the feasibility of the plan needs to be scrutinized. Therefore, it is recommended for JICA to monitor the financial plan by NIA including on how to secure the necessary O&M budget.

#### 4.3 Lessons Learned

- The O&M responsibilities of the flood control facilities remained unclear despite the agreement between the DPWH and Butuan City, which resulted in inappropriate budget allocations and insufficient O&M. When the facilities and O&M responsibilities are to be transferred to local government after the completion of projects, JICA should include in its project design a system where the transfer processes of documents, ownership, the necessary O&M equipment and know-how will be completed during the project period or monitor the processes as a follow-up measure. More binding instruments or documents to ensure continuous commitment by the local governments will also be required.
- The effect and impact of the irrigation component was significantly reduced due to the conversion of the FUSA to other purposes. For irrigation projects in urban areas or areas where further development is anticipated, and when there is a long lag time between FS preparation and commencement of implementation, the target area should be critically reviewed and determined with the participation of the recipient local governments, referring to their land use development plan and policies. In the project plan, it was assumed that 100% of the FUSA would be irrigated and planted in three years after completion, but this was unrealistic. Risks and other factors leading to the inability to actually irrigate 100% of the FUSA, such as conversion of the FUSA to other purposes and the existence of absentee landowners as experienced in this project, should be considered and practical plan and targets should be set and appraised<sup>40</sup>.

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<sup>39</sup> This was proposed at the interim report meeting of this ex-post evaluation held in Butuan City in June 2010.

<sup>40</sup> According to the study by JICA in 2009, the national average ratio of irrigated areas out of the FUSA was 72% in the wet season and 63% in the dry season for 1995, indicating that the actual planted area may have been smaller than the irrigated areas. EIRR calculation and project appraisal should be done based on this kind of actual data. According to the local expert, it is generally planned that a target irrigated and planted area will be achieved five years after completion of a large scale irrigation facility like this project.

- With regard to financial sustainability, concerns regarding the high power cost for pump irrigation and the low collection rate of water fees by the NIA were already raised at the appraisal but there were no explanations for how to cover the necessary O&M costs. For future irrigation projects, the appraisal process should include a thorough economic analysis, financial sustainability assessment and take into account the possible provision of subsidies. In particular for pumping irrigation, the challenges of O&M resulting from high power costs should be fully scrutinized.
- Weak commitments by the recipient local governments were observed in both the flood control and irrigation components. There were also problems with the facilities that could have been prevented if the opinions of residents and farmers were taken into consideration. It is recommended that local governments and beneficiary residents be actively consulted and involved from the design stages of projects through pre-study meetings and workshops. These processes will promote the ownership of the facilities to be constructed, prevent conversion of target areas to other purposes, and incorporate adequate project designs based on the actual situation, and ensure O&M of facilities, thereby increasing the project's effects.
- When substantial numbers of residents are to be relocated such as in flood control projects, resettlement plans and necessary budget allotments should be included in the project design and be implemented from the early stages of the project. In the flood control projects, the resettlement plan was designed during the implementation phase which resulted in the delay of the resettlement processes and other civil works. Involvement and cooperation by the local government and NGOs would contribute to smooth implementation.
- Problems related to ROW significantly delayed the construction schedules of both projects. Efforts should be made for ROW issues to be resolved prior to the project's implementation, such as starting preparatory works related to land acquisition (ie. survey, documentation, budgeting, legal issues) after F/S and actual activities after D/D; obtaining formal agreements from land owners before signing of L/A, before loan disbursement, or before issuance of Notice to Proceed by BOP; or to disburse the funds upon resolving the issues<sup>41</sup>.
- One of the objectives of the flood control component was to protect the facilities and FUSA developed by the irrigation components. At appraisal, EIRR was calculated based on the assumption that all the FUSA to be protected by the flood control component and the synergy effects of the both components were expected. However, after the project completion, a large portion of the FUSA which is near to the river bank and prone to flood has been converted to other purposes and the synergy effects were very limited. This is largely attributed to the fact that the flood control project reduced a flood risk and promoted the development of the area to residential and commercial zones and negatively affected the irrigation component. On the other hand, a significant portion of the remained FUSA is not prone to flood. In a program consisting of multiple projects, not only positive effects but a risk of negative effects should be reviewed, and then target areas should be clearly identified and the expected synergy effects should be set with target indicators. In the project, there was an observed negative effect from the design change of the flood control component to the irrigation beneficiaries,

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<sup>41</sup> In this project, the reasons for delayed processes include a lack of documents for land title and the delay of fund disbursement by GOP. Such delays could have been reduced, if preparatory works had started at earlier stage. For example, the bridge construction project(Bridge Construction Project for Expanded Agrarian Reform Communities Development (Umiray Bridge), Grand Aid, Basic Study was done in 2008) in Philippines assisted by JICA included the resolution of ROW as a condition for project implementation. The land owners and local governments also signed a "Deed of Donation." Upon the signature of the document, D/D started.

i.e., the cancellation of a drainage interceptor canal which caused rainwater run-off flooding to the farmers. Therefore, it is important that changes in the design should be reviewed to promote synergy and to avoid adverse effects to other components. Active and full coordination among component implementers is critical.

### Comparison of the Original and Actual Scope of the Project

Flood Control Project, Phase I		
Item	Original	Actual
<b>1. Project Output</b>		
1). Civil Works		
Embankment Levee (km)	12.3	10.3
Concrete Floodwall (km)	2.1	5.4
Dredging (m <sup>3</sup> )	900,000	700,000
Urban Drainage System (m)	1,100	880
Floodgate	none	1
Spoil Bank Yard Treatment (ha)	171	20
2) Consulting Services		
Foreign Currency Portion (MM)	301	373
Local Currency Portion (MM)	420	811
<b>2. Project Period</b>		
	Jan 1988 - Dec 1993 (72 months)	Jan 1988 - Feb 2000 (146 months)
<b>3. Project Cost</b>		
Amount paid in Foreign currency (in ¥M)	2,640	2,400
Amount paid in Local currency (in ¥M)	1,386	1,296
TOTAL (in ¥M)	4,026	3,696
Japanese ODA loan portion (in ¥M)	3,372	2,798
Exchange Rate	¥7/peso	¥3.2/peso



<b>Flood Control Project, Phase II</b>		
<b>Item</b>	<b>Original</b>	<b>Actual</b>
<b>1. Project Output</b>		
1). Civil Works		
<i>Package 1</i>		
1. Levee (km)	14.5	12
2. Related structures	- spillway (300 m) - irrigation canal crossing - drainage sluice - siphon	Mahay sluice (1.4 m) Banza sluice (5 m) Maug sluice (1.4 m) 8 RCPC cross drains
3. Cut-off channel (km)	7.3	5.5
4. Tumampi Bridge	Pedestrian	Vehicular (3 spans, 48 m)
<i>Package 2</i>		
Construction of viaduct (m)	628	628
Cut-off channel bridge (m)	90	90
Approach road (m)	135	135
<i>Package 3</i>		
1. Dike (Left Bank) (km)	6.2	Cancelled
2. Dredging (m <sup>3</sup> )	1,212,000	2,180,905
3. Spoil bankyard (ha)	170	90
4. Land Improvement (ha)	30 (415 housing units)	7.83 (415 housing units)
5. East Bank Drainage (km)	15.3	Cancelled
<i>Package 4</i>		
A. Masao River Improvement		
1. Levee (km)	11.7	Cancelled
2. Excavation (m <sup>3</sup> )	193,000	408,700
3. Dredging (m <sup>3</sup> )	185,000	408,700
B. Improvement of Urban Drainage System	Total 20 km in 6 areas	Total 19.1 km in 7 areas
Drainage Channel	-	1.4 km
Drainage Channel Sluices	-	45
Box culverts	-	12
2) Consulting Services		
Foreign Currency Portion (MM)	254	309
Local Currency Portion (MM)	598	583
<b>2. Project Period</b>	March 1997 - January 2003 (71 months)	March 1997 - April 2007 (122 months)
<b>3. Project Cost</b>		
Amount paid in Foreign currency (in ¥M)	5,571	5,959
Amount paid in Local currency (in ¥M)	5,067	4,869
TOTAL (in ¥M)	10,638	10,828
Japanese ODA loan portion (in ¥M)	7,979	7,317
Exchange Rate	¥4/peso	¥2.46/peso

<b>Irrigation Project</b>		
<b>Item</b>	<b>Original</b>	<b>Actual</b>
<b>1. Project Outputs</b>		
(1) Civil Works		
Service Area (ha)	7,930	4,493
Pumping Stations	2	2
Regulating Ponds	-	2
Intake Structures	-	2
Main Canal (km)	40.59	39.4
Laterals (km)	42.95	37.31
Sub-laterals (km)	10.56	0.45
Concrete canal lining (km)	-	133.18
Road Network-Service Roads (km)	-	160.22
Drainage canals (km)	69.3	50.04
Structures (units)	-	130
Related Structures (units)	1403	1509
Project Facilities	13 (Total 2,750m <sup>2</sup> )	14 (Total 2,330 m <sup>2</sup> )
2) Procurement of Equipment		
Motor pumps	8 (Vertical shaft two flow)	10 (Submersible motor)
Construction Equipment and Vehicles	55	46
O&M Equipment	41	49
3) Consulting Services		
Foreign Currency Portion (MM)	130	126
Local Currency Portion (MM)	99	127
<b>2. Project Period</b>		
	August 1995 – June 2002 (83 months)	August 1995 – August 2006 (133 months)
<b>3. Project Cost</b>		
Amount paid in Foreign currency (in ¥M)	3,559	3,899
Amount paid in Local currency (in ¥M)	1,828	1,866
TOTAL (in ¥M)	5,387	5,765
Japanese ODA loan portion (in ¥M)	4,040	3,899
Exchange Rate	¥4.13/Peso	¥2.47/Peso

**Third Party Opinion**  
**Lower Agusan Development Project**

Dante B. Canlas, School of Economics, University of the Philippines

**Introduction**

The Lower Agusan Development Project (LADP), which has flood control and irrigation components, is a warranted undertaking of government. Given positive externalities of flood control and irrigation, the government has seen it fit to undertake the LADP. Given the large financial requirements of the project, the Government of the Philippines (GOP) tapped official capital assistance from the Government of Japan (GOJ).

It should be established at the outset that the project is a development priority of the GOP as enunciated in the Medium-Term Philippine Development Plan (MTPDP). On the part of GOJ, the project is consistent with JICA's "Overseas Economic Cooperation Policy". In view of this, both the GOP and GOJ share ownership of the project and should feel jointly accountable for all project outcomes, whether good or bad, or a mixture.

LADP is an appropriate and relevant project in view of the need to raise agricultural productivity and real incomes of project beneficiaries. Considering the large contribution of agricultural output to the regional GDP, the project is consistent with the goal in the aggregate of sustained economic growth and poverty alleviation.

The evaluation has been based on project completion reports, interviews with key informants, small ex-post project surveys, and on-site inspections. The data generated is useful for assessing projects outcomes based on the inputs. However, for generating ultimate impacts on targeted beneficiaries, a long-term consideration, baseline data on socio-economic characteristics at the household level are essential. Follow-on surveys are also needed to determine impacts, after completing the project and allowing it to operate for a sufficiently long time. The GOP may put such impact analysis as part of its project evaluation agenda for the long term.

**Main Findings**

Overall, the LADP gets a grade, rightly so, C (flood control) and D (irrigation), on a scale of A to D, where A is the highest rating possible and D, the lowest. The key factors that pulled down the LADP's overall rating are: time and peso cost overruns, delays in the implementation of the agreement between the national government agency in charge of flood control and the city engineering office on cost sharing, and the significant reduction in the service areas of the irrigation component due to rapid land conversion. Pulling up the rating in the overall is the respectable ex-post economic rate of return from the flood control component. Unfortunately, that cannot be said of the irrigation component, which received a D rating. Unanticipated developments like rapid urbanization led to significant deviations from the existing land use plan of the city, causing targets for irrigation areas to fall short.

**Recommendations**

The external evaluation of the LADP jointly undertaken with the National Economic and Development Authority (NEDA) underscores the great importance that should be attached to:

- Resolving right-of-way (ROW) issues prior to implementation: The GOP is the lead in securing ROW. The GOJ should not give the signal to proceed with implementation unless the GOP has fully secured ROW and guarantees no delay due to ROW issues during implementation
  
- Formulating rules on cost sharing between the national government (NG) and the local government unit (LGU). The NG should look for the legal instrument that would make the cost-sharing agreement with the LGU binding across political administration: The memorandum of agreement between the NG and the LGU should be backed by a city government resolution with a provision for reopening it and resolving any dispute within the NEDA Investment Coordination Committee.

- GOP and GOJ should agree on securing market-based hedging instruments for foreign-exchange risk: This is essential since huge cost overruns in pesos can delay project completion unduly if a government budget cover has to be obtained for the added project cost.



**1. Project Description**



Project Site



Badoc Bridge

(One of the rehabilitated bridges)

**1.1 Background**

In the Philippines, the road network is the largest medium of transportation, handling about 90% of passenger transportation and 50% of freight transportation respectively. Because consideration of its functionality and quality was inevitably of secondary importance following concentrated investment to increase the road length until the early 1980s, many arterial national primary roads and national secondary roads serving as key road networks, were unpaved (pavement ratio: National Primary Roads 71%, National Secondary Roads 47% (1999)) and did not function sufficiently as trunk roads. Also, due to damage caused by natural disasters and a lack of alternative routes in emergencies, traffic efficiency is often inhibited. To promote domestic personnel and material interaction and support revitalization of local roads as well, the development of a safe and efficient arterial road network were required immediately.

**1.2 Project Outline**

The objective of this project is to secure the safety of transport between the metropolitan area and local areas and accelerate the flow of people and goods by reconstructing the deteriorated and damaged bridges along the Philippines-Japan Friendship Highway (the road section in Luzon island), which is the longest north-south highway in the Philippines and the Manila North Highway, which connects Metropolitan Manila and the northern Luzon island, thereby contributing to the economic development of the Luzon island.

Approved Amount / Disbursed Amount	5,068 million yen / 3,786 million yen
Exchange of Notes Date / Loan Agreement Signing Date	December, 1999 / December, 1999
Terms and Conditions	Interest Rate: 1.8%, 0.75% (consulting service) Repayment Period: 30 years (Grace Period: 10 years), 40 years (Grace Period: 10 years) for consulting

	service General untied (Bilateral tied for consulting service)
Borrower / Executing Agency(ies)	Philippine government / Department of Public Works and Highways
Final Disbursement Date	March 2007
Main Contractor (Over 1 billion yen)	Hanjin Heavy Industries & Construction Co., Ltd. (Korea)
Main Consultant (Over 100 million)	Demcor Inc.(Philippines)/TCGI Engineers(Philippines)/Techniks Group Corp.(Philippines)/Nippon Koei Co., Ltd. (Japan)/ Katahira and Engineers International (Japan)
Feasibility Studies, etc.	F/S related to “Rehabilitation and Maintenance of Bridges along Arterial Roads Project” conducted by JICA(Completed in June, 1989)
Related Projects (if any)	1999-2007 Implementation of a Technical Cooperation Project on the maintenance of bridges by the dispatch of experts to DPWH (Road sector)(capacity building of the staff of DPWH), 1998-2005 Construction of rural road bridges (Grant aid)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

### 2.2 Duration of Evaluation Study

Duration of the Study: January 2010 - December 2010

Duration of the Field Study: 17 March - 10 April 2010, 8 June - 7 July 2010,  
5 - 18 September 2010

### 2.3 Constraints during the Evaluation Study

None in particular

## 3. Results of the Evaluation (Overall Rating: B)

### 3.1 Relevance (Rating: a)

#### 3.1.1 Relevance with the Development Plan of the Philippines

The development policy of the Philippines at the time of appraisal is shown in the development goal of transportation sector in the “New-medium term development plan (1999

- 2004) formulated under the Estrada Administration, namely to support the socioeconomic development of the Philippines by providing safe and reliable transportation service, with strategies to achieve this including (1) reduction of government involvement in road development and promotion of utilization of the private sector, (2) enhancing the quality of existing infrastructure through appropriate renovation and maintenance management, (3) introduction of an appropriate legal framework and price policy to nurture the competitive market, and so on. In particular, as priorities toward achieving the abovementioned (2), ① Ensuring the high standard of arterial national roads and decentralization of road links development, and ② The introduction of the user charge principle in road development are established. Primarily under the Department of Public Works and Highways (DPWH), sequential renovations of arterial national roads have been conducted, and the introduction of new funding sources in line with the user charge principle has been considered. This project falls into the abovementioned category of “(2) enhancing the quality of existing infrastructure through appropriate renovation and maintenance management”.

During the ex-post evaluation, in the “Medium Term Philippines Development Plan (2004-2010)”, the development goals and strategies of traffic infrastructure sector are set out as follows and even after the project is conducted, the importance of developing the traffic network remains.

- Providing easier access to markets at home and abroad to alleviate poverty in the countryside and isolated regions;
- Enhancing peace and order in conflict-affected regions through efficient transport and trade;
- Strengthening national unity, family bonds and tourism by making the movement of people faster, cheaper and safer;
- Facilitating the decongestion of Metro Manila via a transport logistics system that would ensure efficient linkages between its business centers and nearby provinces; and
- Generating more transport infrastructure with minimal budget cover or contingent liabilities. Private sector-initiated infrastructure should be deficit-neutral, with minimum government exposure in the project.

### 3.1.2 Relevance with the Development Needs of the Philippines

The Philippines-Japan Friendship Highway, which runs the length of Luzon island, and the Manila North Highway play a very important role in terms of facilitating the flow of people and goods as the trunk roads in the island. Many of the bridges along these trunk roads were, however, constructed during the 1930s – 1960s and are old and damaged due to natural disasters, which threatens the safety and efficiency of transport. In September 1998, a bridge along the Manila North Highway collapsed as the result of flooding caused by a typhoon and there was an urgent need to rehabilitate and improve those deteriorated bridges.

The following table shows the statistics on typhoons having hit the Philippines in and after the year 2000. Luzon island is, in particular, relatively frequently hit by typhoons in the Philippines and exposed to the strong threat of typhoons. Accordingly, there was a need to strengthen the old bridges against the risk of typhoons. Particularly in 2009, 2 typhoons called “Pepeng” and “Ondoy” struck Luzon island and caused considerable damage (Table 2).



Table 1. Typhoon arrival on the Philippines

2000	01	02	03	04	05	06	07	08	09
9	5	4	10	12	10	12	9	14	18

Source : “National Disaster Coordinating Council - Civil Operations Center”, “Philippine Atmospheric Geophysical and Astronomical Services”

Table 2. Damages caused by typhoons “Pepeng” and “Ondoy”

Typhoon	Pepeng	Ondoy
Casualties	719	1,030
— Dead	465	464
— Injured	207	529
— Missing	47	37
Damaged houses	54,373	185,004
Estimated cost of damage to infrastructure and agriculture	27.3 Billion Peso	10.9 Billion Peso

Source : “Situation Report No.50”, National Disaster Coordinating Council

In addition, traffic at each bridge has been increasing steadily since the project completion as shown in the following aspect of effectiveness, which confirms the development needs retroactively.

