

# Ex-Post Evaluation of Japanese ODA Loan Cordillera Road Improvement Project

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## 0. Summary

The objective of this project is to promote transportation for people and materials and improve the efficiency and reduce the costs of shipping by improving main roads in the Cordillera region in the mountainous area of north-central Luzon. Since the project suits the Philippines’ development policies and development needs and is in agreement with the aid policies of the Japanese government, the relevance is high. It also is highly effective since the volume of transportation on project roads has increased steadily, local residents’ access to various facilities has improved, and travel time has decreased. Furthermore, the project is having a gradual impact on the local economy, for example by increasing volumes of agricultural produce shipped by farmers in the vicinity of the project road and increasing numbers of tourists.

However, the efficiency of the project has been evaluated as fair due to a lengthening of the project period. There also are some issues that require improvement in road conditions and maintenance as well, and as such the sustainability of the effects realized by the project is fair.

For the above reasons, the project can be evaluated to be satisfactory.

## 1. Project Description



Project Location



Part of the Cordillera Road

**1.1 Background**

The Cordillera Administrative Region (consisting of the six provinces of Abra, Benguet, Ifugao, Kalinga, Apayao, and Mountain Province) in north-central Luzon is a mountainous region in which about 70% of the surface area (1.83 million ha) consists of rugged mountains. It is the source of the rivers that flow through northern Luzon. While its main industry is mining and manufacturing, which accounted for 58% of the region’s total output of 50.7 billion pesos (1997), about 60% of the region’s population of 1.25 million (1995) were engaged in agricultural production of produce such as rice and highland vegetables.

The administrative region has formulated a Cordillera Regional Development Plan intending to promote agriculture, mining and manufacturing, and tourism and to eradicate poverty through increasing income and expanding employment opportunities. However, development of basic infrastructure such as roads and telecommunications has been slowed in the region by its precipitous terrain. There was a pressing need to develop a safe and efficient road network in order to promote and vitalize the economy in the administrative region, through linking focal points in provinces in the region and promoting transportation of materials and people to and from major cities outside the region.

**1.2 Project Outline**

The objective of this project is to promote transportation for people and materials and improve the efficiency and reduce the costs of shipping by improving main roads in the Cordillera region in the mountainous area of north-central Luzon, thereby contributing to promoting and vitalizing the economy in the region and improving the welfare of its residents.

Loan Approved Amount/ Disbursed Amount	5,852 million yen/5,522 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	December 1999/December 1999
Terms and Conditions	<p>Construction:</p> <p>Interest Rate: 1.8%,  Repayment Period: 30 years (Grace Period: 10 years),  Multiple conditions</p> <p>Consulting/services:</p> <p>Interest Rate: 0.75%,  Repayment Period: 40 years (Grace Period: 10 years),  Multiple conditions</p>
Borrower/Executing Agency(ies)	Government of the Republic of the Philippines/Department of Public Works and Highways (DPWH)

Final Disbursement Date	March 2008
Main Contractor	China GEO Engineering Corporation (People's Republic of China)/Cavite Ideal International Construction & Development Corp. (Philippines)
Main Consultant	Pacific Consultants International (Japan)/Philipp's Technical Consultants Corp (Philippines)/Design Science Incorporated (Philippines)/Urban Integrated Consultants Inc. (Philippines) (JV)
Feasibility Studies, etc.	Conducted by the Philippines
Related Projects	Technical cooperation: Dispatch of JICA experts to the DPWH (Road Department)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

For this project, a joint evaluation was conducted with the National Economic and Development Authority (NEDA).

### 2.2 Duration of Evaluation Study

Duration of the Study: January - December 2011

Duration of the Field Study: March 29 - April 18, June 8 - 25, September 25 - October 9, 2011

### 2.3 Constraints during the Evaluation Study (if any)

No particular constraints

## 3. Results of the Evaluation (Overall Rating: B<sup>1</sup>)

### 3.1 Relevance (Rating: ③<sup>2</sup>)

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

At the time of the appraisal, the new Medium-Term Development Plan (covering the years 1999 - 2004) formulated by the Estrada administration had established the development objective in the transport sector of supporting the socioeconomic development of the Philippines through provision of safe and reliable transport services, and strategies identified for the achievement of this objective included (1) lessening government participation in road development and promoting use of the private sector, (2) improving the quality of existing infrastructure through appropriate repairs and maintenance, and (3) introduction of appropriate legal frameworks and price policies to develop competitive markets. Achieving a high standard in main national highways and decentralization of road-network

<sup>1</sup> A: Highly satisfactory; B: Satisfactory; C: Partially satisfactory; D: Unsatisfactory

<sup>2</sup> ③: High, ②: Fair, ①: Low

development were identified as priority items toward achievement of strategy 2 in particular, and this project corresponds to such an effort to achieve a high standard in national highways.