### 3.1.3 Relevance with Japan’s ODA policy

According to the “Overseas Economic Cooperation Policy” issued by JICA (former JBIC) in 1999, the following statement was included related to the Republic of the Philippines:

“Emphasis is placed on the support for strengthening the economic structure for the purpose of sustainable growth, poverty alleviation and improvement of economic gap among regions, the support for environment protection including disaster prevention, and human resource/institution development.” This project is related to “poverty alleviation and improvement of economic gap among regions”.

According to the appraisal materials, JICA had a policy of supporting the development of economic infrastructure development in the area of transportation and so on to ease bottlenecks in economic development, and secure the sustainable growth of the Philippines. In particular, concerning the development of arterial road links, and starting with the Japan-Philippines Friendship road related project, they had focused on the development of north-south arterial road links, with consideration of the elongated north-south national land structure of the Philippines until then, and also had a policy of engaging in the development of the arterial road linking east and west and circular roads in islands as well as north-south, to ensure the balanced development of the nation in future.

This project has been highly relevant with the country’s development plan, development needs, as well as Japan’s ODA policy, therefore its relevance is high.

### 3.2 Efficiency (Rating: b)

#### 3.2.1 Project Outputs

The following chart shows the distribution of the project sites.



Chart 1. Location of bridges rehabilitated in the project in Luzon

Although there was no particular change of scope which affected the project purpose as a whole, only 11 bridges out of the 15 originally planned were rehabilitated.

First, detailed design research was conducted for 14 bridges other than Pamplona. 3 bridges such as Maasim II, Caba, San Isidro were, however, also targets of ADB's assistance and finally excluded from the scope of this project<sup>1</sup>. Eventually, Pamplona was also excluded from the project scope owing to budgetary constraints.

With regard to the remaining 11 bridges, rehabilitation was conducted almost as planned for 8 bridges and there was a relatively major change of design for 3 bridges.

Details of the scope change are shown below.

<sup>1</sup> These 3 bridges were rehabilitated with the ADB's assistance.

Table 3. Comparison of outputs (Plan and Actual)

Bridges	Plan		Actual		Major changes	Reasons of change
	Method*	Length (m)	Method*	Length (m)		
<b>(Package I)</b>						
1.Aloragat	PCDG	210.0	PCDG	210.6	Modification of the sub-structure of bridge	To eliminate the construction of cofferdam and pile cap in order to fast truck the work and also to strengthen the bridge structure
<b>(Package II)</b>						
2.Arcon	PCBG	150.0	PCDG	140	There is no major change.	
3.Pamplona	PCBG	490.0	Cancelled			Stated above
4.Dummun	Steel Langer	140.0	PCDG	140.2	There is no major change.	
5.Parsua	PCDG	40.0	PCDG	60	There is no major change.	
6.Osmena	PCDG	180.0	PCDG	179.6	There is no major change.	
7.Tipcal	RCDG	38.7	PCDG	40	There is no major change.	
8.Badoc	PCDG	180.0	PCDG	193.1	There is no major change.	
<b>(Package III)</b>						
9.Sta.Cruz I	PCDG	280.0	PCDG	280	There is no major change.	
10.Langlang ka I	RCDG	17.4	RCDG	16.6	There is no major change.	
11.Baroro	PCDG	210.0	PCDG	194.95	Additional works related to the elevation of the bridge by 1m	Consideration to the prevention of flood
12.Caba	PCDG	80.0	Only D/D (Detailed design) was conducted.			Stated above
13.San Isidro	PCDG	75.0	Only D/D was conducted.			Stated above
14.Maasim II	PCDG	90.0	Only D/D was conducted.			Stated above
15.Sulipan	Steel Box/PCBG	369.0	Steel Box/PCDG	358.7	Additional works related to the change of route of road leading to the bridge and stabilization of soil	

\*Note : PCDG – Prestressed Concrete Deck Girder  
RCDG – Reinforced Concrete Deck Girder  
PCBG – Prestressed Concrete Box Girder

With regard to consulting services, according to the Service Completion Report made by the then management consultant, services such as i) detailed engineering design, ii) technical

assistance to DPWH for the pre-construction activities and iii) construction supervision were conducted as planned<sup>2</sup>.

The total M/M of consultants was close to the amount of the initial plan<sup>3</sup> but this does not mean the activities were conducted as originally planned. To be precise, although the scale of outputs was reduced, the stages of bidding preparation and the bidding itself took longer than expected, consuming more M/M of consultants, hence the M/M reduction effect of the reduced scope was offset by the prolonged consulting services.

According to the implementing agencies, both the consultants' and contractors' performance was evaluated as "4" out of a possible 5 grading<sup>4</sup>.

In addition, it was confirmed that no damage was caused by Pepeng and Ondoy typhoons to any of the rehabilitated bridges.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period

For this project, the planned schedule was 5 years and 4 months from the L/A (Loan Agreement) signing (September 1999) to the completion of civil engineering work (December 2004). The actual L/A signing was in December 1999 and the whole civil engineering work was finished in March 2007. In other words, the project period was longer than planned: it actually became 7 years and 4 months or 137.5% of the planned period, based on the weighted average of the rates of different work packages with the different construction period.

As shown above, the project period was considerably extended. When analyzed phase by phase, there was little delay in the actual construction period. However, the stages prior to construction, such as bidding preparation and bidding itself took longer than originally expected and, in particular, contract packages II and III were delayed. The procedure of PQ, which examines the appropriateness of bidding enterprises from the past record, also took longer than expected, e.g. 2 months, as compared with the planned 10 days.

#### 3.2.2.2 Project Cost

The originally planned project cost was 3,437 million yen in foreign currency and 842 million pesos in domestic currency (2,526 million yen\*), which was 5,963 million yen in total. Among the 5,963 million yen, 5,068 million yen was a yen loan, and the remaining 895 million yen was planned to be shouldered by the Philippine government.

\* Exchange rate: 1 peso = 3 yen (as at January, 1999 at appraisal)

The resulting project cost was 964 million yen in foreign currency and 1,412 million pesos in domestic currency (3,114 million yen\*), a total of 4,103 million yen, of which 3,786 million yen was a yen loan, and the remaining 317 million yen was shouldered by the Philippine government.

\* Exchange rate: 1 peso = 2.20541 yen<sup>5</sup>

The ratio of actual cost to planned cost in terms of yen currency was 68.8%, which was considerably lower than planned. However, in peso terms, the total expense was 1,860 million pesos against the original 1,988 million pesos and the rate of actual cost to planned

<sup>2</sup> In this project it was expected to well establish the construction organization, by appropriately conducting P/Q in every tender. Actually P/Q was conducted on JICA's rule and it is estimated that the selection of consultants and contractors was appropriate from the fact that the implementing agency put high rating for their performances.

<sup>3</sup> (Plan) foreign currency portion: 135 MM and domestic currency portion: 1,578 MM, (Results) foreign currency portion: 141.2 MM and domestic currency portion: 1,604.1 MM

<sup>4</sup> 5: Excellent, 4: Good, 3: Fair, 2: Poor, 1: Very Poor

<sup>5</sup> weighted average during the project period

cost was 93.6%.

In the case of this project, the number of bridges was reduced from the originally planned 15 to 11. Therefore, it is not appropriate to simply compare the planned cost and actual cost and some adjustment is needed. When re-calculated after adjustment, the rate of actual cost to planned cost in terms of yen currency was 110.07% and the same rate in peso terms was 149.73%.

There are 2 major factors of the cost increase in Peso terms. One is the change of design in the Sulipan and Baroro bridges and another is the price increase of construction materials far beyond the original estimate.

With the above in mind, both project period and project cost slightly exceeded the plan, therefore efficiency of the project is fair.

### 3.3 Effectiveness (Rating: a)

#### 3.3.1 Quantitative Effects

##### 3.3.1.1 Results from Operation and Effect Indicators

The following table shows the change of AADT (Annual Average Daily Traffic) over time. It shows that the traffic volume has increased steadily since the project and the rehabilitation of bridges is considered to have facilitated the easing of traffic.

Average annual growth rates for the period 1997-2009 (target) are set up at 4.5% for each bridge at appraisal. It seems that the actual average rate 2.35% for 2000-2009 is much lower than the planned, when we simply compare the 2 rates. However, the year when the construction was completed is 2007 and the degree of realization of target traffic growth, as the result of the project, should be measured by more recent data. For example, the average traffic growth rate for the period 2006-2009 is 3.2%<sup>6</sup>. Moreover, the forecast rates of traffic growth of other projects which were planned around the same time are about 3%<sup>7</sup>. Then, there is a possibility that the original forecast of 4.5% itself was too ambitious. Accordingly, the effectiveness from the point of view of operation and effect indicators may not be low.

Table 4. Change of AADT

Bridges	Actual (2000)	Actual (2009)	Annual Growth (%)
Sulipan	7,973	9,794	2.31
Aloragat	11,188	14,215	2.70
Baroro	5,891	7,652	2.95
Sta. Cruz	4,831	5,897	2.24
Langlangka	5,688	6,923	2.21
Parsua	4,268	5,208	2.24
Osmenia	2,225	2,710	2.22
Badoc	3,393	4,218	2.45
Tipcal	3,223	3,920	2.20
Dummun	3,564	4,272	2.03
Arcon	4,990	6,150	2.35
average			2.35

Source : DPWH

<sup>6</sup> This is the average rate of 5 bridges for which data is available. (Source: DPWH)

<sup>7</sup> With regard to roads in Pangasinan in Luzon (like this project) in "Rural Road Network Development Project (RRNDP) – Phase 2" which was appraised in 1995, the forecast rates of AADT are between 2.71% and 3%. And with regard to Dalton pass section of Sta Rita – Aritao Road in "Arterial Road Links Development Project (IV)" which was appraised in 1999, the forecast rate of AADT for the period 1981-2007 is 3.25%.

### 3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)<sup>8</sup>

Although the EIRR (Economic Internal Rate of Return) calculation methods are not exactly the same as the appraisal method, at the ex-post evaluation, similar economic profitability was estimated in the following table.

(Assumptions)

- Cost: Project cost
- Benefits: Reduction of VOC (Vehicle Operation Cost), benefit owing to the increased weight the bridges can withstand, decreased number of impassable days owing to flooding and reduction in maintenance management cost<sup>9</sup>
- Project life: 20 years

Table 5. Comparison of EIRR

Priority rank	Bridges	EIRR at appraisal (%)	EIRR at ex-post evaluation (%)	Comparison*1	Analysis of differences*2
1	Maasim II	46.22	n.a.	n.a.	
2	Sulipan	45.78	19.44	-	Actual AADT (Annual Average Daily Traffic) is only 9,794, while the forecasted AADT during appraisal is 22,945. In addition, actual cost is higher than the expected cost during appraisal. Because of these 2 factors of benefit and construction cost, EIRR became lower.
3	Tipcal	45.34	36.52	-	Actual AADT is only 3,920, while the forecasted AADT during appraisal is 4,050. In addition, actual cost is higher than the expected cost during appraisal because of road extension. Therefore, EIRR became lower.
4	Parsua	27.16	22.56	-	
5	Baroro	27.16	20.91	-	Cost increase lead to the decrease of EIRR.
6	Aloragat	22.94	32.71	+	Actual AADT is 14,215, while the forecasted AADT during appraisal is about 10,000 only. Therefore, EIRR became higher.
7	Caba	22.50	n.a.	n.a.	

<sup>8</sup> The financial internal rate of return (FIRR) shall not be calculated because this project does not generate income without toll fare collection.

<sup>9</sup> In the ex-post evaluation, “benefit owing to the increased weight the bridges can withstand” and “decreased number of impassable days owing to flooding” are not considered, as the detailed record of necessary data of these factors does not remain and we cannot re-calculate them. Generally, “Reduction of VOC” and “reduction in maintenance management cost” are more influential factors.

8	Arcon	21.96	19.47	-	
9	San Isidro	21.80	n.a.	n.a.	
10	Osmena	21.16	15.02	-	As actual AADT is lower than the expected, EIRR became lower.
11	Dummun	20.16	28.14	+	As actual AADT was higher, EIRR was higher.
12	Langlangka I	19.81	31.8	+	This difference cannot be explained by the difference of AADT and construction cost.
13	Pamplona	18.05	n.a.	n.a.	
14	Sta. Cruz I	17.66	18.22	+	
15	Badoc	17.31	19.58	+	
Average		29.29	24.35		

Note:

\*1. "+" means EIRR is higher than that at appraisal and "-" means opposite.

\*2. Analysis was conducted, when the difference was bigger than 5%.

### 3.3.2 Qualitative Effects

#### 3.3.2.1 The results of interviews

The summary results of interviews with stakeholders on the direct benefit brought by the project are shown below. (These are the interviews conducted by the Japanese consultant on 3 bridges which he visited.) In summary the effect of transport time reduction and the resulting improvement of flow of goods and improvement of access to various places were confirmed.

Bridge	Interviewees	Comment on effect
Sulipan bridge	District office in charge, DPWH	The time needed to pass the same distance was reduced.
Tipical bridge	District office in charge, DPWH	The time needed to pass the same distance was reduced.
	Staff of Urban Planning and Development, Currimaos city, to which the bridge belongs	Traffic became smoother. Because of the elevation of the bridge position, ships for sightseeing may be able to pass in future. There was no reallocation of residents or land acquisition. There is no environmental issue, either.
	Staff of Urban Planning and Development, neighboring Batac city	The traffic became smoother, because the bridge was widened (there were traffic jams previously). The transport of goods between Ilocos Norte and Manila was improved and the time between the production/harvest of goods/products and sale was reduced. It seems that citizens' access to medical service was also improved.
Badoc bridge	District office in charge, DPWH	The time needed to pass the same distance was reduced.
	Mayor of Badoc city	The bridge was damaged by the typhoon in 2001. He was very satisfied with the project and wanted to express his gratitude to the Japanese government. The bridge was

		widened and the traffic eased. There was no reallocation of residents owing to the project. There was reasonable price determination with regard to the land acquisition and he understands that both sellers of land (citizens) and buyer (DPWH) received benefit.
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The consultant also conducted interviews with stakeholders in Laoag city, in northern Luzon and the results are shown as follows:

1. Bus companies and car rental companies (4 companies): All the companies enjoy the benefit of the reduction of transport time. For example, it took at least 10 hours to move from Laoag to Manila before but it takes only around 8 hours now. They do not feel any particular negative impact from the project.
2. Companies and shops along the arterial road including the rehabilitated bridges (7 companies/shops): 6 out of 7 companies/shops replied that they enjoyed the benefit of the project (reduction of transport time). 2 companies even mentioned their sales had increased. No one felt a negative impact from the project.

### 3.3.2.2 The results of beneficiary survey

The results of a beneficiary survey conducted near 11 rehabilitated bridges were as follows. The effect of transport time reduction and the resulting improvement of flow of goods and improvement of access to various places were confirmed here as well.

The total number of resident respondents was 214, who were residents living at the roadsides or in the neighborhoods of the bridges rehabilitated in this project. The respondents were a virtually equal split of males and females, and their main occupations were employers (storekeepers and so on), drivers, those with no regular job/housewives, farmers and blue-collar workers. Over 70% of them use the bridges daily.

The following are the responses concerning the direct benefits of this project:

- This project has brought an increase in the shipping volume of goods (mainly crops). 71 repliers, more than 30% of the total, agreed on this.
- The smoother traffic realized by this project contributed to the distribution of goods to and from further destinations. In both aspects about 10% of repliers agreed.
- Reduced travel time was realized. 138 people, more than 60% of the total, agreed. In addition, 31 people replied that the previous 1 hour travel had been shortened by 15 minutes or more.
- Improved access was demonstrated by the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	69.2
Social services (schools and so on)	45.3
Hospitals	52.8
Government offices	28.0
NGO offices	8.4
Others	2.8

The total number of passengers responding was 29, of whom the main occupations were drivers, business persons, employers (e.g. storekeepers) and so on. Over 60% of them use the bridges daily.



The following are responses concerning the direct benefits of this project:

- This project has brought an increased shipping volume of goods (mainly crops). 17 people, about 60% of the total, agreed on this.
- The smoother traffic realized by this project facilitated the distribution of goods to and from further destinations. About 30% of repliers agreed on the facilitation of the distribution of goods to further destinations, while 20% agreed on the facilitation of the distribution of goods from further destinations.
- Reduced travel time was realized. 25 people, more than 80% of the total, agreed. In addition, 7 people replied that the previous 1 hour travel had been shortened by 15 minutes or more.
- Improved access was reflected in the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	69.0
Social services (schools and so on)	51.7
Hospitals	48.3
Government offices	34.5
NGO offices	3.4
Others	6.9

With the above in mind, this project has largely achieved its objectives, therefore its effectiveness is high.

### 3.4 Impact

#### 3.4.1 Intended Impacts

① The results of the abovementioned beneficiary survey

The existence of a certain number of residents who stated an increase of employment opportunities and/or income was confirmed. Nearly 80% of interviewees replied with either “Excellent” (5) or “Good” (4) with 40% of interviewees replying “Excellent”, with regard to the project benefit.(5 grade evaluation)

In addition, the effect of the transport time reduction and the increased shipping volume of agricultural products, which are confirmed in the item of “effectiveness”, seem to have had a certain positive impact on industries, transport companies, farmers and other citizens in terms of income. (See the benefit related comments by bus/rent-a-car companies and enterprises /shops along the arterial roads including the project bridges, shown in the above item of 3.3 effectiveness.)

Furthermore, the positive impact on the environment given by the project was also confirmed and there was almost no influence on private properties and houses.

The following were the concrete responses by 214 interviewed residents concerning the impact of this project:

1. Job opportunity: Did you get any new job opportunities after this project? Yes (15.4%), No (68.7%), No answer (15.9%)
2. Change in income: Did your household income increase after this project? Yes (38.8%), No (38.3%), No answer (22.9%)
3. Change in the number of traffic accidents: Increased (38.8%), decreased (51.4%), Unknown (9.8%)
4. Impact on properties and houses: There is an impact (1.9%)

5. Change in environment after construction

(only the main items extracted, response rate: %)

Item	Deterioration	No change	Improvement
Air	4.7	38.8	56.5
Noise	6.1	40.7	53.3
Water quality	0.5	80.8	18.7

6. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	37.4
Good	41.1
Neutral	15.4
Slightly Negative	0.9
Very Negative	1.4
No answer	3.7

The concrete responses by 29 passengers concerning the impact of this project were as follows:

1. Change in the number of traffic accidents: Increased (20.7%), decreased (69.0%), Unknown (10.3%)
2. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	17.2
Good	55.2
Neutral	17.2
Slightly Negative	3.4
Very Negative	0
No Answer	6.9

② Economic indicators: Agricultural production

The changes in the outputs of “rice and corn” in 7 provinces, including the 11 rehabilitated bridges, were as follows: (The completion dates of packages 1, 2 and 3 are respectively, November 2002, March 2006 and March 2007.) In considering the results of the beneficiary survey, it is estimated that this project may have contributed to the increase of agricultural production by improving the transport of agricultural products.

The deterioration of indicators in 2009 seems to be caused by the typhoons. The number of typhoons which attacked this region since the year 2005 (annual base) is “1, 3, 1, 1, 6”<sup>10</sup> and the figure of 2009 (6) is outstanding.

<sup>10</sup> Information of Philippine Atmospheric Geophysical and Astronomical Services

Table 5. Indicators on agricultural production in project areas

Item	2005	2006	2007	2008	2009
Rice (thousand tons)	3,257	3,608	3,772	3,862	3,451
Annual growth rate (%)	1.05	10.77	4.54	2.37	-10.64
Corn (thousand tons)	1,008	1,438	1,549	1,724	1,789
Annual growth rate (%)	-22.71	42.62	7.74	11.32	3.77

Source: Bureau of Agricultural Statistics website ([www.bas.gov.ph](http://www.bas.gov.ph))

### 3.4.2 Other impacts

Negative influence on natural environment is not observed. No particular problems occurred concerning relocation of residents or land acquisition. There is no particular problem as a whole.

(1) Impacts on the natural environment: The issuance of an Environmental Compliance Certificate (ECC) was a prerequisite of the construction in the project and the ECC was issued as planned.

Also in interviewing the executing agency (DPWH, District Offices) with an environment checklist (the same as that used during the appraisal) for 3 rehabilitated bridges, no particular problem was seen. In addition, based on the results of the abovementioned beneficiary survey, in terms of air pollution and noise, many stated that the situation was improved after the project (56.5% of the total answered that the air quality had improved, and 53.3% stated a noise reduction).

(2) Land Acquisition and Resettlement: Although a questionnaire including this issue was sent to all the DPWH Regional Offices in charge of the rehabilitated bridges, very little information was provided. According to the financial report of the project, however, the actual expenditure of the land acquisition was approximately 13 million Pesos, while the planned amount was approximately 18.5 million Pesos. In addition, in the abovementioned beneficiary survey, although it was a sample survey, there was no reply of a complaint concerning resettlement and land acquisition.

According to the interview with the stakeholders at 2 places also, it was confirmed that there was no resettlement of residents and the compensation price for the land was formulated rationally with regard to the land acquisition at Badoc bridge without any trouble.

(3) Unintended Positive/Negative Impact: Likewise in the results of the beneficiary questionnaire survey, very little negative impact was mentioned.

According to the results of beneficiary survey of residents living near the bridges, the result of interview to various government staff and economic data of the regions including the project sites, the expected impact of the project such as the economic development of the Luzon island is estimated to be realized to a certain degree. Negative impact on natural environment and others is not observed.

### 3.5 Sustainability (Rating: b)

#### 3.5.1 Structural Aspects of Operation and Maintenance

The actual maintenance operation was supposed to be conducted by the District Office under the supervision of the Regional Office either directly or by the use of the service contract<sup>11</sup>. However, with regard to 5 project bridges including 3 bridges surveyed by us, the managerial responsibility has not been transferred from the central PMO (Project Management Office) to the Regional or District Offices. Although there is no particularly serious problem of bridge condition at moment, unclear O&M responsibility may lead to the future shortage of O&M budget or loose O&M management. More than 3 years have elapsed since the completion of rehabilitation (January, 2007) and the earliest possible transfer of such responsibility is needed.

#### 3.5.2 Technical Aspects of Operation and Maintenance

The expected operation and maintenance are as follows:

- Patching of holes along the carriageway and asphalt overlay along the approaches
- Painting of bridges to prevent rusting

In addition, immediate measure will be taken in an emergency such erosion caused by flood.

According to an interview survey and questionnaire response, the number of staff is sufficient and there seems to be no particular problem in terms of the technological levels of the staff. Training of staff is undertaken by dispatching staff to training organized by DPWH Regional Offices. The maintenance method is fairly standardized in DPWH and the following manuals are used in District Offices:

- Road Repair and Maintenance Manual, June 1991 (DPWH)
- Road Construction Manual (DPWH)
- Bridge Inspector's Handbook (DPWH), originally from "Overseas Unit, Transport and Road research Laboratory, Crowthorne Berkshire, U.K."

With the above in mind, it is fair to say that there is no problem in terms of the operation and maintenance technology.

#### 3.5.3 Financial Aspects of Operation and Maintenance

The road maintenance budget amounts of the entire DPWH in recent years were as follows: Every year a certain maintenance budget is secured.

Table 6. The road maintenance budget of the entire DPWH Unit: million pesos

Year	Routine/Carriageway maintenance	Roadside maintenance	Preventive maintenance	Total length of national roads (km)
2007* <sup>1</sup>	2,021	1,750	7,300	29,968
2008* <sup>2</sup>	4,021	1,850	6,690	30,224
2009	3,500	2,020	7,300	30,594

Source: Bureau of Maintenance, DPWH

\*1. In 2007, 720 million Pesos of so-called "Special Road Safety Fund" were also allocated.

\*2. In 2008, 663 million Pesos of "Road Safety Projects" were also allocated.

With regard to the sufficiency of the O&M budget for the project bridges, 5 out of 9 DPWH District Offices, which were either interviewed or replied to the questionnaire, mentioned that the O&M budget for roads including the project roads was not sufficient. However, when we examine the trend of the O&M budget for all the offices in charge of rehabilitated bridges, there is no overall declining trend.

<sup>11</sup> According to the appraisal document

### 3.5.4 Current Status of Operation and Maintenance

As stated above, with regard to almost half the rehabilitated bridges, the management responsibility of O&M was not officially transferred to DPWH Regional Offices or District Offices from the central office. However, a District Office, which will be in charge of Sulipan bridge, already conducts O&M activities such as patching of holes along the carriageway and asphalt overlay along the approaches under the supervision of the Regional Office.

The situation of the 4 bridges which the evaluation consultant visited is summarized as follows:

Sulipan: There is a small problem in the expansion joints (melted and deformed asphalt) but not serious.

Tipcal: In good condition.

Badoc: There is a small problem in the expansion joints (melted and deformed asphalt) but not serious.

Aroragat: In good condition.

According to the researchers involved in the beneficiary survey, who actually visited all the 11 bridges, the condition is good in general but there was a need to install lights at some bridges from the point of view of safety.

Likewise, in the beneficiary survey, 58 of 243 interviewees requested the installation or addition of lights. In particular, for Sulipan and Tipcal, nearly half the interviewees requested lights.

Having mentioned the above issues, 199 interviewees, 93% of the total, were satisfied with the condition of O&M of the rehabilitated bridges.

Although there is no serious problem with the facilities themselves, the management responsibility of O&M should be promptly transferred to the DPWH Regional Offices or District Offices, as mentioned above.

With the above in mind, some problems have been observed in terms of organization; therefore sustainability of the project is fair.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

The relevance of this project is high because the project is highly consistent with the following three matters: the development policy of the Philippines at the time of both the appraisal and the ex-post evaluation; development needs; and Japan's aid policy. Both project period and project cost slightly exceeded the plan<sup>12</sup>, therefore efficiency of the project is fair. The effectiveness as seen in the operation and effect indicators and the internal rates of return is high and an impact was also created. Some problems have been observed in terms of organization; therefore sustainability of the project is fair.

In light of the above, this project is evaluated to be satisfactory (B).

### 4.2 Recommendations

#### 4.2.1 Recommendation to the executing agency

- Management responsibility is usually transferred from the central PMO to the Regional/District Offices of DPWH 1 year after the project completion. However, with regard to the 5 bridges, the management responsibility was not yet officially transferred.

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<sup>12</sup> The project scope was reduced and accordingly, the necessary project period and cost were recalculated for the purpose of an appropriate evaluation.

Accordingly, it is urgently necessary to transfer the management responsibility.

- In the beneficiary survey a considerable number of interviewees requested either the installation or addition of lights to prevent traffic accidents and such requests should be seriously discussed based on the traffic volume particularly at night.

#### 4.2.2 Recommendation to JICA

None in particular.

#### **4.3 Lessons Learned**

None in particular.

### Comparisons of the Planned and Actual Figures

Components	Plan		Actual	
① Outputs				
Bridges	Method*	Length(m)	Method*	Length(m)
<b>(Package I)</b>				
1.Aloragat	PCDG	210.0	PCDG	210.6
<b>(Package II)</b>				
2.Arcon	PCBG	150.0	PCDG	140
3.Pamplona	PCBG	490.0	cancelled	
4.Dummun	Steel Langer	140.0	PCDG	140.2
5.Parsua	PCDG	40.0	PCDG	60
6.Osmena	PCDG	180.0	PCDG	179.6
7.Tipcal	RCDG	38.7	PCDG	40
8.Badoc	PCDG	180.0	PCDG	193.1
<b>(Package III)</b>				
9.Sta.Cruz I	PCDG	280.0	PCDG	280
10.Langlangka I	RCDG	17.4	RCDG	16.6
11.Baroro	PCDG	210.0	PCDG	194.95
12.Caba	PCDG	80.0	Only detailed design was conducted.	
13.San Isidro	PCDG	75.0	Only detailed design was conducted.	
14.Maasim II	PCDG	90.0	Only detailed design was conducted.	
15.Sulipan	Steel Box/ PCBG	369.0	Steel Box/ PCDG	358.7
② Term	September, 1999~ December, 2004 (64 months)		December, 1999~ March, 2007 (88 months)	
③ Project costs				
Foreign currency	3,437 million Yen		964 million Yen	
Local currency	842 million Peso (2,526 million Yen)		1,412 million Peso (3,114 million Yen)	
Total	5,963 million Yen		4,103 million Yen	
ODA Loan Portion	5,068 million Yen		3,786 million Yen	
Exchange Rate	1 Peso = 3 Yen (As at January, 1999)		1 Peso = 2.20541Yen (Weighted average)	

\*Note: PCDG – Prestressed Concrete Deck Girder  
RCDG – Reinforced Concrete Deck Girder  
PCBG – Prestressed Concrete Box Girder

**Third Party Opinion  
Rehabilitation and Maintenance of Bridges Project (Phase IV)**

Josef T. Yap, Philippine Institute for Development Studies

The evaluation process adopts a straightforward methodology and judging from other projects, the methodology is applied consistently. The criteria and ranking are well defined.

When evaluating cost effectiveness, the exchange rate is allowed to vary. Hence the comparison of the budget at the start of the project and the actual cost in yen terms becomes misleading. The main reason is that the actual costs are in peso terms. The project evaluator argues that this is a rule that JICA has set. Nevertheless, as shown in the report comparing yen costs and local currency costs will generate different outcomes about cost efficiency.

The provinces where the bridges are located are as follows:

	<b>Bridge Name</b>	<b>Province</b>	<b>Road Name</b>
1	SULIPAN	Pampanga	Manila North Rd
2	ALORAGAT	Pangasinan	Manila North Rd
3	BARORO	La Union	Manila North Rd
4	STA CRUZ	Ilocos Sur	Manila North Rd
5	LANGLANGKA	Ilocos Sur	Manila North Rd
6	PARSUA	Ilocos Sur	Manila North Rd
7	OSMENA	Ilocos Sur	Manila North Rd
8	BADOC	Ilocos Norte	Manila North Rd
9	TIPCAL	Ilocos Norte	Manila North Rd
10	DUMMUN	Cagayan	Cagayan Valley Rd
11	ARCON	Isabela	Daang Maharlika

These are provinces located mainly in Region 1 and 2. Poverty incidence in Region 1 is almost equal to that of the national average.<sup>13</sup> Hence there is not much controversy in geographic location of the projects. Ilocos Sur, La Union, and Pangasinan experienced sharp reductions in poverty incidence between 2000 and 2003. While there was a deterioration in the poverty situation between 2003 and 2006, there was a net improvement between 2000 and 2006. The projects, therefore, contributed positively to poverty reduction in Ilocos Sur, La Union, and Pangasinan. Ilocos Norte, Cagayan, and Pampanga are provinces where poverty is less of a problem.

The evaluation of effectiveness of the project was done systematically and in a robust manner.

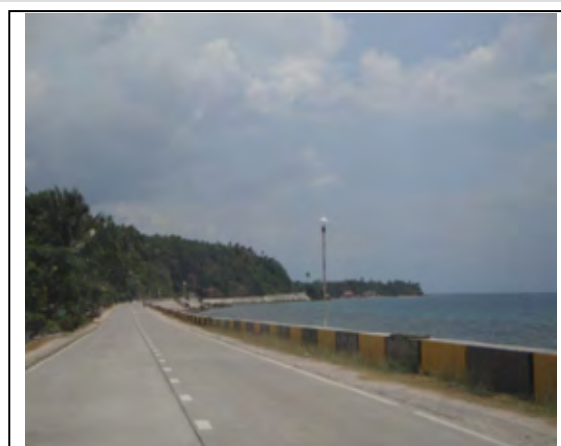
<sup>13</sup> Data on poverty incidence per province can be obtained from [http://www.nscb.gov.ph/poverty/2006\\_05mar08/table\\_1.asp](http://www.nscb.gov.ph/poverty/2006_05mar08/table_1.asp)



**1. Project Description**



Project Site



Project Road  
(Bohol Circumferential Road)

**1.1 Background**

In the Philippines, the road network is the largest medium of transportation, handling about 90% of passenger transportation and 50% of freight transportation respectively. Because consideration of its functionality and quality was inevitably of secondary importance following concentrated investment to increase the road length until the early 80s, many arterial national primary roads and national secondary roads serving as key road networks, were unpaved (pavement ratio: National Primary Roads 71%, National Secondary Roads 47% (1999)) and did not function sufficiently as trunk roads. Also, due to damage caused by natural disasters and a lack of alternative routes in emergencies, traffic efficiency was often inhibited. To promote domestic personnel and material interaction and support revitalization of local roads as well, the development of a safe and efficient arterial road network were required immediately.

**1.2 Project Outline**

The objective of this project is to promote personnel and material interaction, efficiency and cost reduction in transportation by developing north-south and east-west arterial roads and circumferential roads in islands, which comprise major national roads, thereby contributing to stimulating and revitalizing the local economy and improving the welfare of the residents.

Approved Amount / Disbursed Amount	15,384 million yen / 15,251 million yen
Exchange of Notes Date / Loan Agreement Signing Date	December, 1999 / December, 1999
Terms and Conditions (loan)	Interest Rate 1.8 %, 0.75% (consulting service) Repayment Period: 30 years (Grace Period: 10 years), 40 years (Grace Period: 10 years) for consulting service

	General untied (Bilateral tied for consulting service)
Borrower / Executing Agency	The Government of the Republic of the Philippines / Department of Public Works and Highways
Final Disbursement Date	March, 2008
Main Contractors	Italian-Thai Development Public Company Limited (Thailand) / Cavite Ideal International Construction & Development Corp. (Philippines) / China Road and Bridge Corporation (China) / C. M. Pancho Construction Inc. (Philippines) / Hanjin Heavy Industries & Construction Co., Ltd. (Korea)
Main Consultant (Over 100 million)	Katahira and Engineers International(Japan) / Nippon Koei Co., Ltd. (Japan) / Design Science Incorporated (Philippines) / Inter-Structure Systems, Inc. (Philippines) / Philipp's Technical Consultants Corp. (Philippines) / Pacific Consultants International (Japan) / CTI Engineering Co., Ltd. (Japan) / Demcor Inc. (Philippines) / Pertconsult International (Philippines) / PKII Engineers (Philippines) / Engineering and Development Corp. of the Philippines (EDCOP) (Philippines) / Multi-Infra Konsult, Inc. (Philippines)
Feasibility Studies (F/S), etc. (if any)	“Bohol Circumferential Road Improvement Project I/P”(December, 1987), “Arterial Road Links Development Project (III) I/P”(October, 1996), “Southern Leyte Trunk Road Development Project F/S”(January, 1997), “Naga-Toledo Road Development Project I/P”(October, 1998) and “Japan-Philippines Friendship Road Typhoon Damage Restoration Project I/P”(December, 1998) (conducted by the Philippine side)
Related Projects (if any)	Arterial Road Links Development Project (III)

## **2. Outline of the Evaluation Study**

### **2.1 External Evaluator**

Ryujiro Sasao, IC Net Limited

### **2.2 Duration of Evaluation Study**

Duration of the Study: January, 2010 - December, 2010

Duration of the Field Study: 17 March - 10 April, 2010, 8 June - 7 July, 2010,  
5 - 18 September, 2010

### **2.3 Constraints during the Evaluation Study**

None in particular

## **3. Results of the Evaluation (Overall Rating: B)**

### **3.1 Relevance (Rating: a)**

#### 3.1.1 Relevance with the Development Plan of the Philippines

The development policy of the Philippines at the time of appraisal is shown in the development goal of transportation sector in the “New-medium term development plan (1999 ~ 2004) formulated under the Estrada Administration, namely to support the socioeconomic development of the Philippines by providing a safe and reliable transportation service, with strategies to achieve this including (1) reduction of government involvement in road development and promotion of utilization of the private sector, (2) enhancing the quality of existing infrastructure through appropriate renovation and maintenance management, (3) introduction of an appropriate legal framework and price policy to nurture the competitive market, and so on. In particular, as priorities toward achieving the abovementioned (2), ① Ensuring the high standard of arterial national roads and decentralization of road links development, and ②The introduction of the user charge principle in road development are established, and primarily under the Department of Public Works and Highways (DPWH), as well as renovations of arterial national roads conducted sequentially, consideration of the introduction of new funding sources in line with the user charge principle is underway.

This project falls into the above mentioned category of “① Ensuring the high standard of arterial national roads”.

Also during the ex-post evaluation, in the “Medium Term Philippines Development Plan (2004-2010)”, the development goals and strategies of traffic infrastructure sector are set out as follows:

- Improve access to domestic and international markets to ease poverty in local and remote areas.
- Enhance peace and security in areas of conflict through efficient traffic and commerce.
- Enhance national solidarity, family bonds and sightseeing by ensuring swift, economical and safe forms of transfer for people.
- Build a transportation logistics system which achieves efficient access between the business centre of the Manila metropolitan area and nearby states to ease traffic congestion in the metropolitan area.
- Develop traffic infrastructure at a minimum budget and debts.

As above, after the project is conducted, the importance of developing the traffic network

remains. Therefore, as well as during the appraisal, the Arterial Road Links Development remains a key part of the national development plan at the ex-post evaluation.

### 3.1.2 Relevance with the Development Needs of the Philippines

During the appraisal, all five roads involved in this project were unpaved or low-cost pavement, and in the interests of enhanced efficiency in crop distribution, activation of industrial or commercial activities, and sightseeing development as well, the need for road development (paving) emerged. The road development was expected to stimulate the economy of the surrounding areas and benefit local people as a result.

In addition, the change in the paving rates of major roads confirmed during the ex-post evaluation was as follows:

Table 1. The paving rates of major roads (Unit: %)

Type of road	1992	2009
National roads	50	75.15
- PCC (concrete paving)	27	47.45
- AC (Asphalt paving)	23	27.70
- Gravel	49	24.56
- Earthen roads	1	0.29
Provincial roads	12	41.99
- PCC	3	36.00
- AC	9	5.99
- Gravel	71	50.25
- Earthen roads	17	6.26

Source: Department of Public Works and Highways

For the period of nearly 20 years to date, the paving rates have grown drastically. Also according to the statistics of the Department of Land Transport and Communications, the number of registered vehicles in the Philippines increased from 3,701,173 in 2000 to 5,891,272, around 1.6 times, in 2008. Needs in terms of the use of national roads from the time of appraisal up to now are thought to be considerable.

In addition, as seen in the following, the traffic volume on the roads covered by this project has also increased steadily.

Accordingly, the need to renovate the roads in question since the appraisal time up to now was obvious.