In the Cordillera Administrative Region, the Cordillera Regional Development Plan 1999-2004 was formulated with the aims of promoting agriculture, mining and manufacturing, and tourism and eradicating poverty through increasing income and expanding employment opportunities. A Cordillera Road Improvement Program is addressed specifically in this development plan, and as such this project is relevant to the plan.

At the time of the Ex-Post Evaluation, the midterm infrastructure development plan (covering the years 2011 - 2016) formulated by the DPWH identified the following as objectives in the road sector:

“The main objectives of the DPWH are to improve the public’s access to products and services and enhance the safety and international development of the road network, through maintenance, improvement, and expansion of the nation’s road network in an efficient, environment conscious way.”

In addition, the Cordillera Administrative Region Updated Regional Development Plan, 2008-2010 notes that the percentage of national highways that were paved had risen from 31% in 2003 to over 34% in 2007, thanks to implementation of World Bank and JICA projects. The plan established the objective of increasing this ratio to 40% by 2010.

In this way, even after the implementation of this project, improvements to the transportation network remain important. As shown by policies at the time of the appraisal and later, both the government of the Philippines and the Cordillera Administrative Region have continually recognized the importance of improving the main roads in the Cordillera Administrative Region, and as such this project can be said to be highly relevant to the country’s development plan.

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

The road network is a weakness in the Cordillera Administrative Region (about 80% of the national highways in the region were unpaved), and often traffic on main roads was cut off by damage from natural disasters. There was a need for steady improvement in the network of main roads, as basic infrastructure. The Baguio - Arifao road covered by this project is a main east-west thoroughfare linking Baguio, a central city in the Cordillera Administrative Region, with the most important main road, Philippine-Japan Friendship Highway which traverses the Philippines from north to south. The project road passes through steep and mountainous area and the quality of the road was very poor. With a high level of development effects in increasing the efficiency of transport of agricultural produce and improving access to social services, it was expected to improve the living environment of residents in the vicinity, including many ethnic minorities.

As shown by the operation and effect indicators under “Effectiveness” below, the volume of traffic on the project road is increasing steadily. In addition, the total population of the Cordillera Administrative Region and its number of registered vehicles are increasing over time so that the presence of development needs can be confirmed at the time of ex-post evaluation as well.<sup>3</sup>

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<sup>3</sup> While the total population was approximately 1.25 million in 1995, in 2007 it was approximately 1.52 million. The number

In this way, the development needs were clear at the time of the appraisal and have been verified statistically at the time of ex-post evaluation as well, and as such the project is relevant with development needs.

### 3.1.3 Relevance with Japan's ODA Policy

According to the appraisal materials, JICA had a policy of supporting improvement to the economic infrastructure in areas such as transportation in order to eliminate bottlenecks to economic development, for the purpose of securing sustainable growth in the Philippines. In improvements to the main road network in particular, already efforts had been focused on improvements to north-south road networks, in consideration of the geographical structure of the Philippines as a long country from north to south, including the Philippine-Japan Friendship Highway project. Subsequently, a policy had been adopted to improve main roads linking east with west and peripheral roads on islands, in addition to north-south roads, to encourage balanced land development.

The overseas economic cooperation implementation policy released at about the same time as the appraisal included the following passage:

#### “3. Country-Specific Aid: (v) Philippines

*The focal points of aid for the sustainable growth in the Philippines will be on strengthening the economic structure of the Philippines as well as alleviating poverty and rectifying regional disparities, which are leading factors limiting growth, and on aid contributing to environmental protection measures including disaster prevention and aid in areas such as human-resources development and development of systems.”*

The Cordillera Administrative Region is an area where the poverty rate is higher than the average in the Philippines,<sup>4</sup> and this project is relevant with the overseas economic cooperation implementation policy.

For the above reasons, this project has been highly relevant with the Philippines' development plan and development needs, as well as Japan's ODA policy. Therefore its relevance is high.

## **3.2 Efficiency (Rating: ②)**

### 3.2.1 Project Outputs

The purpose of this project is to improve the road and bridges between Baguio and Aritao (total distance: approximately 101 km).

#### (1) Civil Engineering

(Major scope)

- Paving, bridge repairs, protecting slopes, etc., on the road between Baguio and Pangawan.
- Paving, bridge repairs, protecting slopes, etc., on the road between Pangawan and Aritao.

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of registered vehicles (including motorcycles) was approximately 51,000 vehicles in 2003 and approximately 73,000 in 2009.

<sup>4</sup> According to the Japan Bank for International Cooperation's Poverty Profile of the Philippines (July 2008)

Since the subject roads pass through very steep terrain, countermeasures against disaster need to be conducted fully, and the project scope included slope protection construction. Since widening of roads would be dangerous in numerous locations, the number of lanes was set at one and emergency shelters were set up where needed (as planned).

Original plan and actual performance of civil engineering and main causes of changes are shown in Table 1 below. All changes are considered to have been necessary for achievement of project goals.

Table 1: Comparison of Outputs (Original Plan vs. Actual)

Item	Original	Actual	Main Reasons for Changes
<b>Baguio - Pangawan</b>			
1. Road distance (km)	59.20	68.128	The halfway point was extended to the border between two provinces. Route changes took place as well.*2
2. Paving method: PCC*1 (km)	59.20	66	Since some paving took place after appraisal, this figure is lower than the actual road distance (68.128 km).
3. Slope protection	22,000 m or 66,000 m <sup>2</sup>	117,129 m <sup>2</sup>	Due to needs not recognized at the time of the appraisal
4. Flood countermeasures (m)	6,100	700	Embankment construction originally planned not needed due to the above route changes.
5. Bridges	2	2	No change
<b>Pangawan - Aritao</b>			
1. Road distance (km)	41.5	35.616	Due to the change in the halfway point mentioned under 1 above.
2. Paving method: PCC (km)	41.5	30	Due to paving by the DPWH conducted after the appraisal
3. Slope protection	15,000 m or 45,000 m <sup>2</sup>	47,102 m <sup>2</sup>	Due to discovery of unstable slopes
4. Flood countermeasures (m)	3,500	3,500	No change
5. Bridges	7	7	No change
6. Additions	N/A	Installation of road signage, landscaping, etc.	Installation was requested by Environment Compliance Certificate (revised in 2005).

Notes:

\*1 PCC: Paving with Portland cement concrete

\*2 Ambuklao Dam is located at the 35-km point on this section of road. The original route was changed because the National Power Corporation (NPC), which generates power at the dam, had requested suspension of construction because construction of a bypass through the vicinity would have a negative impact on the structure of the dam.

## (2) Consultants

While consultants provided the originally planned services of detailed design, bidding support, and construction supervision, the following services were added to each of the services of consultants in response to changes in scope. Services related to environmental measures<sup>5</sup> were conducted as planned.

<sup>5</sup> This refers to conducting the supplementary Environment Impact Assessment, support for acquisition of land and resettlement conducted by the DPWH, and environmental monitoring to ensure compliance with the environmental conditions attached to the Environment Compliance Certificate.

Additional services:

- Detailed design: increase in detailed design services due to addition of RCBC<sup>6</sup> and design services related to the change of route of bypass roads
- Construction supervision services: addition of construction supervision in connection with extension of construction period

According to the executing agency, contractor performance (including quality of facilities) and quality of consulting services are evaluated highly.

### 3.2.2 Project Inputs

#### 3.2.2.1 Project Cost

The project cost was planned originally at 4,317 million yen in foreign currency and 856 million pesos (2,568 million yen\*) in local currency, for a total of 6,885 million yen.<sup>7</sup>

\* Exchange rate: 1 peso = 3 yen

Actual project cost was 3,508 million yen in foreign currency and 1,265 million pesos (2,720 million yen\*) in local currency, for a total of 6,228 million yen.<sup>8</sup>

\* Exchange rate: 1 peso = 2.15 yen

Thus, the actual cost was lower than originally planned. (Actual vs. original: 90.5%, Sub-rating: ③)

A look at individual cost items shows that construction costs in Philippine pesos reached about 140% of the originally planned amount. This resulted from route changes on the bypass and an extension of the overall construction period. However, since the yen rose by about 40% in value against the peso over the project period, this increase was kept down when viewed in terms of yen.