### 3.1.3 Relevance with Japan's ODA Policy

According to the "Overseas Economic Cooperation Policy" issued by JICA (former JBIC) in 1999, the following statement was included related to the Republic of the Philippines:

"Emphasis is placed on the support for strengthening the economic structure for the purpose of sustainable growth, poverty alleviation and improvement of economic gap among regions, the support for environment protection including disaster prevention, and human resource/institution development." This project is related to "poverty alleviation and improvement of economic gap among regions".

According to the appraisal materials, JICA had a policy of supporting the economic infrastructure development in the area of transportation and so on to ease bottlenecks in economic development, and secure the sustainable growth of the Philippines. In particular, concerning the development of arterial road links, and starting with the Japan-Philippines Friendship road related project, they had focused on the development of north-south arterial road links, with consideration of the elongated north-south national land structure of the

Philippines until then, and also had a policy of engaging in the development of the arterial road linking east and west and circular roads in islands as well as north-south, to ensure the balanced development of the nation in future.

At the time of appraisal, the policy of JICA precisely served as a basis to promote this project and its relevance to Japan's ODA policy is high.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy; therefore its relevance is high.

### 3.2 Efficiency (Rating: c)

#### 3.2.1 Project Outputs

The following chart shows the distribution of the project sites.

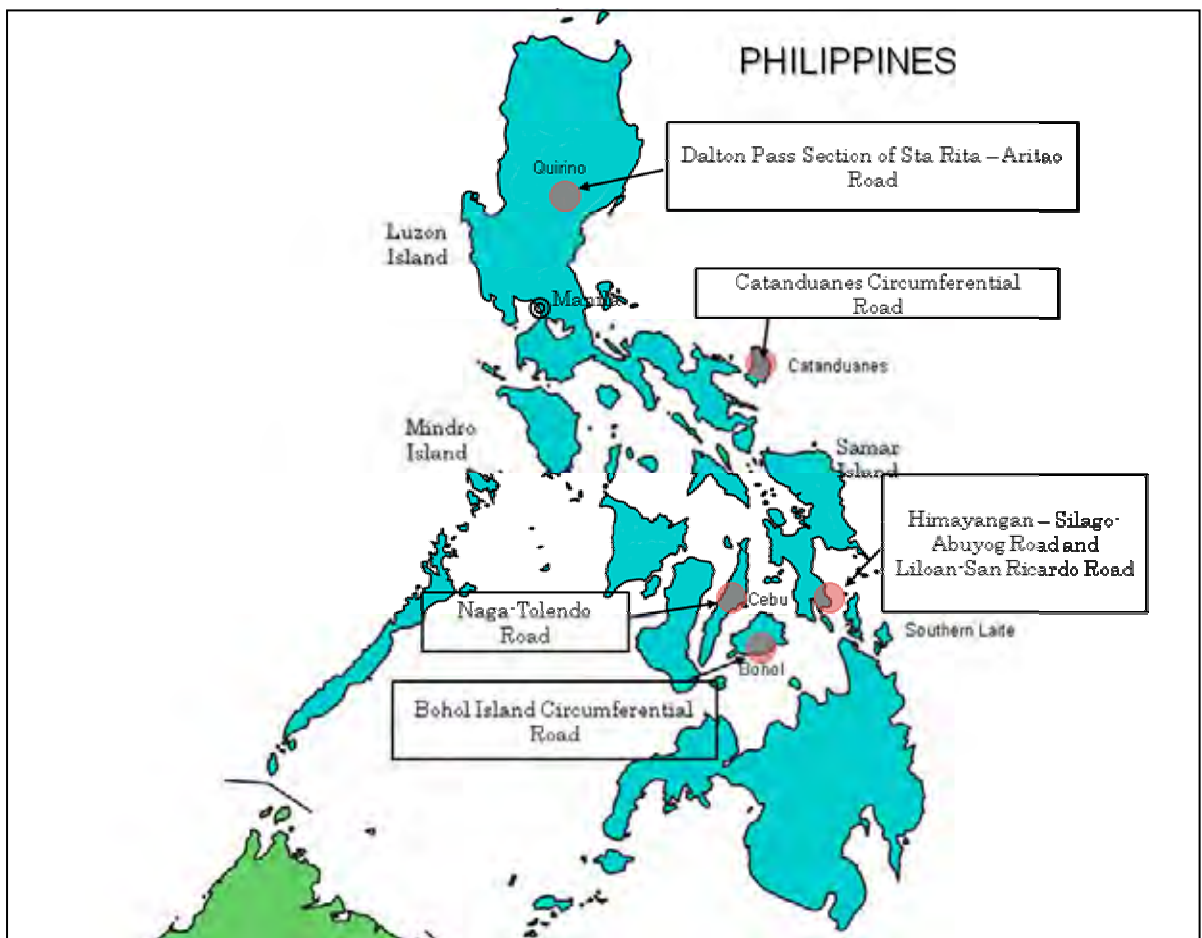


Chart 1. Project site location

Although there are minor changes, overall, the initially planned outputs were realized. These changes were due to security issues, countermeasures to problems which happened after the appraisal and addition of drainage facilities. All of the changes were necessary or important and contributed to the realization of project purpose.

Table 2. Comparison of outputs (Plan and Actual)

Plan	Actual	Differences and reasons
<p>1. Catanduanes Circumferential Road: Development of roads, bridges and so on (about 63 km)</p> <ul style="list-style-type: none"> <li>• Renovation of damaged bridges along Codon-Biga (about 63 km) and circumferential road (total length about 545 km), the PPCP construction method (Portland Cement Concrete, concrete paving) was utilized.</li> </ul>	<p>Development of roads, bridges and so on (43.11 km)</p> <ul style="list-style-type: none"> <li>• Renovation of damaged bridges along Codon-Biga and the circumferential road (total length about 397m, 5 bridges in total), the PPCP construction method was utilized.</li> </ul>	<p>The overall road length was shortened, however this is because the route of the roads was rearranged to be closer to the mountainside for safety reasons.</p>
<p>2. Bohol island circumferential road: Development of roads and so on (about 136 km)</p> <ul style="list-style-type: none"> <li>• Calape-Loay (about 67 km)</li> <li>• Loay-Candijay (about 69 km)</li> </ul>	<p>Although the total extension is the same, the descriptions of the road segmentation differ from before as follows:</p> <ul style="list-style-type: none"> <li>• Calape - Valencia (about 84 km)</li> <li>• Candijay - Valencia (about 52 km)</li> </ul> <p>There was the partial addition of scope (drainage facilities) and also in terms of the construction method, PCCP was adopted instead of planned ACP in some portions.</p>	<p>Although there were very few changes in scope, the partial development of drainage facilities on the side of the road (in Tagbilaran city), which was not initially assumed, was added. Also, in terms of the construction method, PCCP was adopted instead of planned ACP (Asphalt Concrete, Asphalt paving) for some portions. The abovementioned development of drainage facilities was in response to a strong request made by the mayor. Also the adaptation of PCCP was because it was tougher and also cheaper in terms of maintenance management.</p>
<p>3. Himayangan – Silago – Abuyog Road and Liloan – San Ricardo Road : development of roads, bridges and so on (about 136 km)</p> <ul style="list-style-type: none"> <li>• Himayangan-Sirago (about 61 km)</li> <li>• Sirago-Abuyog (about 38 km)</li> <li>• Liloan-Saint Richard (about 37 km)</li> </ul>	<p>The total extension of all three packages was 129.12 km, slightly shorter than the original plan. The construction and renovation of bridges is as planned. Also, in response to damage caused by e.g. typhoons and earthquakes, in each of the left three zones, scope which was not initially planned was added.</p>	<p>Himayangan-Sirago: Four approach roads, which were damaged by earthquakes, were renovated.(Earthquakes happened between appraisal and the start of construction.) In line with the request by the mayor, drainage facilities were developed in San Juan. So-called UK bridges, which had remained unfinished due to budget shortfalls, were renovated. Following a landslide disaster in a place called Guinsauggon, construction equipment was used to save lives.</p>

		<p>Sirago-Abuyog: There was a design change because the soil texture, which was irrelevant to the originally planned construction method, emerged.</p> <p>Liloan-Saint Richard: There was a design change due to damage by flooding just before groundbreaking.</p>
<p>4. Naga-Toledo Road: Development of roads, bridges and so on (about 37 km)</p> <ul style="list-style-type: none"> <li>• Naga-Toledo (about 37 km)</li> </ul>	Conducted as planned.	
<p>5. Dalton Pass Section of Sta Rita – Aritao Road: Renovation of the damaged portion of the road. (about 0.9 km)</p>	<p>The road length is the same. In addition to the originally planned scope, the following construction was implemented:</p> <ul style="list-style-type: none"> <li>• Paving to respond to fresh damage to typhoons “Feria” and “Harurot”</li> <li>• Reinforcement measures to respond to the deterioration of the road after the time of appraisal</li> </ul>	As described on the left.

Also, MM of consultant increased from the originally planned figure, due to the extended construction caused by poor weather, the response to additional construction due to typhoon damage, changed scope and so on.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period

For this project, the planned schedule was 5 years and 1 month from the L/A (Loan Agreement) signing date (September, 1999) to the completion of civil engineering work (September, 2004), however, the actual L/A signing was in December, 1999 and the whole civil engineering work was finished in November, 2007. In other words, the project period, which was scheduled to be 61 months, actually became 96 months, 157.3% of the planned amount, significantly longer than planned.

The respective causes of the delay were as follows:

1. Catanduanes circumferential road: Due to local (Philippines’ government) funding shortages, it took time to select a contractor, and due to poor weather and security problems (acts of vandalism destroying equipment), the construction schedule was delayed significantly.
2. Bohol island circumferential road: the Loay-Loon-Calape zone took 41 months against the originally planned 18 months, and the Candijay-Duero-Valencia zone took 32 months against the originally planned 18 months. For this road, significant time was required to acquire land in areas of high population density, which was noticeable, particularly in the Loay-Loon-Calape zone.

3. Himayangan – Silago – Abuyog Road and Liloan – San Ricardo Road: In all three zones, the originally planned construction periods (18 or 19 months) were exceeded by about 20 months. The main causes of delay were “operational delays due to poor weather”, “design changes”, “delays in payments for construction due to scope changes” and so on, with “operational delays due to poor weather” in particular the most influential cause. In response to these delays, the executing agency requested that the builders boost operations by inputting considerable equipment, however, because the poor weather was an external factor, it seems that the recovery was limited.
4. Naga-Toledo Road: The main cause of delay was the delay in making payment to contractors, due to the financial crisis of the government, which meant the construction period was extended. There was hardly any delay in the construction operation itself.
5. Dalton Pass Section of Sta Rita – Aritao Road: In this sub project also, delays in construction occurred due to funding shortages caused by financial difficulties. Also, in order to respond to site damage caused by typhoons, operations that had not been anticipated had to be carried out beforehand.

### 3.2.2.2 Project Cost

The originally planned project cost was 10,872 million yen in foreign currency and 2,517 million pesos in domestic currency (7,551 million yen\*), which was in total 18,423 million yen. Among the abovementioned 18,423 million yen, 15,384 million yen was yen loan, and the rest amount of 3,039 million yen was planned to be allocated by the Philippine government budget.

\*Exchange rate: 1 peso = 3 yen (as at January, 1999)

The project result was 7,749 million yen in foreign currency and 5,151 million pesos in domestic currency (11,282 million yen\*), a total of 19,031 million yen, and of this 19,031 million yen, 15,251 million yen was a yen loan, and the remainder of 3,780 million yen was allocated under the Philippine government budget.

\* Exchange rate: 1 peso = 2.1902 yen (weighted average during the project period)

The rate of actual cost to the plan in yen currency is 103.3%, which is slightly higher than planned. However, for information, in peso terms the total expense was 8,689 million pesos against the original 6,141 million peso, namely exceeding planned expenditure by 41%.

For each sub project, in peso currency, both construction and consulting fees substantially exceeded the original budget. The causes of the cost increase are summarized as follows:

Site (road)	Cause of cost increase
Catanduanes circumferential road	Increase in construction fee due to additional digging operation and operation to remove newly-found rock.
Bohol island circumferential road	Increase in construction fee due to the adoption of the PPCP construction method, which was not initially assumed and installation of drainage facilities in Tagbilaran city, which was also initially unplanned.
Himayangan – Silago – Abuyog Road and Liloan – San Ricardo Road	Plan change based on the actual site inspection, route change, increase in material fees and so on.
Naga-Toledo Road	Increase in consulting fees for additional



	surveys concerning the specific road portion.
Dalton Pass Section of Sta Rita – Aritao Road	Damage to the road caused by typhoon and partial change in the construction method.

Also, although the above represent the main causes of the increase in construction fees, due to the extension of the construction period as described above, there was also an increase in consulting fees.

The project cost was slightly higher than planned while the project period was significantly higher than planned, therefore efficiency of the project is low.

### 3.3 Effectiveness (Rating: a)

#### 3.3.1 Quantitative Effects

##### 3.3.1.1 Results from Operation and Effect Indicators

The changes in the yearly average traffic of the roads of this project are as follows, and they increase smoothly as compared with the forecast at appraisal.

Table 4. The changes in yearly average of daily traffic (AADT) (Unit: number of cars)

Road	Before project (2000) <sup>*1</sup>	Forecast at appraisal (2005)	After project (2009)
1. Catanduanes circumferential road			
San Andres - Virac	1,332 (1990)	2,006	4,334
Virac – Jct. Bato	1,393 (1990)	3,476	
San Miguel – Summit	257 (1990)	339	
Summit - Viga	341 (1990)	429	
2-1. Bohol island circumferential road (Calape- Tagbilaran)	1,081 (1990)	4,543	4,780
2-2. Bohol island circumferential road (Candijay-Jagna Valencia)	524 (1995)	2,005	4,320
3-1. Southern Leyte arterial road (Himayangan-Abuyog)	852 (1996)	3,193	718 <sup>*2</sup>
3-2. Southern Leyte arterial road (Liloan-San Ricardo)	617 (1996)	1,565	956
4. Naga-Toledo road	2,376 (1998)	6,360	16,991
5. Dalton Pass Section of Sta Rita – Aritao Road	936 (1981)	2,017	3,730

Source: DPWH

\*1. Figures in ( ) means year

\*2. It seems that there were differences in terms of survey points or survey method between appraisal and ex-post evaluation points.

#### Effect of VOC (Vehicle Operation Cost) reduction and time reduction

According to the calculation based on the data obtained from the implementing agency, the following benefit was estimated. (Figures are Net Present Value of VOC and time reduction

over the period of 20 years.)

(Unit: peso)

Road	VOC reduction effect	Time reduction result	Total
1. Catanduanes circumferential road	1,405,578	918,599	2,324,178
2. Bohol island circumferential road	4,254,405	1,855,787	6,110,192
3. Southern Leyte arterial road	1,606,771	2,216,111	3,822,882
4. Naga-Toledo road	2,929,072	1,363,618	4,292,690
5. Dalton Pass Section of Sta Rita – Aritao Road	756,698	413,379	1,170,077

### 3.3.1.2 Results of Calculations of Internal Rate of Return<sup>1</sup> (IRR)

The economic internal rate of return (EIRR) of this project, calculated based on the following assumptions were as follows, and overall, the EIRRs similar to those calculated at the time of appraisal were re-calculated and the economic profitability was estimated.

(Assumptions)

- Project life: 20 years
- Cost: Project cost
- Benefits: Reduction in VOC, reduction in maintenance management cost and so on

Table 4. EIRR Comparison of before and after the project

(Unit: %)

	EIRR at appraisal	EIRR* <sup>1</sup> at ex-post evaluation	Analysis of difference* <sup>2</sup>
1. Catanduanes circumferential road	24.4	20.81	-
2. Bohol island circumferential road	34.0	33.74	-
3-1. Southern Leyte arterial road (Himayangan-Abuyog)	27.9	16.51	Modifications of plan based on the site survey, route changes and increase of the prices of materials happened. Accordingly, as actual construction cost was approximate 2,045 million pesos against planned 1,203 million pesos, actual EIRR became lower.
3-2. Southern Leyte arterial road (Liloan-Saint Richard)	17.4	14.19	-
4. Naga-Toledo road	36.9	41.13	-

<sup>1</sup> Because this project does not generate income without toll fare collection, the financial internal rates of return (FIRR) shall not be calculated.

5. Dalton Pass Section of Sta Rita – Aritao Road	33.6	24.64	Typhoon damaged the road and there was a partial change of construction method. Accordingly, as actual construction cost was approximate 598 million pesos against planned 391 million pesos, actual EIRR became lower.
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\*1. For both project costs and benefits, the figures of the actual results are utilized.

\*2. Analysis was undertaken, when the difference is more than 5%.

### 3.3.2 Qualitative Effects

In two areas of Bohol and Southern Leyte, beneficiary surveys concerning the impact of this project were conducted (on residents and passengers)<sup>2</sup>. Based on the subsequent results of the beneficiary surveys, direct benefits such as reduced travel time, increased shipping volume of goods (mainly crops), improved forms of access, and so on were confirmed.

The total number of resident respondents was 360, who were residents living at the roadsides or neighborhoods of the roads involved in this project. The respondents were a virtually equal split of males and females, and their main occupations were employers (storekeepers and so on), farmers, blue-collar workers, civil servants, those with no regular job/housewives and so on. Over 70% of them (267 people) use the project road daily.

The following are responses concerning the direct benefits of this project:

- This project has brought increase in shipping volume of goods (mainly crops) (257 people which is more than 70% of the total).
- The traffic facilitation by this project contributed to the distribution of goods to and from further destinations (the former responses comprised 70% of the total, and the latter also exceeded 50% of the total).
- Reduced travel time was also realized. (for 330 people, comprising over 90% of the total, further 228 people, around 70% of 330, said that previous one-hour travel had been reduced by over 15 minutes.)
- Improved access was demonstrated by the following rates.

Destination	Rate of respondents who said access was improved (%)
Markets and stores	89.7
Social services (schools and so on)	74.2
Hospitals	67.8
Government offices	50.8
NGO offices	31.1
Others	4.4

The total number of passengers responding was 75, of whom the main occupations were drivers, employers (storekeepers and so on), farmers and so on. Over 80% of them (63

<sup>2</sup> We could not conduct beneficiary survey in all the project sites. Accordingly, we selected the survey sites carefully based on such criteria as budget scale of sub-project (preference on bigger projects), geographical distribution of projects (we tried not to select nearby sub-projects) and security (preference on less dangerous area).

people) use the project road daily.

The following are responses concerning the direct benefits of this project:

- This project has allowed an increased shipping volume of goods (mainly crops) (for 65 people, more than 80% of the total).
- The traffic easing quality of this project facilitated the distribution of goods to and from further destinations (the former and latter responses were beyond 60% and 50% of the total respectively).
- Reduced travel time was realized. (the responses of 68 people, over 90% of the total, also 39 people, around 60% of the total, said previous one-hour travel had been reduced by over 15 minutes.)
- Improved access was reflected in the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	80.0
Social services (schools and so on)	61.4
Hospitals	57.3
Government offices	49.3
NGO offices	29.3
Others	1.3

In light of the above, this project has largely achieved its objectives, therefore its effectiveness is high.

### 3.4 Impact

#### 3.4.1 Intended Impacts

##### ① Bohol island circumferential road

The situation of the indicators concerning the impact on the Bohol area of the Bohol island circumferential road is as follows. The construction was completed in July, 2007.