Despite the increase in MM, costs of consulting services did not rise that much even when viewed in terms of pesos. This resulted from conclusion of contracts at amounts substantially lower than originally budgeted for consulting services paid in foreign currency, as the result of bidding.

#### 3.2.2.2 Project Period

This project scheduled an implementation period of five years and two months, from the signing of the loan agreement (L/A) in September 1999 to completion of civil engineering work in October 2004. Actually, the L/A was signed in December 1999 and civil-engineering work was completed in March 2008. In other words, the project period planned for five years and two months in fact lasted eight years and four months, so that the ratio of the actual to the original project period rose to 161.3% (Sub-rating: ①).

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<sup>6</sup> Reinforced Concrete Box Culvert, Drainage passing under road or railway, whose cross section is square.

<sup>7</sup> Of the total of 6,885 million yen, 5,852 million yen was planned to be funded by ODA loans, with the remaining 1,033 million yen to be funded from the Philippine government budget.

<sup>8</sup> Of the total of 6,228 million yen, 5,522 million yen was funded by ODA loans, with the remaining 706 million yen funded from the Philippine government budget.

The table below shows the main causes of delays.

Main Causes of Delays	Months Delayed
<b>Section: Baguio - Pangawan</b>	
• Delay in decision on construction contractors (final decision by contractor selection committee delayed due to lodging of complaint by a contractor that lost an order)	3
• Request made for suspension of construction in specific segment after detailed design (This refers to the request by the NPC for suspension of construction in the vicinity of Ambuklao Dam, mentioned above.)	6.9
• Negotiations with local residents to secure land for construction of Ambuklao Bypass	2.25
• Difficulty of construction due to structure involving narrow roads and major curves	2

Source: Prepared by the evaluator based on interviews with executing agency

Of the above main causes of delay, the “suspension of construction in specific segment after detailed design” can be considered a case in which prior explanation to and exchange of opinions with related parties possibly could have raised the problem in advance and reflected it in project plans. In addition, the “negotiations with local residents to secure land for construction of Ambuklao Bypass” is a secondary cause of delay resulting from the effects of the “suspension of construction in specific segment after detailed design.”

### 3.2.2.3 Consulting Service

Additional consulting services stated in the above 3.2.1 Outputs resulted in an increase in MM in each of the three stages such as detailed design, before construction and construction supervision. Accordingly, MM of foreign experts, Pilipino experts and local supporting staff increased from the original plan respectively, from 163 to 217.4, from 429 to 559.72, and from 537 to 805.06.

For the above reasons, although the project cost was within the plan, the project period was significantly exceeded. Therefore the efficiency of the project is fair.

## 3.3 Effectiveness (Rating: ③)

### 3.3.1 Quantitative Effects

#### 3.3.1.1 Results from Operation and Effect Indicators

The completion date was significantly delayed in the project. Considering the resulting time lag of the appearance of the project effect, we decided to compare the plan figure at 2004, which is 2 years later than the originally expected completion date, shown in the Feasibility Study report (F/S)<sup>9</sup> formulated in 2001, and the result in 2010, which is 2 years after the actual completion date. Then, the ratio of achievement of target indicator (traffic volume) is 84%, which is 1,413 to 1,682.

Forecast Annual Average Daily Traffic (AADT) on the Baguio - Aritao road shown in the feasibility-study (F/S) report and the results (actual) are shown below.

<sup>9</sup> In the F/S 1996 is the base year of simulation and 2002 is assumed as the year of project completion.



Table 2-1: Forecast and Actual AADT (the Baguio - Aritao road)

Year	Unit: Number of vehicles					
	1996 (actual)	2002	2004	2006	2011	2016
1. AADT (F/S forecasts)	N/A	1,400	1,682	2,020	2,782	3,812
3. AADT (actual)*	889	N/A	N/A	584	N/A	N/A

\*Source: DPWH

Trends (details) in the road's actual AADT are shown below.