Table 5. Impact indicators on Bohol

Indicator	2006	2007	2008	2009
Grain output (M.T.= Metric tons=1 ton)	464,658	509,194	581,194	632,906
Livestock output (M.T.)	28,749	30,994	32,635 (Interim)	-
Number of registered commercial and industrial offices	1,547	1,554	1,724	1,426 (Up to the number registered as of 6 November)
Number of new registrations of travel agencies	5	7	7	3
Number of tourists	418,030	531,812	567,174	-

Source: Department of Trade and Industry, Bohol sightseeing office, Bohol investment promotion centre, Tagbilaran city agricultural statistics

Concerning the two largest industries, namely agriculture and sightseeing, improvement in the indicators was seen before and after the project.

As seen in the results of interview to the stakeholders described below, the improvement of the road situation through this project is considered to have helped improve these indicators to some extent.

Concerning agriculture, the results of the surveys of beneficiaries (resident) also back up the above indicators. (The total number of resident repliers is 180 and they live along or near the project roads. The detail of beneficiary survey is attached as APPENDIX 1.) For example, in the results of the beneficiary survey, more than 60 % of the residents reported the increase of shipping volume of agricultural and other products. The survey result also shows that more than 60% of respondents answered “Yes” to the question “Do you think that the project has had an impact on expanding the destination of agricultural or industrial products?” and nearly 40 % of residents answered “Yes” to the question “Do you think that the project has had an impact on expanding the origin of agricultural or industrial products?”.

In addition, almost 30% of residents responded that “they had obtained new job opportunities”, while almost 70% responded that “their income had increased”. Likewise in environmental terms, there were many responses saying it had improved.

According to farmers, key factors behind the increased agricultural output of recent years include the improved logistics owing to the road development and the development of irrigation by dam construction nearby. In addition, the Bohol sightseeing office explained that the road development had improved the access to sightseeing areas so they felt the impact on the promotion of sightseeing was significant.

The following chart shows the location of the project roads.

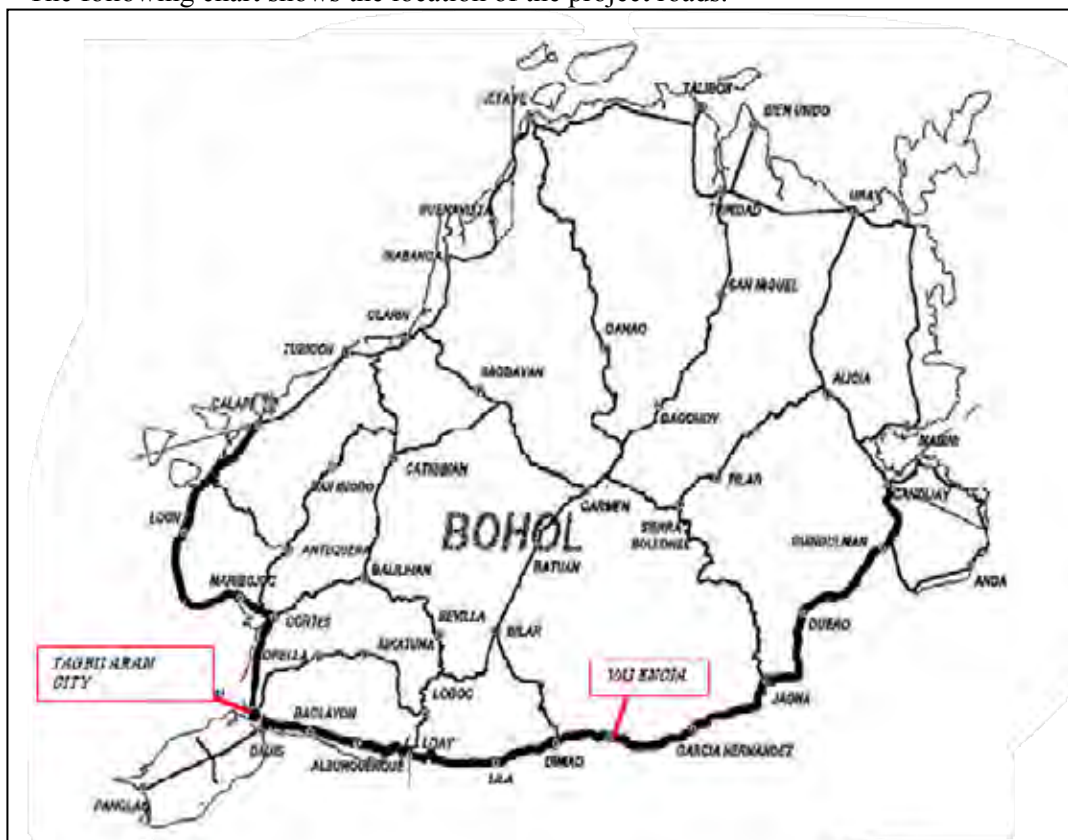


Chart 2. Location of the project road in Bohol (Thick line)

The following is a summary of the other interviews:

- Civil Engineering Division, Tagbilaran city: Because the access to each area had improved, the satisfaction level of the citizens is high.
- Barangay Captain, the largest town in Tagbilaran city: The surface of roads was smoothened, the traffic eased and access to each place has improved considerably.
- The consumer cooperative and private sectors (bus company, travel agencies and greengrocers) in Tagbilaran city: Jointly claimed that access has improved and that they enjoyed the benefits.
- Police office of Tagbilaran city: Number of traffic accidents on the project roads seems to be increasing. However, most seem to be bike accidents due to excessive speeding.
- Civil Engineering Division, Valencia city: Traffic has eased, and dust doesn't rise, so the citizens are satisfied.

② Himayangan – Silago – Abuyog Road and Liloan – San Ricardo Road (Southern Leyte arterial road)

The situation of the indicators concerning the impact by Southern Leyte arterial road is as follows. The construction was completed in October, 2007.

Table 6. Impact indicators on Southern Leyte

Indicator	2005	2006	2007	2008
Agricultural product output of Southern Leyte area: Banana (M.T.= Metric tons)	50,564	52,593	59,875	67,935
Agricultural product output of Southern Leyte area: Rice (M.T.)	82,451	84,413	86,902	99,934
Agricultural product output of Southern Leyte area: Corn (M.T.)	5,792	6,670	6,831	7,665
Number of registered offices	589	1,047	1,027	n.a.
Number of tourists	5,506	5,162	61,127	44,833

Source: Department of Trade and Industry, Department of Tourism, Tacloban agricultural statistics office

The agricultural output of Southern Leyte has been increasing steadily since 2005 in multiple areas. Although the growth post-2007, when the current project was completed, was remarkable, according to the Tacloban agricultural statistics office, the development of such agriculture was largely owing to farmers being supported by local government. However, in considering the results of beneficiary survey, half of whose respondents are farmers, the project is estimated to have contributed to the above indicators to a certain degree. (The total number of resident respondents is 180 and they live along or near the project roads. The detail of beneficiary survey is attached as APPENDIX 1.) For example, in the results of the beneficiary survey, more than 80 % of the residents reported the increase of shipping volume of agricultural and other products. The survey result also shows that more than 70% of residents answered “Yes” to the question “Do you think that the project has had an impact on expanding the destination of agricultural or industrial products?” and nearly 70 % of residents answered “Yes” to the question “Do you think that the project has had an impact on expanding the origin of agricultural or industrial products?”.

In addition, more than 40% of residents responded that “they had obtained new job opportunities”, while more than 70% responded that “their income had increased”. Likewise in environmental terms, there were many responses saying it had improved.

Also, the number of tourists to Southern Leyte rocketed just around the time the construction ended, to which this project also seems to have contributed to a certain extent. According to staff of a local branch office of the Department of Trade and Industry, the development of this project road and the Agas-agas Bridge contributed to the increase in tourists in recent years. With regard to the project road, it is used by tourists to move from Tacloban airport to a sightseeing area (Sagod Area) of Southern Leyte.

The following is a summary of other interviews:

- Civil Engineering Division, Abuyog city: This project has brought enormous benefits. In concrete terms, these include improved traffic between Abuyog and Sirago (which was previously mountainous and impassable), improved access to farmland, improved transport of agricultural products from Sirago, housing land development along the road, enhanced satisfaction among residents concerning roads, and so on.
- Police office of Abuyog city: Although the traffic was increased, an officer felt that the number of accidents had also increased.
- Barangay<sup>3</sup> Captain in Abuyog city: Access to nearby lands was improved.
- Bus company, travel agencies and greengrocers in Abuyog city: the bus company said the bus business along the route of this project road had expanded in terms of both the number of services and passenger numbers. With travel agencies, no clear benefits were confirmed. For greengrocers, because they purchase commercial products mainly from Manila, Davao and Cebu, this project had no particular benefits.

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<sup>3</sup> Local government of the Philippines consists of province, city/town, barangay and the barangay is the smallest administrative unit.



The following chart shows the location of the project roads.

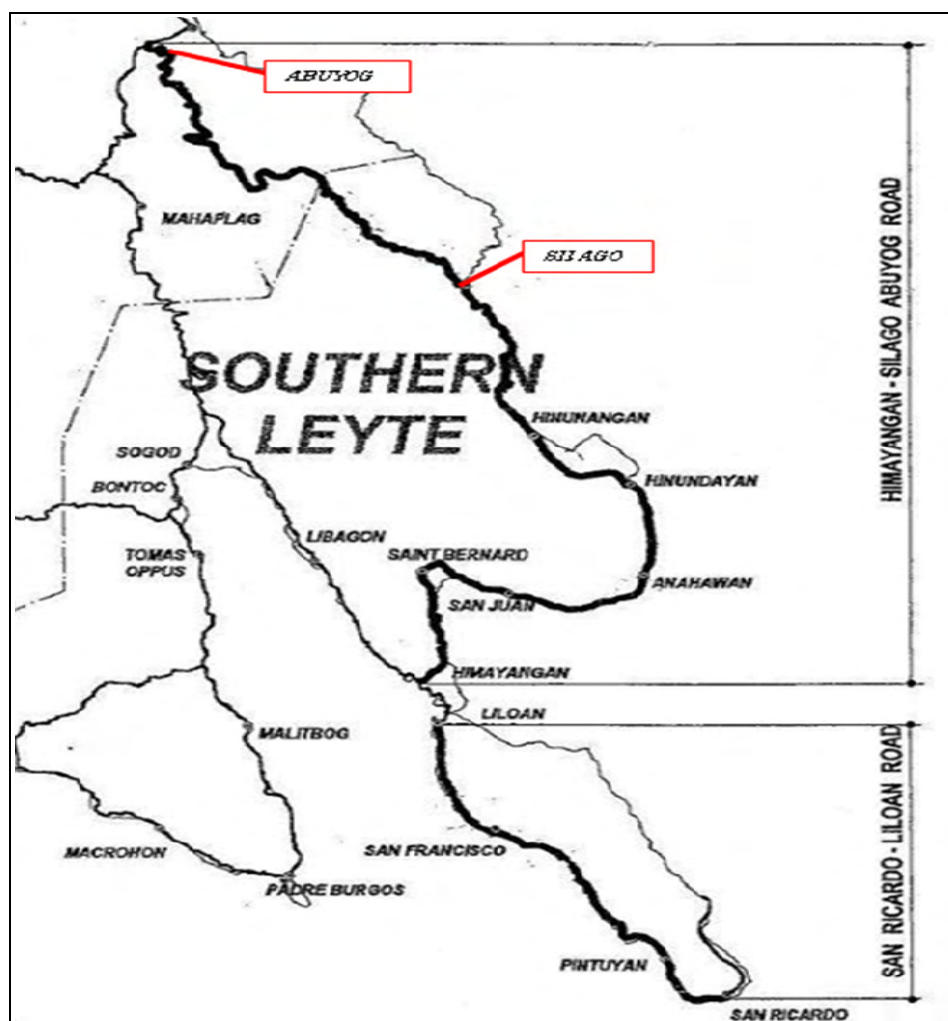


Chart 3. Location of the project road in Southern Leyte (Thick line)

③ Economic indicators of other project areas

The changes in output of “rice and corn” in three provinces<sup>4</sup> other than Bohol and Southern Leyte were as follows. As for the construction completion time of other than Bohol and Southern Leyte, Dalton Pass Section of Sta Rita – Aritao Road was completed in 2003, both Catanduanes circumferential road and Naga-Toledo road were completed in 2007. Considering the above increase of traffic and the results of beneficiary survey, it is estimated that the entire project may have also contributed to the agricultural production.

Table 7. Indicators on agriculture of three provinces other than Bohol and Southern Leyte

	2005	2006	2007	2008	2009
Rice (thousand tons)	251	270	277	286	285
Annual growth rate(%)	2.2	7.80	2.35	3.33	-0.12
Corn (thousand tons)	141	160	155	150	168
Annual growth rate (%)	-11.28	13.46	-3.11	-3.63	12.42

Source: Bureau of Agricultural Statistics website ([www.bas.gov.ph](http://www.bas.gov.ph))

<sup>4</sup> Provinces where other project roads are located.



### 3.4.2 Other Impacts

① Impacts on the natural environment: an Environmental Compliance Certificate (ECC) has been acquired in advance. Based on the environment assessment conducted by the Department of Environment and Natural Resources, the negative impact has been minimized.

The concrete examples are as follows (Bohol):

- Control of sediment volume excavated
- Appropriate disposal of excavated sediment
- Restriction of logging trees

Also in hearing the executing agency with an environment check list (the same as that used during the appraisal) in Bohol and Southern Leyte, no particular problem was seen<sup>5</sup>.

② Land Acquisition and Resettlement: Although land acquisition was conducted in Southern Leyte arterial road, for example, compensation for affected buildings and properties was conducted fairly by a provincial appraisal committee. Appraisals were conducted with regard to the standard prices used in tax payment, and although the negotiations with the residents took time, there were no particular disputes nor legal proceedings. However, with regard to Bohol island circumferential road, land acquisition took much time in high population density areas. More than 41 months were spent, while the plan was 18 months. The lengthy process of land acquisition was the major cause of the construction delay, hence it would be desirable to complete the land acquisition before groundbreaking of construction in future. It seems that in a small portion of the total, houses were relocated, but no problem was highlighted in particular (executing agency, beneficiary survey).

③ Unintended Positive/Negative Impact: No negative impact was seen in particular.<sup>6</sup>

Among the five project roads, the impact was scrutinized only in two areas, namely Bohol island circumferential road and Southern Leyte arterial road. However, from the point of view of improvement of economic indicators in regions including the project sites, the results of beneficiary surveys which support such indicators and the results of analysis of interviews to various stakeholders, the expected impact of the project such as the stimulated and revitalized local economy and improved welfare of the residents is estimated to be realized to a certain degree in these provinces. Negative impact on natural environment and others is not observed. Based on the above traffic indicators and EIRR figures, it is also estimated that the similar impact was achieved for the remaining three project roads.

## 3.5 Sustainability (Rating: a)

### 3.5.1 Structural Aspects of Operation and Maintenance

The DPWH Regional Office was supposed to be responsible for maintenance after the project completion, and the actual maintenance operation was supposed to be conducted by the District Office under the supervision of the Regional Office in direct management or by service contract. The roads developed in this project other than Southern Leyte are, in line with the above plan, maintained by the District Office (Bohol, Naga-Toledo, Catanduanes, Dalton Pass). However in Southern Leyte, the management responsibility for roads hasn't been transferred from the central PMO (Project Management Office) to the Regional and

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<sup>5</sup> Also based on the results of the abovementioned beneficiary survey, in terms of air pollution and noise, many stated that the situation had improved after the project (73.6% of the total answered that the air quality had improved, and 51.4% stated a noise reduction).

<sup>6</sup> In the results of the beneficiary questionnaire survey as well, very little negative impact was highlighted.

District Offices.

To reaffirm assurance with regard to road maintenance, the earliest possible transfer of such responsibility is desired.

### 3.5.2 Technical Aspects of Operation and Maintenance

The regular road maintenance method is as follows:

(Daily maintenance)

- Control of weeds
- Cleaning of bridges
- Maintenance of unpaved road shoulders
- Correction of ruts
- Cleaning of side ditches
- Embankment protective construction in disasters

(Regular/special maintenance)

- Signposting on roads
- Renovation of bridges, banking construction

According to a hearing survey and questionnaire response, staff was able to cope with the arising problems by themselves sufficiently. There is considered to be no problem in terms of the technological levels of the staff in particular. The number of staff is mostly sufficient, and their stability is also high. For road maintenance, manuals like that shown below are used, and the maintenance method is standardized in DPWH.

- ROADWORKS SAFETY MANUAL

- HIGHWAY SAFETY DESIGN STANDARDS

- MAINTENANCE BY CONTRACT MANUAL – 3rd Edition, October 1991

Also, staff training is regularly conducted at the initiative of the Regional Office.

With the above in mind, there is no particular problem in terms of the operation and maintenance technology.

### 3.5.3 Financial Aspects of Operation and Maintenance

The changes to the road maintenance budget of the whole DPWH in recent years were as follows: Every year a certain maintenance budget is secured.

Table 8. Road maintenance budget of the entire DPWH (Unit: million pesos)

Year	Routine/Carriageway maintenance	Roadside maintenance	Preventive maintenance	Total length of national roads (km)
2007 <sup>*1</sup>	2,021	1,750	7,300	29,968
2008 <sup>*2</sup>	4,021	1,850	6,690	30,224
2009	3,500	2,020	7,300	30,594

Source: Bureau of Maintenance, DPWH

\*1. In 2007, 720 million Pesos of so-called “Special Road Safety Fund” were also allocated.

\*2. In 2008, 663 million Pesos of “Road Safety Projects” were also allocated.

In this project, for each road, a certain level of maintenance fees are disbursed every year. A certain District Office was having a problem that although the minimum scale necessary for maintenance was secured, because the disbursement is not stable and given the uncertainty as to when the next budget grant would be advanced, the cash flow situation was very difficult (Bohol).

Examining the responses from each office, although the maintenance budget is not necessarily sufficient, the situation is not serious. Concerning the request on the timely disbursement of budget to a District Office, a remedial action is desired.

#### 3.5.4 Current Status of Operation and Maintenance

Based on the responses to the questionnaires by the executing agency and the visual inspection conducted by the evaluation team members including the local consultant<sup>7</sup>, the status is basically good. The status of the two areas actually inspected by the evaluation team members was as follows:

(Bohol)

Although there is a crack in a small portion, there are plans to repair it in the near future. Apart from that, there is no particular problem concerning their overall use.

(Southern Leyte)

There is no particular problem.

Also, according to the abovementioned beneficiary survey, 316 people, representing 88% of all respondents, were satisfied with the road maintenance status.

No major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

## 4. Conclusion, Lessons Learned and Recommendation

### 4.1 Conclusion

Because this project has a high relevance with the development policy of the Philippines at the time of both the appraisal and ex-post evaluation, as well as the high consistencies with development needs and Japan's aid policy, the relevance is also high. Although the output originally planned was realized, the efficiency is low, because the project duration was substantially over the forecast level, and the project cost also slightly exceeded the budget. The effectiveness as seen in the operation and effect indicators and the internal rates of return is high and an impact was also created. No major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

In light of the above, this project is evaluated to be satisfactory (B).

### 4.2 Recommendation

#### 4.2.1 Recommendation to the executing agency

In Southern Leyte, because the management responsibility of roads has not yet been transferred to the Regional and District Offices (at the time of site visit), the responsibility should be transferred at the earliest possible time to reaffirm assurances on road maintenance.

In Bohol, it is desirable that the Regional Office budget for operation and maintenance be disbursed timely or the disbursement time be informed in advance.

#### 4.2.2 Recommendation to JICA

None in particular.

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<sup>7</sup> The local consultant surveyed the "Dalton Pass Section of Sta Rita – Aritao Road" as well as accompanying the inspection of the Japanese consultant.

### **4.3 Lessons Learned**

In this project lengthening of the land acquisition was a major cause of construction delay. This means that not only the following project phase of construction was delayed but also construction process itself was affected by the simultaneously undertaken land acquisition. In this case it was time consuming because the population density was high at the project site. From now on they should allow enough time for the land acquisition in such a highly populated area and should complete land acquisition before the beginning of construction.

## APPENDIX 1. The summary of beneficiary survey (Impact)

1. The results of the beneficiary survey (residents and passengers) on the impact of this project conducted in Bohol were as follows:

The total number of **residents** responding was 180, who were residents living at the roadsides or neighborhoods of the roads involved in this project. The respondents were a virtually equal split of males and females, and their main occupations were employers (storekeepers and so on), civil servants, farmers, blue-collar workers, no regular job/housewives and so on. 80% of them use the road daily.

The following were the concrete responses concerning the impact of this project:

1. Job opportunity: Did you get any new job opportunities after this project?: Yes (27.8%), No (58.3%), No answer (13.9%)
2. Change in income: Did your household income increase after this project?: Yes (68.9%), No (23.9%), No answer (7.2%)
3. Did the shipping volume of crops and commodities increase?: Yes (60.6%), No (7.8%), Unknown (31.7%)
4. Did the shipping area of crops and commodities expand?: Yes (63.3%), No (7.2%), Unknown (29.4%)
5. Did the harvesting and producing area of crops and commodities expand?: Yes (37.2%), No (8.9%), Unknown (53.9%)
6. Change in the number of traffic accidents: Increased (56.1%), decreased (34.4%), Unknown (9.4%)
7. Impact on business properties and houses: There is an impact (26.1%)
8. Change in environment post-construction (only the main items extracted, response rate: %)

Item	Deterioration	No change	Improvement
Air	3.9	25.6	70.6
Noise	9.4	51.7	38.9
Water quality	0.6	62.2	37.2

9. Comprehensive evaluation of project benefits

Item	Rate of respondents (%)
Excellent	7.2
Good	57.8
Neutral	18.3
Slightly Negative	4.4
Very Negative	0.6
No Answer	11.7

The total number of **passengers** responding was 36, of whom 75% use the road daily.

The concrete responses concerning the impact of this project were as follows:

1. Did the shipping volume of crops and commodities increase?: Yes (86.1%), No (5.6%), Unknown (8.3%)
2. Did the shipping area of crops and commodities expand?: Yes (61.1%), No (2.8%), Unknown (36.1%)
3. Did the harvesting and producing area of crops and commodities expand?: Yes (30.6%), No (5.6%), Unknown (63.9%)

4. Change in the number of traffic accidents: Increased (44.4%), decreased (44.4%), Unknown (11.1%)
5. Comprehensive evaluation of project benefits

Item	Rate of respondents (%)
Excellent	5.6
Good	75.6
Neutral	8.3
Slightly Negative	2.8
Very Negative	0
No Answer	8.3

2. The results of the beneficiary survey (residents and passengers) on the impact of this project conducted in Southern Leyte are as follows:

The total number of the **residents** responding was 180, who were residents living at the roadsides or neighborhoods of the roads involved in this project. The respondents were a virtually equal split of males and females, and their main occupations were farmers, employers (storekeepers and so on), civil servants, blue-collar workers, and so on. Almost 70% (68.3%) of them use the road daily.

The concrete responses concerning the impact of this project were as follows:

1. Job opportunity: Did you get any new job opportunities after this project?: Yes (42.2%), No (41.7%), No answer (16.1%)
2. Change in income: Did your household income increase after this project?: Yes (74.4%), No (17.8%), No answer (7.8%)
3. Did the shipping volume of crops and commodities increase?: Yes (82.2%), No (2.8%), Unknown (15.0%)
4. Did the shipping area of crops and commodities expand?: Yes (73.3%), No (5.6%), Unknown (21.1%)
5. Did the harvesting and producing area of crops and commodities expand?: Yes (68.9%), No (6.7%), Unknown (24.4%)
6. Change in the number of traffic accidents: Increased (78.9%), decreased (11.1%), Unknown (10.0%)
7. Impact on business properties and houses: There is an impact (8.9%)
8. Change in the post-construction environment (only the main items extracted, response rate: %)

Item	Deterioration	No change	Improvement
Air	4.4	18.9	76.7
Noise	7.8	28.3	63.9
Water quality	0.6	53.3	46.1

9. Comprehensive evaluation of project benefits

Item	Rate of respondents (%)
Excellent	12.2
Good	67.2
Neutral	9.4
Slightly Negative	1.1
Very Negative	1.1
No Answer	8.9

The total number of **passengers** responding was 39 and 92.3% of the respondents who use the road daily.

The concrete responses concerning the impact of this project were as follows:

1. Did the shipping volume of crops and commodities increase?: Yes (87.2%), No (0%), Unknown (12.8%)
2. Did the shipping area of crops and commodities expand?: Yes (64.1%), No (5.1%), Unknown (30.8%)
3. Did the harvesting and producing area of crops and commodities expand?: Yes (74.4%), No (5.1%), Unknown (20.5%)
4. Change in the number of traffic accidents: Increased (76.9%), decreased (7.7%), Unknown (15.4%)
5. Comprehensive evaluation of project benefits

Item	Rate of respondents (%)
Excellent	17.9
Good	71.8
Neutral	5.1
Slightly Negative	0
Very Negative	0
No Answer	5.1

### Comparisons of the Planned and Actual Figures

Components	Plan	Actual
① Outputs	1. Catanduanes Circumferential Road: Development of roads, bridges and so on (about 63 km) <ul style="list-style-type: none"> <li>• Renovation of damaged bridges along Codon-Biga (about 63 km) and circumferential road (total length about 545 km), the PPCP construction method (Portland Cement Concrete, concrete paving) was utilized.</li> </ul>	Development of roads, bridges and so on (43.11 km) Renovation of damaged bridges along Codon-Biga and the circumferential road (total length about 397m, 5 bridges in total), the PPCP construction method was utilized.
	2. Bohol island circumferential road: Development of roads and so on (about 136 km) <ul style="list-style-type: none"> <li>• Calape-Loay (about 67 km)</li> <li>• Loay-Candijay (about 69 km)</li> </ul>	Although the total extension is the same, the descriptions of the road segmentation differ from before as follows: <ul style="list-style-type: none"> <li>• Calape - Valencia (about 84 km)</li> <li>• Candijay - Valencia (about 52 km)</li> </ul> There was the partial addition of scope (drainage facilities) and also in terms of the construction method, PCCP was adopted instead of planned ACP in some portions.
	3. Himayangan – Silago – Abuyog Road and Liloan – San Ricardo Road : development of roads, bridges and so on (about 136 km) <ul style="list-style-type: none"> <li>• Himayangan-Sirago (about 61 km)</li> <li>• Sirago-Abuyog (about 38 km)</li> <li>• Liloan-Saint Richard (about 37 km)</li> </ul>	The total extension of all three packages was 129.12 km, slightly shorter than the original plan. The construction and renovation of bridges is as planned. Also, in response to damage caused by e.g. typhoons and earthquakes, in each of the left three zones, scope which was not initially planned was added.
	4. Naga-Toledo Road: Development of roads, bridges and so on (about 37 km) <ul style="list-style-type: none"> <li>• Naga-Toledo (about 37 km)</li> </ul>	Conducted as planned.
	5. Dalton Pass Section of Sta Rita – Aritao Road: Renovation of the damaged portion of the road. (about 0.9 km)	The road length is the same. In addition to the originally planned scope, the following construction was implemented: <ul style="list-style-type: none"> <li>• Paving to respond to fresh damage to typhoons “Feria” and “Harurot”</li> <li>• Reinforcement measures to</li> </ul>



		respond to the deterioration of the road after the time of appraisal
② Term	September, 1999— September, 2004 (61 months)	September, 1999— November, 2007 (96 months)
③ Project costs Foreign currency Local currency  Total ODA Loan Portion Exchange Rate	10,872 million Yen 2,517 million Peso (7,551 million Yen) 18,423 million Yen 15,384 million Yen 1 Peso = 3 Yen (As at January, 1999)	7,749 million Yen 5,151 million Peso (11,282 million Yen) 19,031 million Yen 15,251 million Yen 1 Peso = 2.1902 Yen (Weighted average)

**Third Party Opinion**  
**Arterial Road Links Development Project (Phase IV)**

Josef T. Yap, Philippine Institute for Development Studies

The evaluation process adopts a straightforward methodology and judging from other projects, the methodology is applied consistently. The criteria and ranking are well defined.

When evaluating cost effectiveness, the exchange rate is allowed to vary. Hence the comparison of the budget at the start of the project and the actual cost in yen terms becomes misleading. The main reason is that the actual costs are in peso terms. The project evaluator argues that this is a rule that JICA has set. Nevertheless, as shown in the report comparing yen costs and local currency costs will generate different outcomes about cost efficiency.

The provinces where projects were undertaken are: Catanduanes, Bohol, Cebu, Southern Leyte, and Nueva Ecija-Nueva Vizcaya where the Dalton Pass goes through. In terms of poverty incidence in 2000, Catanduanes and Bohol were areas where infrastructure development was badly needed then.<sup>8</sup> Cebu and Southern Leyte were relatively better off but the project would have benefitted Leyte province, where poverty incidence was higher than the national average. It is the prioritization of Dalton Pass that is questionable since poverty incidence in Nueva Vizcaya is fairly low but the decision may have been caused by inertia since this is part of the Japan-Philippines Friendship Road. Moreover, this road was heavily damaged by the typhoon in 1998 and urgent repair from the damage was needed.

Poverty trends in these provinces has been mixed. There were major improvements in terms of poverty reduction in Catanduanes, Bohol, Cebu, Nueva Ecija and Nueva Vizcaya between 2000 and 2003. However, the improvements were not sustained between 2003 and 2006. Nevertheless, poverty incidence in 2006 was still lower compared to 2000. Poverty incidence deteriorated in Southern Leyte. Based on the data, it is likely the projects contributed positively to reducing poverty incidence.

The choice of Bohol and Leyte for the survey to evaluate effectiveness is fairly representative of disadvantaged provinces. The favorable impact of the project in Bohol can be partly deduced from the sharp fall in poverty incidence between 2000 and 2003.

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<sup>8</sup> Data on poverty incidence per province can be obtained from [http://www.nscb.gov.ph/poverty/2006\\_05mar08/table\\_1.asp](http://www.nscb.gov.ph/poverty/2006_05mar08/table_1.asp)

**1. Project Description**



Project Site



Project Road (Iloilo Province)

**1.1 Background**

In the Philippines, the arterial road network expanded quantitatively by intensive investment after independence until the 1980s, in response to the increasing road traffic demand. Because consideration of the functionality of road and the grade of pavement was not prioritized, aging temporarily-built bridges, unpaved and/or narrow roads had inhibited traffic efficiency. There was a strong need to improve qualitative conditions such as the modification of unpaved roads to paved and improving the temporary bridges into permanent bridges to secure an efficient, safe and reliable road network. Road improvement projects, however, had primarily focused on establishing the major arterial road network rather than rural roads, as mentioned above.

**1.2 Project Outline**

The objective of this project is to realize a safe and efficient regional road network in 11 provinces of the Philippines by improving National Secondary Roads which were connected to major arterial road links, thereby contributing to the promotion of regional industries and the improvement of the living standards of inhabitants.

Approved Amount / Disbursed Amount	12,895 million yen / 12,514 million yen
Exchange of Notes Date / Loan Agreement Signing Date	July, 1995 / August, 1995
Terms and Conditions	Interest Rate: 2.7%, 2.3% (consulting service) Repayment Period: 30 years (Grace Period: 10 years), General Untied
Borrower / Executing Agency(ies)	Philippine government / Department of Public Works and Highways
Final Disbursement Date	June, 2006

<sup>1</sup> This project was jointly evaluated with National Economic and Development Agency (NEDA) of the Philippines government.

Main Contractor (Over 1 billion yen)	China GEO Engineering Corporation (China) / Dongsung Construction Company Limited (the Republic of Korea) / Italian-Thai Development Public Company Limited (Thailand)
Main Consultant (Over 100 million)	United Technologies (Philippines) / Demcor Inc. (Philippines) / Multi-Infra Konsult, Inc. (Philippines) / Techniks Group Corp. (Philippines) / Katahira Engineering International (Japan)
Feasibility Studies, etc.	2 Feasibility studies conducted by JICA (one completed in February, 1989 and another completed in October, 1990)
Related Projects (if any)	Formulation of “Rural Road Network Development Project (RRNDP) – Phase 2” by JICA’s SAPROF (Special Assistance for Project Formation)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

### 2.2 Duration of Evaluation Study

Duration of the Study: January 2010 - December 2010

Duration of the Field Study: 17 March - 10 April 2010, 8 June - 7 July 2010,  
5 - 18 September 2010

### 2.3 Constraints during the Evaluation Study

None in particular

## 3. Results of the Evaluation (Overall Rating: B)

### 3.1 Relevance (Rating: a)

#### 3.1.1 Relevance with the Development Plan of the Philippines

In the “Medium-term Philippine Development Plan(MTPDP), 1993-1998” and  
“Medium-term Philippine Public Investment Program, 1993-1998” effective at the time of  
appraisal, the cited targets were to increase the paved ratio of arterial roads up to 85% and  
that of second national roads up to 60% by 1998, the last year of the plan.

This target reflects the intention to invest in order to improve the quality of the road network,  
which had already been well formulated quantitatively and the plans were suitable for the  
current situation of the Philippine road sector.

This project focuses mainly on the second road<sup>2</sup> and is an attempt to conduct improvement  
works. The project is confirmed to be one of those clearly mentioned in the above plans.

At the time of the ex-post evaluation, in the “Medium Term Philippines Development Plan  
(2004-2010)”, the development goals and strategies of transport infrastructure sector are set  
out as follows:

- Improve access to domestic and international markets to ease poverty in local and

<sup>2</sup> Other strategically important roads were also included in the plan.

remote areas.

- Enhance peace and security in areas of conflict through efficient traffic and commerce.
- Enhance national solidarity, family bonds and sightseeing by ensuring swift, economical and safe forms of transfer for people.
- Build a transportation logistics system which achieves efficient access between the business centre of the Manila metropolitan area and nearby states to ease traffic congestion in the metropolitan area.
- Develop transport infrastructure at a minimum budget and debts.

In addition, in order to rationalize the allocation of scarce public resources, the 2004-2010 MTPDP prioritizes the following activities in the road sector: a) maintenance of existing assets; b) rehabilitation of damaged sections; c) improvement and widening of heavily used roads; and d) construction of new roads and missing links in the road network in that order.

As above, after as well as before the project is conducted, the importance of developing the rural road network remains.

### 3.1.2 Relevance with the Development Needs of the Philippines

In the Philippines in the 1990s, there was a strong need to improve qualitative conditions such as the modification of unpaved roads to paved and improving the temporary bridges into permanent bridges to secure an efficient, safe and reliable road network. Road improvement projects, however, had primarily focused on establishing the major arterial road network rather than rural roads, as mentioned in the above 1.1 Background.

Therefore, there was a future need to promote the expansion of the rural road network, which links the local towns and villages and the main arterial road network, in addition to improving the arterial road network. The expansion of the rural road network was necessary to activate the local economy, leading to reduced income disparity between residents in urban and local areas.

In addition, the change in the paving rates of major roads confirmed at the ex-post evaluation was as follows:

Table 1. Paving rates of major roads (Unit:%)

Type of road	1992	2009
National roads	50	75.15
- PCC (concrete paving)	27	47.45
- AC (Asphalt paving)	23	27.70
- Gravel	49	24.56
- Earthen roads	1	0.29
Provincial roads	12	41.99
- PCC	3	36.00
- AC	9	5.99
- Gravel	71	50.25
- Earthen roads	17	6.26

Source: Department of Public Works and Highways

During the period of about 20 years to date, the paving rates have grown drastically. According to the statistics of the Land Transportation Office, Department of Transportation Communications, the number of registered vehicles in the Philippines had increased from 3,701,173 in 2000 to 5,891,272 in 2008, which is about 1.6 times the figure in 2000.

In addition, as seen in the following, the traffic volume on the project roads has also increased steadily.

This project is suitable for the development needs (road usage needs) from the time of appraisal to date. The selection of project roads was very systematic and detailed.

### 3.1.3 Relevance with Japan's ODA policy

According to the "Overseas Economic Cooperation Policy" issued by JICA (former JBIC) in 1999, the following statement was included related to the Republic of the Philippines:

"Emphasis is placed on the support for strengthening the economic structure for the purpose of sustainable growth, poverty alleviation and improvement of economic gap among regions, the support for environment protection including disaster prevention, and human resource/institution development."

This project is in line with the then Japan's ODA policy.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

## 3.2 Efficiency (Rating: b)

### 3.2.1 Project Outputs

The following chart shows the distribution of the project sites.



Chart 1. Location of project sites (Red portions)

As seen in the following “Table 2. Comparison of outputs”, although the plan and actual outputs differ, the overall project scale is almost the same.

Table 2. Comparison of outputs

Province	Plan			Actual		
	Total length (km)	Number of road sections	Target bridges	Total length (km)	Number of road sections	Target bridges
1. Ilocos Sur	36.1	4	4	17.33	1	3
2. Pangasinan	40.6	4	2	86.38	10	3
3. Cagayan	39.7	2	5	31.43	2	0
4. Nueva Ecija	31.6	1	6	53.45	4	4
5. Rizal	28.8	3	1	17.90	2	0
6. Camarines Sur	9.5	1	1	19.95	1	4
7. Iloilo	43.7	4	2	35.93	3	5
8. Negros Oriental	48.7	2	3	17.29	1	1
9. Eastern Samar	16.2	2	0	19.47	2	0
10. Misamis Oriental	41.2	1	0	24.71	2	0
11. Compostela Valley* <sup>1</sup>	29.3	2	4	34.43	2	0
12. Bukidnon* <sup>2</sup>	—	—	—	8.0	1	0
<b>Total</b>	<b>365.4</b>	<b>26</b>	<b>28</b>	<b>366.27</b>	<b>28</b>	<b>20</b>

\*1. The name of province “Davao del Norte” at appraisal was changed to “Compostela Valley”.

\*2. Bukidnon was added because of change of a project road.

Details of the change of scope are as follows:

With regard to sub-projects, many road sections were deleted/cancelled in the provinces<sup>3</sup>. The reason for the change of scope of sub-projects is that the many road sections that were part of the original plan had already been repaired by the Philippine Government. Because of the time having elapsed between the appraisal and the detailed design, which was more than two (2) years, the localities could not wait for the project to start. Accordingly, repair works which were similarly necessary were separately implemented. These alternative roads satisfied the 4 criteria decided as preconditions during the appraisal, e.g., that the EIRR should be higher than 15%.