Table 2-2: Trend in Actual AADT (the Baguio - Aritao road)

Year	Unit: Number of vehicles				
	2001	2005	2006	2009	2010
Actual AADT	516	342	584	1,138*	1,413*
- Baguio - Pangawan				1,400	1,783
- Pangawan - Aritao				637	705

\* Since AADT is recorded by segment for 2009 and later years, a weighted average taking into account the distance covered by each of the two segments is used.

Since no official statistics were available on matters such as shortening of time required for travel and savings in travel costs, the following supplemental qualitative effects are provided.

While a local police station (located near the starting point of the project road in Baguio) was visited to gather information related to traffic accidents on the project road, no official statistical figures was obtained. However, a police officer reported a feeling from police work that the number of traffic accidents had not increased. In a recipient survey of residents living near the road, largely the same numbers of responses reported increases and decreases. In conclusion, traffic accidents are not considered to be a serious problem. As the necessary guardrails were installed through the entire road section, it is estimated to contribute to the traffic safety.

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

#### Economic Internal Rate of Return (EIRR)

Table 3: Comparison of Economic Internal Rate of Return (EIRR)  
Before and After Project

	Appraisal	Ex-Post Evaluation (Recalculated)*
EIRR	15.6%	20.1%
Grounds for calculation:		
Project life	20 years	20 years
Cost	Project costs	Project costs
Benefits	Reduction in travel costs, savings in maintenance costs	Reduction in travel costs, savings in maintenance costs

\* Since appraisal materials do not provide details on the EIRR calculation process, a standard calculating method for the road sector in the Philippines was employed.

It is very difficult to conduct the analysis of difference on the economic profitability, as the details

of the benefit calculation at appraisal were not available (It was assumed that recalculated EIRR may decrease, as the cost increased and also the traffic amount, which is the basis of calculation of benefit, decreased compared to the appraisal. It is estimated that the actual benefit may have increased somehow but the details are unknown<sup>10</sup>).

### 3.3.2 Qualitative Effects

During the Ex-Post Evaluation, we verified the effects reported in JICA documents as follows. As a result, the qualitative effects stated in the PCR were confirmed, using certain numerical figures and examples from interviews and other activities conducted in a field survey.

1. Reduction of travel time and stability in transport costs: Travel time over the approximately 100 km from Baguio to Aritao decreased from five hours prior to the project to three hours (according to the DPWH regional office). (Note: The project road is the one passing a very mountainous area and in the most of the sections one side of the road is a cliff. There are many curves and the shape is like Japan's famous "Nikko-Irohazaka". The quality of road was also very poor before the project.)

2. Alleviation of isolation of communities in each region<sup>11</sup> due to landslides during heavy rain or flooding: Prior to this project, landslides during heavy rains and flooding occurred three to four times a year, with each case rendering the road impassible for two to three days. Recently, the time of road closure has shortened to several hours (according to the DPWH regional office).

3. Improved market access for farmers: The volume of agricultural produce shipments has increased. Agricultural production takes place in Bokod and Kayapa, where vegetables such as lettuce, broccoli, and cauliflower are produced (according to the DPWH regional office).

4. Lessening of high vehicle maintenance costs and high transportation costs due to poor road conditions: Improved road quality has clearly reduced vehicle maintenance costs and high transportation cost (according to the DPWH regional office).

Next, results of a recipient survey (residents) conducted through random sampling in the vicinity of the project road are outlined below. A look at results of the recipient survey shows that the effect of travel time reduction is as good as other road projects in the Philippines (yen loan projects).<sup>12</sup> Access to various facilities has also improved.

No particular difference is apparent in the responses from recipient-survey subjects between the categories of ethnic minorities and others.

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<sup>10</sup> According to the ex-post economic evaluation conducted by DPWH (Economic Evaluation Update, in June 2006), the recalculated IRR of the project is 22.75%.

<sup>11</sup> Bokod, Benguet, Kayapa, Nueva Vizcaya, etc.

<sup>12</sup> According to comparison with the subject projects in ex-post evaluations in the road sector conducted in the Philippines last year

The total number of **resident respondents (not including ethnic minorities)** was 118 people, living beside or near the project road. Women numbered slightly more than one-half of respondents, and respondents' main occupations included no regular employment/homemakers, business people (e.g., store managers), manual laborers, professional drivers, and farmers. Nearly 80% of respondents (91 people) use the road daily.