With regard to each road section improved as planned, the scope was occasionally changed to better suit the site conditions, based on detailed design research.

There is no particular change about the content of consulting services. The implementing agency, DPWH highly evaluates the performance of the consultants. Although M/M of Project Management Consultants (PMO) and local consultants exceeded the original plan, this is owing to the extension of the entire construction period, as stated below in 3.2.2.1 Project Period.

With regard to the influence of the change of scope on the project purpose, the project seems to have been conducted in line with the project purpose, despite the change of scope.

<sup>3</sup> According to the replies of questionnaire to the implementing agencies, as far as the number of road sections is concerned, about half of the original plan was cancelled, as the construction was conducted by the Philippine government. Other road sections were improved by the use of remaining budget of this project.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Period

For this project, the planned schedule was 5 years and 4 months from the L/A (Loan Agreement) signing (July 1995) to the completion of civil engineering work (October 2000). The actual L/A signing was in August 1995, while the overall civil engineering work was finished in April 2007. In other words, the project period actually became 141 months, significantly longer than the planned 64 months, which means the rate of actual period to the plan is 220.3%.

(Breakdown of period by stages)

Stage	Plan (months)	Actual (month)	Ratio of Actual to Plan
1. Selection of consultants (Project management)	12	4	33%
2. Selection of consultants (Local consultants)	18	11	61%
3. Selection of sub-projects	6	9	150%
4. Detailed design	12	20	167%
5. Selection of contractors	30	31	103%
6. Construction	34	80	235%
7. Construction management	34	82	241%
8. Land acquisition	12	16	133%

As shown above, the critical factor of the delay was the extended construction period. This was due to the following factors, of which “Change in scope based on the actual field condition” was the most influential.

- Additional roads in 6 provinces<sup>4</sup>
- Bad weather
- Change in scope based on the actual field condition<sup>5</sup>
- ROW problem
- Problematic Contractor’s performance (very partial)<sup>6</sup>

Other factors behind the difference between the plan and actual period are as follows:

The reason for the longer detailed design period is also due to the major change of scope (road extensions) in some areas. The reason for the consultant selection shorter than plan is that the mode of procurement for consultants was through a Negotiated Contract. The loan effectiveness also took 10 months, much longer than the usual 3-4 months<sup>7</sup>.

#### 3.2.2.2 Project Cost

The originally planned project cost was 8,925 million yen in foreign currency and 2,002 million pesos in domestic currency (8,268 million yen\*), which totaled 17,193 million yen. Among the 17,193 million yen, 12,895 million yen was a yen loan, and the remaining 4,298 million yen was planned to be shouldered by the Philippine government.

<sup>4</sup> “Additional roads” were, in many cases, replacements for roads that had been cancelled from the original plan, as they were constructed by the Philippine government. Therefore, the construction is time consuming, because the activity has to start from scratch, i.e. from project identification, which resulted in a longer implementation period.

<sup>5</sup> When considerable time passes after the F/S, there is potential for geological conditions to change due to typhoons or other factors. Consequently, it becomes inevitable to modify the scope.

<sup>6</sup> Based on PCR (Project Completion Report) and the interview to the executing agency.

<sup>7</sup> This is due to the addition of preconditionalities by the Japanese government to the Philippines’ side.



\* Exchange rate: 1 peso=4.13 yen (as at January, 1995)

The actual project cost was 4,893 million yen in foreign currency and 4,470 million pesos in domestic currency (11,622 million yen\*), a total of 16,516 million yen, of which 12,514 million yen was a yen loan, and the remaining 4,002 million yen was shouldered by the Philippine government.

\* Exchange rate: 1 peso=2.6 yen (weighted average during the project period)

As shown above, although the degree of change of scope is considerable, when we look at the overall length, number of road sections and target bridges as a whole, there is little difference before and after the project. Accordingly, in calculating the rate of actual cost to planned cost, the scope change was not reflected.

In terms of the Japanese yen, the actual cost is significantly lower than planned and the rate of actual to planned cost is as low as 96.1%. For information, in peso terms, however, the rate of actual to plan is 152.6%. In other words, the actual cost exceeded the plan but because of the considerable appreciation of the Japanese yen in terms of foreign exchange, the cost appears to be under-budget.

There are 2 major factors behind the cost increase as follows:

1. Extended construction period owing to many changes of scope and the addition/replacement of sub projects
2. Considerable increase of the cost of materials, labor and fuel and so on

With the above in mind, although the project period was significantly longer than planned, the project cost was lower than planned, therefore efficiency of the project is fair.

### 3.3 Effectiveness (Rating: a)

#### 3.3.1 Quantitative Effects

##### 3.3.1.1 Results from Operation and Effect Indicators

AADT (Annual Average Daily Traffic) has steadily increased as compared with the forecasted figures at appraisal. For example, while the forecasted annual average traffic growth rate is 2.91%, the actual growth rate is 2.40%. (Actual growth rates are slightly lower than forecast in general. But the period of actual growth rates does not include 1997-2000. According to the census, this period during 1997-2000 shows very high population growth rate as compared with the following period. If we could include the period during 1997-2000 in the calculation of actual growth rates, the rates would have been higher than the figures in the table.)

Table 3. Change of AADT (Annual Average Daily Traffic) over time

Province	Project Road	Before the project (2000)	After the project (2009)	Actual Annual Growth Rate (%) (2000-2009)	Forecasted Annual Growth Rate (%) (1997-2009)*
1. Ilocos Sur	Tagudin-Suyo	1,294	1,548	2.01	n.a.
	Santiago-Lidlidda	2,407	2,872	1.98	3.00
	Candon-Salcedo	4,648	5,539	1.97	n.a.
2. Pangasinan	Carmen-Bayambang	8,677	11,079	2.75	n.a.
	Bayambang-San Carlos	8,677	11,079	2.75	3.00
	Jct. Agno-Agno	1,850	2,326	2.58	3.00
	Lingayen-Labrador	4,902	6,180	2.61	3.00
	San Carlos-Manat	8,677	11,079	2.75	3.00

	Manaoag-Jct.Pao Road	2,807	3,536	2.60	3.00
	Binalonan-Jct.Pao	2,807	3,536	2.60	3.00
3.Cagayan	Jct.Gattaran-Capissayan	1,065	1,291	2.16	3.00
4.Nueva Ecija	Laur-Gabaldon and other	n.a.	n.a.	n.a.	2.03
5.Rizal	Marikina-Rodriguez-Wawa and other	n.a.	n.a.	n.a.	3.00
6.Camarines Sur	Sipocot-Calabanga Road	4,068	5,028	2.38	3.00
7.Iloilo	Barotac Viejo-San Rafael Road	2,116	2,586	2.25	3.00
	Tigbauan-Cordova-Leon Road	3,083	3,792	2.33	3.00
	Miagao-Igbaras Road	387	474	2.28	2.28
8.Negros Oriental	Bayawan-Basay Road and other	n.a.	n.a.	n.a.	3.00
9.Eastern Samar	Dolores-Oras-San Policarpo	1,139	1,416	2.45	3.00
10.Misamis Oriental	Cagayan de Oro-Tikalaan and other	n.a.	n.a.	n.a.	3.00
11. Compostela Valley	Compostela-New Bataan and other	n.a.	n.a.	n.a.	3.00
Simple average				2.40	2.91

Source : DPWH

\*Note : At appraisal

### 3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)<sup>8</sup>

According to the re-calculation of EIRR (Economic Internal Rate of Return) based on the actual construction cost and the AADT, based on the same method as the appraisal, the entire situation is comparable to the EIRR estimated at appraisal and the required level of 15% to conduct a project was satisfied for almost all project roads. Hence the economic profitability of the project is estimated.

### 3.3.2 Qualitative Effects

The summary results of the beneficiary (Residents' and Passengers') survey<sup>9</sup> conducted in Pangasinan and Nueva Ecija are as follows. Increase of shipping volume of products and improvement of access were confirmed.

The total number of resident respondents was 379, who were residents living at the roadsides or neighborhoods of the project roads. The main occupations of the respondents were those with no regular job/housewives, employers (storekeepers and so on), farmers, blue-collar workers and public servants. Over 70% of them (280) use those project roads daily.

The following are the responses concerning the direct benefits of this project:

- This project has brought an increase in the shipping volume of goods (mainly crops).

<sup>8</sup> The financial internal rate of return (FIRR) shall not be calculated because this project does not generate income without toll fare collection.

<sup>9</sup> We could not conduct beneficiary survey in all the project sites. Accordingly, we selected the survey sites carefully based on such criteria as budget scale of sub-project (preference on bigger projects), geographical distribution of projects (we tried not to select nearby sub-projects) and security (preference on less dangerous area).

225 respondents, who are nearly 60% of the total, agreed on this.

- The smoother traffic realized by this project has contributed to the distribution of goods to and from further destinations. In “distribution of goods to further destinations”, nearly 50% of the respondents agreed and in “distribution of goods from further destinations” more than 50% agreed.
- Reduced travel time were realized. 276 people, more than 70% of the total, agreed. In addition, 200 replied that the previous 1 hour travel had been shortened by 15 minutes or more.
- Improved access was demonstrated by the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	90.5
Social services (schools and so on)	78.1
Hospitals	70.2
Government offices	74.1
NGO offices	46.2
Others	20.3

The total number of passengers responding was 68, of whom the main occupation was driver. Over 90% of them (66 people) use the project road daily.

The following are responses concerning the direct benefits of this project:

- This project has brought an increased shipping volume of goods (mainly crops). 37 people, more than 50% of the total agreed on this.
- The smoother traffic realized by this project facilitated the distribution of goods to and from further destinations. More than 50% of the respondents agreed on the facilitation of the distribution of goods to further destinations, while nearly 50% agreed on the facilitation of the distribution of goods from further destinations.
- Reduced travel time were realized. 62 people, more than 90% of the total, agreed. In addition, 40 people replied that the previous 1 hour travel had been shortened by 15 minutes or more.
- Improved access was reflected in the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	88.2
Social services (schools and so on)	88.2
Hospitals	70.6
Government offices	73.5
NGO offices	39.7
Others	30.9

With the above in mind, this project has largely achieved its objectives, therefore its effectiveness is high.

### 3.4 Impact

#### 3.4.1 Intended Impacts

First, information related to impact on 2 areas where the site survey was conducted is as follows:

① Pangasinan: Data on the impact which the project roads may have made was obtained as follows. Indicators show the development after the project completion (June, 2006) in aspects of agriculture, business activities and tourism. According to the interview with the related governmental staff, improving the project roads is estimated to have contributed to the positive indicators to a certain degree.

When we look at the results of the beneficiary survey, more than 40% of residents reported the increase of job opportunities and household income. It also shows that more than 40% of respondents answer “Yes” to both the following questions: “Do you think that the project has had an impact on expanding the destination of agricultural or industrial products?” and “Do you think that the project has had an impact on expanding the origin of agricultural or industrial products?”. This may be interpreted as evidence of the project’s contribution to agriculture. (The total number of resident repliers is 199 and they live along or near the project roads. The detail of beneficiary survey is attached as APPENDIX 1.)

Table 4. Indicators on the impact brought by the project (Pangasinan)

Indicators	2003	2004	2005	2006	2007	2008	2009
Rice production within the province (MT= Metric tons)	800,438	809,240	835,874	976,198	1,011,115	1,027,289	n.a.
Corn production within the province (MT)	113,792	130,675	188,957	199,227	199,120	211,229	n.a.
Number of registered business establishments by sector in Pangasinan	n.a	n.a.	5,805	5,991	6,135	7,114	6,611
Number of persons by Registered Business Establishments in Pangasinan	n.a	n.a.	18,346	15,969	18,093	19,710	16,640
Investments of BN registered establishments (Million Peso)	n.a	n.a.	3,612.8	7,586.6	5,720.7	11,456.3*	1,406.9
Total tourist arrivals	n.a	n.a.	43,392	53,404	56,505	58,200	n.a.

Source : Bureau of Agricultural Statistics, DTI-Pangasinan, Department of Tourism, Regional Office 1

\*Note : There was a series of construction of large scale commercial facilities this year.

Agricultural production has been increasing continuously since early 2000s and business activities have also been active since 2005. The slowdown of business activities in 2009 may have been caused by typhoons that year. The number of tourists has also been increasing since 2005.

According to the DTI-Pangasinan, improvement of roads may have not only realized easier transport of agricultural products but also reduced the transport time, contributing to total agricultural production. In addition, the improved roads may be contributing to activate business activities by reducing the transport cost. Road improvement has also contributed to securing alternative roads for transport during large scale natural disasters, by improving the

local road network.

The Bureau of Agricultural Statistics (Pangasinan) states that the potential of the project roads' contribution to agricultural production is strong, as the farmland is spread over the entire Pangasinan, although it is difficult to find a clear cause-effect relationship from the statistics.

The Engineering Office in the Pangasinan Provincial government also mentioned that, as a benefit of the project road, farmers' access to market had improved.

A summary of the other interviews is as follows:

- Transport companies (staff of 14 companies such as drivers of vehicles, bus conductors): All the companies pointed out the benefit of the reduced transport time. 5 companies replied that they had also increased company profit.
- Companies and shops along the road (various business sectors, total 13): 12 companies mentioned the benefit of the reduced transport time. 6 companies replied that they had also increased company profit.
- Barangay captains of barangays near the road (6 people): The population of barangays varies from 669 to 3,658. All the barangay captains mentioned benefits such as reduced travel time and also the decrease of floods during the rainy season. In their overall evaluation results, in terms of 5 grade evaluations, 4 captains chose "Excellent" (5), 1 chose "Good" (4) and 3 captains chose "Neutral" (3).

② Nueva Ecija: Data on the impact which the project roads may have had was obtained as follows. Indicators show the development after the project completion (May, 2003) in terms of agriculture and business activities. According to an interview with the related governmental staff, improving the project roads is estimated to have contributed to the positive indicators to a certain degree.

When we look at the results of the beneficiary survey, about 30% of residents reported the increase of job opportunities and more than 40% reported the increase of household income. It also shows that more than 50% of respondents mentioned "Yes" to both the following questions: "Do you think that the project has had an impact on expanding the destination of agricultural or industrial products?" and "Do you think that the project has had an impact on expanding the origin of agricultural or industrial products?". This may be interpreted as evidence of the project's contribution to agriculture. (The total number of resident repliers is 180 and they live along or near the project roads. The detail of beneficiary survey is attached as APPENDIX 1.)

Table 5. Indicators on the impact brought by the project (Nueva Ecija)

Indicators	2003	2004	2005	2006	2007	2008	2009
Rice production within the province (MT= Metric tons)	716,168	733,246	738,805	777,844	881,505	892,046	884,595
Onion production within the province (MT)	53,315	42,810	37,177	29,994	77,850	70,289	n.a.
Number of registered business establishments by sector in Nueva Ecija	n.a	4,221	4,499	4,265	4,787	5,528	4,727
Employment Generated	n.a	15,163	15,377	16,013	15,521	16,464	12,983
Investments of BN registered establishments (Million Peso)	n.a	1,742	1,473	1,485	1,846	2,123	1,281

Source: Nueva Ecija Provincial government (Agricultural Dept.), Bureau of Agricultural Statistics (Cabanatuan city), DTI – Nueva Ecija



According to the Nueva Ecija Provincial government (Agricultural Dept., City Planning Dept.) and the Bureau of Agricultural Statistics (Cabanatuan city), Zaragoza – Jaen Road (Segment 3 of project sites in Nueva Ecija, Chart 2 of the next page), one of the project roads is used as follows. Goods going to Zaragoza are eventually delivered to Manila and those going to Jaen are delivered to Cabanatuan (local major city, near Sta Rosa in the Chart 2). In that sense many rice farmers around the road section are estimated to be benefiting in terms of easier access to market and reduced transport time. Tablang (Laur) – Gabaldon Road (Segment 1 of project sites in Nueva Ecija, the following Chart 2) may also be contributing to the active transport of agricultural products in the direction of Laur / Tablang. In this area, onions, which are the major product of Nueva Ecija, are widely produced in addition to rice. The transport of goods between Nueva Ecija and its neighboring province in the east, Aurora, is expected to be improved by the project. Aurora faces the sea and there are ports and beach suitable for swimming and marine sport near the end of the project road. Therefore, the transport of fishery products will be boosted and also the flow of tourists from Nueva Ecija to Aurora, as Nueva Ecija is landlocked.

Other provincial data is also listed above. It is not clear how much the project roads directly contributed due to a lack of information. The abovementioned improvement of efficiency in transport, however, may have also contributed to industries other than agriculture.

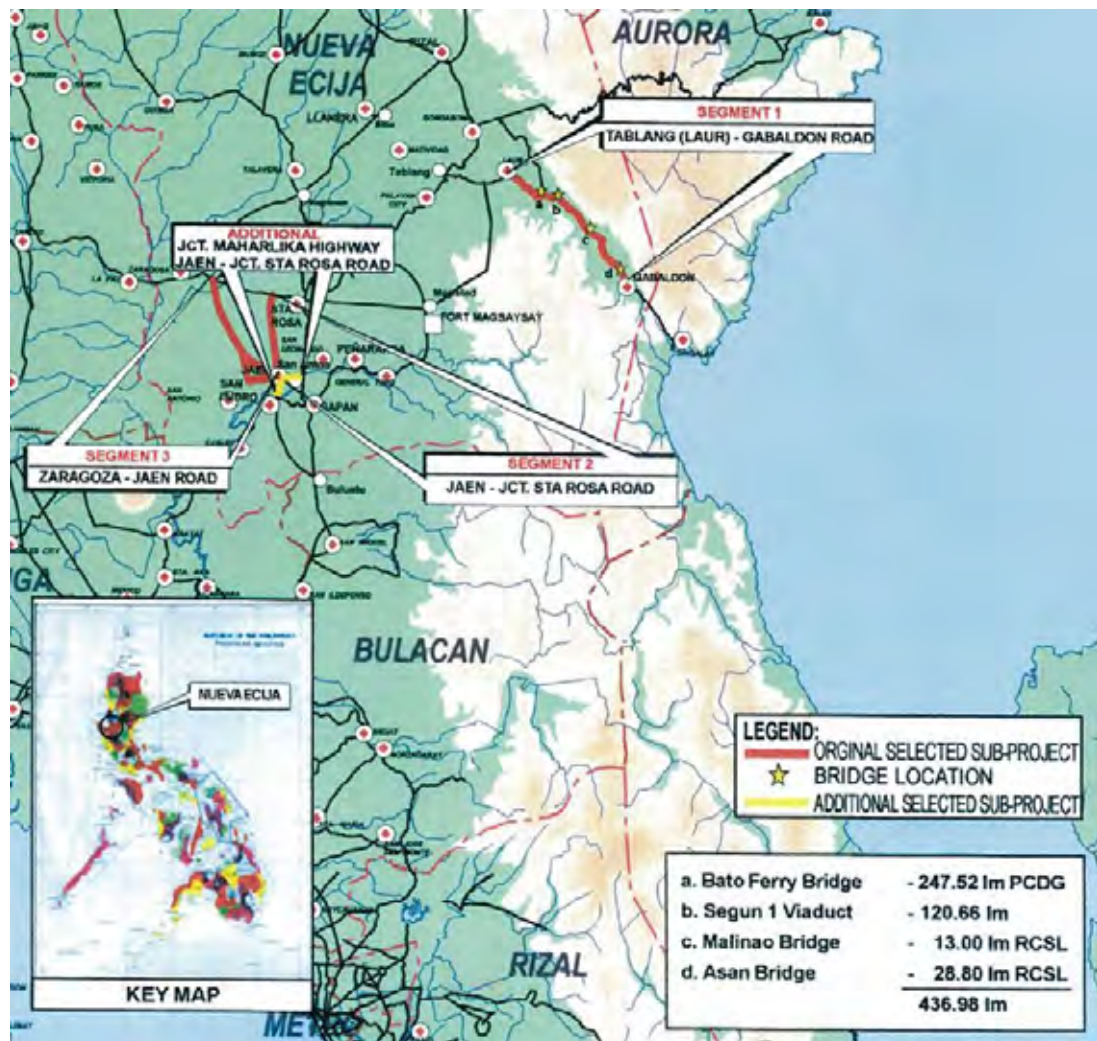


Chart 2. Project sites in Nueva Ecija province

\*Note: “KEY MAP” means the entire Philippines.