Respondents gave the following responses on the direct benefits of this project:

- The project has resulted in an increase in volumes of materials shipped (primarily agricultural produce). (Given by 36 people, more than 30% of respondents)
- The project has realized a shortening of travel time. (Given by 81 people, nearly 70% of respondents, with more than one-half of respondents, 64 people, reporting that travel time that had been one hour before had decreased by 20 minutes or more.)
- The following percentages of respondents identified improvements in access:

Table 4-1: Situation of Improvement of Access (Residents not including ethnic minorities)

Destination	Percentage of Respondents Reporting Improvements in Access (%)
Markets, retailers	85.6
Social services (e.g., schools)	71.2
Hospitals	63.6
Government offices	35.6
NGO offices	6.8
Other	0.8

The total number of **resident respondents (ethnic minorities)** was 19 people, living beside or near the project road. Women numbered more than 70% of respondents, and respondents' main occupations included no regular employment/homemakers, farmers, business people (e.g., store managers), manual laborers, and professional drivers. More than 80% of the respondents (16 people) use the road daily.

Respondents gave the following responses on the direct benefits of this project:

- The project has resulted in an increase in volumes of materials shipped (primarily agricultural produce). (Given by six people, more than 30% of the respondents)
- The project has realized reduction of travel time. (Given by eight people, more than 40% of the respondents, with more than 30% of the respondents, six people, reporting that travel time that had been one hour before had decreased by 30 minutes or more.)
- The following percentages of respondents identified improvements in access:

Table 4-2: Situation of Improvement of Access (Ethnic minorities)

Destination	Percentage of Respondents Reporting Improvements in Access (%)
Markets, retailers	84.2
Social services (e.g., schools)	47.4
Hospitals	57.9
Government offices	26.3
NGO offices	21.1
Other	5.3

In light of the above, this project has largely achieved its expected effects, in areas such as steady growth in traffic on the project road, improvements in access to various facilities and shortening of travel time for local residents, and increased shipments of agricultural produce. Therefore its effectiveness is high.

### 3.4 Impact

#### 3.4.1 Intended Impacts

##### (1) Assessment Using Quantitative Indicators

The status of indicators of impact is shown in Table 5 below. While the appraisal record indicated that the project's objectives were to promote and vitalize the economy in the Cordillera region and to improve the welfare of its residents, since the project road passes through only a small part of the Cordillera region, the direct impact of the project was measured by narrowing the scope of the indicators. Economic indicators for Benguet Province, which includes the project road, and the cities through which the road passes are, overall, in a continuously upward trend.

While it is difficult to prove a clear cause-effect relationship, among these indicators it is fair to say that behind increases in vegetable production and in numbers of tourists are greater ease of transporting agricultural produce due to improvements to the project road and greater ease and speed of travel due to same improvements in road conditions. Statements from interviews conducted with related parties in this survey also support this conjecture.

Table 5: Economic Indicators in the Vicinity of the Project Road

**Note: The entire project road was completed in March, 2008.  
(the Pangawan - Aritao segment was completed in December 2006.)**

Indicator	2005	2006	2007	2008	2009	2010
1. Vegetable production (metric tons, or M.T.)						
- Bokod * <sup>1</sup>	524.30	565.00	583.00	570.50	625.50	888.33
- Itogon	245.50	242.50	278.50	294.50	331.50	321.00
2. Number of visiting tourists						
- Benguet Province	84,192	106,382	117,365	194,491	205,032	228,312
- Baguio City	637,298	709,671	794,548	814,975	770,187	N/A

Sources: Department of Trade & Industry Baguio office, Cordillera Administrative Region Department of Agriculture, Cordillera Administrative Region Department of Tourism

\*1 The majority of the Baguio - Pangawan section of the road covered in this project (68 km) is in the two cities of Bokod and Itogon.

\*2 Baguio is the capital of Benguet Province, where the project road is located, and is the starting point of the road.