Finally, almost all the indicators deteriorated in the year 2009 and the influence of the typhoon was considerable, particularly on agriculture. The following table shows the number of typhoons which struck this area, in which 2009 stands out.

Year	2005	2006	2007	2008	2009
The number of typhoons which struck this area	1	3	1	1	6

Source: Information of Philippine Atmospheric Geophysical and Astronomical Services

The results of other interviews are summarized as follows:

- The provincial government of Nueva Ecija, Director, Office of Civil Works: This project has had a certain benefit for the local community. The transport of agricultural products from farm to market has become easier. In addition, the time needed for transport has been reduced and the mobility of local people has increased. In a comprehensive 5 grade evaluation, he gave the second-highest level “Good”, mentioning it would have been better, if the road and shoulder were wider.
- Transport companies (3 drivers or owners of tricycle, jeepney or truck): All the interviewees mentioned benefits such as reduced transport time and the ability to transport heavier cargo than before, while 2 interviewees stated that the competition among companies had intensified.
- Companies and shops along the road (various business sectors, total 6): All 6 interviewees mentioned benefits such as reduced travel time, the ability to transport heavier cargo than before and the decreased damage by typhoons. All 6 interviewees also mentioned the increase of company profits.
- Barangay captains of barangays near the road (9 people): The population of barangays varies from 1000 to 5000 (approximate figures). All the captains mentioned benefits such as reduced travel time and better access to hospitals. As the comprehensive evaluation of the project, 4 captains gave 5 (Excellent), 3 captains gave 4 (Good) and 1 captain gave 2 (Slightly Negative) with 1 not responding.

### ③ Other economic indicators

Agricultural statistics of 8 provinces except Pangasinan, Nueva Ecija and Cagayan<sup>10</sup> are shown as follows.

Production of rice and corn over time is shown below. The project completion dates in these 8 provinces varies from 2003 to 2007. When we compare the data of the traffic amount of Pangasinan<sup>11</sup> with other provinces, it is similar and it is estimated that the entire project may have also contributed to the agricultural production to a certain degree.

Table 6. Production of rice and corn in 8 provinces

Item	2005	2006	2007	2008	2009
Rice (thousand tons)	1,630	1,789	1,847	1,941	1,900
Annual growth rate (%)	-7.18	9.74	3.25	5.12	-2.14

<sup>10</sup> Because of the lack of available data, Cagayan is not included.

<sup>11</sup> Data for Nueva Ecija was not available.

Corn (thousand tons)	414	481	546	604	493
Annual growth rate (%)	23.02	16.23	13.50	10.65	-18.42

Source : Bureau of Agricultural Statistics website (www.bas.gov.ph)

### 3.4.2 Other impacts

There is no particular problem as a whole.

- (1) Impacts on the natural environment: In this project, the impact was regarded as “small”, as the project is the improvement of the existing roads and the project received ECC exemptions. According to the questionnaire replies from the DPWH District Offices, there seems to be no negative impact on the natural environment.
- (2) Land Acquisition and Resettlement: According to the questionnaire replies from the DPWH District Offices, no particular problems or disputes occurred in relation to land purchase. In the project, the DPWH was supposed to complete the land acquisition before the JICA’s agreement of the main construction contract, with the smooth implementation in mind. As a result, land acquisition was almost completed before the start of construction. The process of land acquisition was not significantly delayed, either.
- (3) Unintended Positive/Negative Impact: Not particularly reported.

The detailed situations following actual visits to 2 sites were as follows:

#### (Pangasinan)

- a. Impact on the natural environment: The site condition was checked using JICA’s standard environment checklist in an interview with the implementing agencies but no particular problem was found. The consultant team actually visited sites (part of the project roads) but did not observe any particular problems, either.
- b. Relocation of residents and land purchase: Among the 4 offices in charge of the project roads (3 DPWH District offices and the Pangasinan Provincial governmental office), information was collected from 2 offices. Compensation was paid for about 700 households, in total. With regard to the compensation, it was time consuming but no particular problems or disputes occurred in relation to land purchase. There was no relocation of residents.

#### (Nueva Ecija)

- a. Impact on the natural environment: The site condition was checked using JICA’s standard environment checklist in an interview with the implementing agencies but no particular problem was found. The consultant team actually visited sites (part of the project roads) but did not observe any particular problems, either.
- b. Relocation of residents and land purchase: There are 2 offices in charge of the project roads (DPWH, District office and the Nueva Ecija provincial government), which the consultant team visited. Around the project roads under the jurisdiction of the DPWH, compensation was paid related to land use for road improvement to 500-1000 households. (NOTE: It was an activity conducted in around 2000 and no detailed records remain.)  
With regard to the compensation level determination, the Provincial Appraisal Committee<sup>12</sup> decides the level of compensation considering the land tax, assessment by financial organizations and the market price of the land. To agree compensation, 5 staff members of

<sup>12</sup> The committee consists of the Provincial Assessor’s Office, Provincial Engineering Office and Provincial Treasury Office.



the DPWH District Office, Planning Div. negotiated with residents for about 6 months. No particular problems or disputes occurred in relation to land purchase. There was no relocation of residents.

From the point of view of improvement of economic indicators in regions including the project sites, the results of beneficiary surveys which support such indicators and the results of analysis of interviews to various stakeholders, the expected impact of the project such as the promotion of regional industries and the improvement of the living standards of inhabitants is estimated to be realized to a certain degree. Negative impact on natural environment and others was not observed.

### 3.5 Sustainability (Rating: b)

#### 3.5.1 Structural Aspects of Operation and Maintenance

The District Offices mainly conducted the operation and maintenance of the project roads and facilities improved/constructed. The number of O&M staff members in all the District Offices was almost sufficient. The turnover ratio is very small and staff are very stable everywhere<sup>13</sup>.

Responsibility for some of the road sections has been transferred to provincial governments. For example, in Pangasinan province, 2 out of 10 project roads are maintained by the Pangasinan provincial government. There was no particular problem in the operations. In Nueva Ecija, 3 out of 4 project roads are maintained by the provincial government but there is no particular problem, either.

#### 3.5.2 Technical Aspects of Operation and Maintenance

The usual O&M methods in use are as follows:

- cleaning & desilting of drainage structures
- resealing of pavement cracks and joints
- vegetation control
- application of concrete epoxy of PCCP blocks with scaling.

According to the questionnaire replies from the DPWH District Offices and interviews with them, O&M staff can conduct their tasks without particular technical problems. O&M manuals are in use in all the offices and they are common manuals issued by the DPWH.

With regard to the skills of the staff, in addition to OJT in each District Office, DPWH Regional Offices periodically conduct training, to which District Offices dispatch their staff.

#### 3.5.3 Financial Aspects of Operation and Maintenance

The road maintenance budget amounts of the entire DPWH in recent years were as follows. Every year a certain maintenance budget is secured.

Table 7. Road maintenance budget of the entire DPWH Unit: million pesos

Year	Routine/ Carriageway maintenance	Roadside maintenance	Preventive maintenance	Total length of national roads (km)
2007* <sup>1</sup>	2,021	1,750	7,300	29,968
2008* <sup>2</sup>	4,021	1,850	6,690	30,224
2009	3,500	2,020	7,300	30,594

Source: Bureau of Maintenance, DPWH

<sup>13</sup> However, the District Office of Nueva Ecija uses an outside contractor for road maintenance and the necessary funds come from a relatively temporary budget ("Employment Creation Program (2004-2010)" under the Arroyo government, which is stated in the following 3.5.3 Financial Aspects of Operation and Maintenance).

Note : \*1. In 2007, 720 million Pesos of so-called “Special Road Safety Fund” were also allocated.

\*2. In 2008, 663 million Pesos of “Road Safety Projects” were also allocated.

According to the questionnaire replies from the DPWH District Offices and interviews with the offices, many offices<sup>14</sup> in charge state that the O&M budget is not sufficient.

Also according to the Bureau of Maintenance of DPWH, over the last few years, among steady maintenance budgets, the whole “Roadside maintenance” has been completely dependent on the time-limited measure by the former president Arroyo (“employment creation program” for the period 2004–2009) and there is future uncertainty concerning the financial source of this portion. If the program finishes, there will be some influence on the sufficiency of personnel in District Offices in charge of project roads. (There is related explanation in footnote 13.)

#### 3.5.4 Current Status of Operation and Maintenance

According to the questionnaire replies from the DPWH District Offices, interviews with the offices and site visits by consultants<sup>15</sup> and local surveyors<sup>16</sup>, it was confirmed that most of the project roads are in use without problems. In a very limited section of the project roads, however, problems such as small cracks were found and need to be repaired. (According to local surveyors, in the Jaen – Zaragoza section, a very limited part of the project road in Nueva Ecija, approximately 20 small cracks were found.)

Also, according to the abovementioned beneficiary survey, 304 people, representing 80.2% of the total respondents, were satisfied with the road maintenance status. (Not satisfied: 5.3%, No reply: 14.5%)

With the above in mind, some problems have been observed in terms of finance; therefore sustainability of the project is fair.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

The relevance of this project is high because the project is highly consistent with the following three matters: the development policy of the Philippines at the time of both the appraisal and the ex-post evaluation; development needs; and Japan’s aid policy. Project period is significantly longer than planned and project cost is lower than planned, therefore efficiency of the project is fair. The effectiveness as seen in the operation and effect indicators and the internal rates of return is high and an impact was also created. Some problems have been observed in terms of finance; therefore sustainability of the project is fair.

In light of the above, this project is evaluated to be satisfactory (B).

### 4.2 Recommendations

#### 4.2.1 Recommendation to the executing agency

Allocation of the O&M budget is not sufficient and there is some uncertainty in future with regard to the roadside maintenance budget. Therefore, the budget of O&M should be secured in general.

<sup>14</sup> 7 out of 10 responding District Offices replied the insufficiency of O&M budget.

<sup>15</sup> Consultants (Ex-post evaluation team members) visited the project roads in Pangasinan and Nueva Ecija. The local consultant visited Ilocos Sur, Iloilo and Rizal. Hence 5 out of 11 provinces were covered.

<sup>16</sup> Local surveyors also visited the project roads in Pangasinan and Nueva Ecija more intensively, as they conducted a beneficiary survey.

#### 4.2.2 Recommendation to JICA

Nothing in particular.

#### **4.3 Lessons Learned**

One of the reasons why the construction period was extended is the frequent changes of scope due to various findings at the time of Detailed Design (D/D). With regard to this issue, it is not appropriate to stick to the original scope and proceed in order to avoid a prolonged construction period. However, when a long time has elapsed after conducting the F/S, geological conditions may change significantly owing to typhoons, for example. Accordingly, substantial modifications in terms of repair methods, construction period and cost may become inevitable. Such a situation may affect the project in the form of extended project period and fund shortages and also project evaluation.

Therefore, it is worth considering a review of F/S before D/D and making the necessary amendment to the basic elements of the project plan, when considerable time has elapsed after F/S and the geological condition has changed significantly.

## APPENDIX 1. The summary of beneficiary survey (Impact)

1. The results of the abovementioned beneficiary survey in Pangasinan are as follows:

The following were the concrete responses by 199 interviewed **residents** concerning the impact of this project:

1. Job opportunity: Did you get any new job opportunities after this project? Yes (45.2%), No (43.7%), No answer (11.1%)
2. Change in income: Did your household income increase after this project? Yes (44.2%), No (33.7%), No answer (22.1%)
3. Has this project brought an increased shipping volume of goods? Yes (50.3%), No (5.5%), No answer (44.2%)
4. Has the smoother traffic realized by this project contributed to the distribution of goods to further destinations? Yes (41.2%), No (5.5%), No answer (53.3%)
5. Has the smoother traffic realized by this project contributed to the distribution of goods from further destinations? Yes (45.2%), No (7.0%), No answer (47.7%)
6. Change in the number of traffic accidents: Increased (91.0%), decreased (3.5%), Unknown (5.5%)
7. Impact on properties and houses: There was an impact (1.5%)
8. Change in environment after construction  
(only the main items extracted, response rate: %)

Item	Deterioration	No change	Improvement
Air	4.0	27.1	68.8
Noise	37.2	33.2	29.6
Water quality	0.5	88.9	10.6

9. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	8.5
Good	62.3
Neutral	18.6
Slightly Negative	0.5
Very Negative	0
No answer	10.1

The concrete responses by 40 **passengers** concerning the impact of this project were as follows:

1. Has this project brought an increased shipping volume of goods? Yes (45.0%), No (5.0%), No answer (50.0%)
2. Has the smoother traffic realized by this project contributed to the distribution of goods to further destinations? Yes (42.5%), No (5.0%), No answer (52.5%)
3. Has the smoother traffic realized by this project contributed to the distribution of goods from further destinations? Yes (42.5%), No (2.5%), No answer (55.0%)
4. Change in the number of traffic accidents: Increased (92.5%), decreased (5.0%), Unknown (2.5%)
5. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	12.5

Good	60.0
Neutral	27.5
Slightly Negative	0
Very Negative	0

2. The results of the abovementioned beneficiary survey in Nueva Ecija are as follows:

The following were the concrete responses by 180 interviewed **residents** concerning the impact of this project:

1. Job opportunity: Did you get any new job opportunities after this project? Yes (29.4%), No (61.1%), No answer (9.4%)
2. Change in income: Did your household income increase after this project? Yes (42.8%), No (45.6%), No answer (11.7%)
3. Has this project brought an increased shipping volume of goods? Yes (69.4%), No (5.6%), No answer (25.0%)
4. Has the smoother traffic realized by this project contributed to the distribution of goods to further destinations? Yes (53.9%), No (8.3%), No answer (37.8%)
5. Has the smoother traffic realized by this project contributed to the distribution of goods from further destinations? Yes (57.2%), No (11.7%), No answer (31.1%)
6. Change in the number of traffic accidents: Increased (77.8%), decreased (7.2%), Unknown (15.0%)
7. Impact on properties and houses: There is an impact (20.0% - properties, 2.2% - houses)
8. Change in environment after construction  
(only the main items extracted, response rate: %)

Item	Deterioration	No change	Improvement
Air	7.8	47.2	45.0
Noise	66.7	22.2	11.1
Water quality	9.4	79.4	11.1

9. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	36.7
Good	34.4
Neutral	17.8
Slightly Negative	0.6
Very Negative	0
No answer	10.6

The concrete responses by 28 **passengers** concerning the impact of this project were as follows:

1. Has this project brought an increased shipping volume of goods? Yes (67.9%), No (7.1%), No answer (25.0%)
2. Has the smoother traffic realized by this project contributed to the distribution of goods to further destinations? Yes (64.3%), No (10.7%), No answer (25.0%)
3. Has the smoother traffic realized by this project contributed to the distribution of goods from further destinations? Yes (50.0%), No (3.6%), No answer (46.4%)
4. Change in the number of traffic accidents: Increased (85.7%), decreased (3.6%), Unknown (10.7%)

5. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	25.0
Good	57.1
Neutral	7.1
Slightly Negative	0
Very Negative	0
No Answer	10.7

### Comparisons of the Plan and Actual Figures

Components	Plan			Actual		
① Outputs						
Province	Total length (km)	Number of road sections	Target bridges	Total length (km)	Number of road sections	Target bridges
1. Ilocos Sur	36.1	4	4	17.33	1	3
2. Pangasinan	40.6	4	2	86.38	10	3
3. Cagayan	39.7	2	5	31.43	2	0
4. Nueva Ecija	31.6	1	6	53.45	4	4
5. Rizal	28.8	3	1	17.90	2	0
6. Camarines Sur	9.5	1	1	19.95	1	4
7. Iloilo	43.7	4	2	35.93	3	5
8. Negros Oriental	48.7	2	3	17.29	1	1
9. Eastern Samar	16.2	2	0	19.47	2	0
10. Misamis Oriental	41.2	1	0	24.71	2	0
11. Compostela Valley	29.3	2	4	34.43	2	0
12. Bukidnon	—	—	—	8.0	1	0
Total	365.4	26	28	366.27	28	20
② Term	July, 1995 ~ October, 2000 (64 months)			August, 1995 ~ April, 2007 (141 months)		
③ Project costs						
Foreign currency	8,925 million Yen			4,893 million Yen		
Local currency	2,002 million Peso (8,268 million Yen)			4,470 million Peso (11,622 million Yen)		
Total	17,193 million Yen			16,516 million Yen		
ODA Loan Portion	12,895 million Yen			12,514 million Yen		
Exchange Rate	1 Peso = 4.13 Yen (As at January, 1995)			1 Peso = 2.6 Yen (Weighted average)		

**Third Party Opinion**  
**Rural Road Network Development Project (II)**

Josef T. Yap, Philippine Institute for Development Studies

The evaluation process adopts a straightforward methodology and judging from other projects, the methodology is applied consistently. The criteria and ranking are well defined.

When evaluating cost effectiveness, the exchange rate is allowed to vary. Hence the comparison of the budget at the start of the project and the actual cost in yen terms becomes misleading. The main reason is that the actual costs are in peso terms. The project evaluator argues that this is a rule that JICA has set. Nevertheless, as shown in the report comparing yen costs and local currency costs will generate different outcomes about cost efficiency.

There is a difference in the plan and actual outputs of the project on arterial road development. Pangasinan and Nueva Ecija clearly gained while Negros Oriental and Misamis Oriental lost out. For example, the *planned* road length in Pangasinan was 40.6 kilometers and the *actual* road length was 86.38 kilometers. Pangasinan and Nueva Ecija experienced a significant reduction in poverty incidence between 2000 and 2003.<sup>17</sup> Meanwhile, poverty incidence in Misamis Oriental barely went down and increased sharply in Negros Oriental. While it can be argued that this is the evidence that the project had an impact in terms of poverty reduction, it is also an indication that resources are not allocated to provinces where they are needed more. Project resources could have been allocated more equitably.

The survey methodology and conclusions drawn from the survey results are acceptable and sound. However, the choice of Pangasinan and Nueva Ecija for evaluating the effectiveness and impact of the project can be questioned. Since they gained from the changes in the original plan, it is likely the survey results will show a favorable impact. It could have been balanced by survey results from the other provinces.

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<sup>17</sup> Data on poverty incidence per province can be obtained from [http://www.nscb.gov.ph/poverty/2006\\_05mar08/table\\_1.asp](http://www.nscb.gov.ph/poverty/2006_05mar08/table_1.asp)