The main industry in both Benguet and Nueva Vizcaya provinces, where the project road is located, is agriculture. This survey examined, in particular, production of vegetables, main products in both cities of Bokod and Itogon, located in Benguet Province. As shown in the table above, production increased steadily in the period following completion of the road. According to an interview with the Cordillera Administrative Region Department of Agriculture, there are agricultural trade centers in La Trinidad (near Baguio, the starting point of the road) and Banban (near Aritao, the end point of the road). Farmers producing agricultural produce along the road transport about 90% of their harvests to these trade centers where they are bought by brokers. For this reason, it is conceivable that these farmers benefit from improvements to the project road.<sup>13</sup>

Figures of Benguet Province on numbers of visiting tourists seem to show an increase that began around the time the project road was completed. According to the DPWH regional office, in recent years numbers of travelers are increasing in both directions on this road. While this is not statistical data, it is said that there is a sense that numbers of travelers, including those from overseas, clearly have been increasing in recent years. According to an interview with the Cordillera Administrative Region Department of Tourism, there are five main routes by which tourists come to Baguio<sup>14</sup>, and this road is ranked third among these in terms of traffic volume. The interviewed staff guessed that while the share of this road had been 5% or less prior to this project, it probably had reached a level of 10% following the project.

## (2) Qualitative Impact Analysis

Results of a recipient survey (residents) conducted in the vicinity of the project road concerning the project's impact are outlined below.

A considerable number of respondents to the questionnaire (residents) responded that they had gained new employment opportunities and that their income had increased. As such, the project can be surmised to have had some economic impacts. However, it is conceivable that the respondents enjoyed these economic impacts because they resided along the road.

Largely equal numbers of respondents reported increases and decreases in traffic accidents, so that at the very least there appears to be no increasing trend in accidents. Many respondents were of the opinion that the environment (such as air) had improved.

Responses to the questionnaire in general show no major differences between residents belonging to ethnic minorities and other residents.

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<sup>13</sup> In an interview at the agricultural trade center in La Trinidad, a woman vegetable (cauliflower) grower who came from the town of Kabayan at the north of the project road reported that, while previously it had taken her 6 - 7 hours to go from Kabayan to Baguio, it now took 4 - 5 hours. Furthermore, she said that the volume of produce she shipped had increased and her income had risen as well. Diversification of production in accordance with advice from the Department of Agriculture and changes in production to match consumer tastes seem to be behind this increase in farmers' production as well.

<sup>14</sup> Baguio is a popular summer resort, as widely known as "Summer capital". Many tourists visit Baguio every year.

**Resident respondents (not including ethnic minorities;** the same 118 people described above) gave the following specific answers concerning the impact of this project:

1. Employment opportunities: Have new employment opportunities become available since this project?: 27.1% Yes; 66.1% No; 6.8% no answer
2. Changes in income: Has household income increased since this project?:<sup>15</sup> 47.5% Yes; 40.7% No; 11.9% no answer
3. Changes in number of traffic accidents: 37.3% increased; 37.3% decreased; 25.4% not sure
4. Effects of the project on property and houses: No respondents sold land for use in this project.
5. Environmental changes since the project (only main items excerpted below, with percentages of respondents):

Item	Worsened	No change	Improved
Air	0.0	51.7	48.3
Noise	1.7	44.1	54.2
Water quality	0.0	85.6	14.4

6. Overall evaluation of project benefits:

Item	Percentage of Respondents (%)
Excellent	22.0
Good	49.2
Neutral	23.7
Slightly Negative	0.0
Very Negative	0.0
No answer	5.1

**Resident respondents (ethnic minorities;** the same 19 people described above) gave the following specific answers concerning the impact of this project:

1. Employment opportunities: Have new employment opportunities become available since this project?: 26.3% Yes; 73.7% No; 0.0% no answer
2. Changes in income: Has household income increased since this project?: 36.8% Yes; 36.8% No; 26.3% no answer
3. Changes in number of traffic accidents: 36.8% increased; 26.3% decreased; 36.8% not sure
4. Effects of the project on property and houses: No respondents sold land for use in this project.
5. Environmental changes since the project (only main items excerpted below, with percentages of respondents):

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<sup>15</sup> It is estimated since the respondents also included many people operating stores along the road, the increase in traffic led to an increase in income.

Item	Worsened	No change	Improved
Air	0.0	57.9	42.1
Noise	0.0	52.6	47.4
Water quality	0.0	89.5	10.5

6. Overall evaluation of project benefits:

Item	Percentage of Respondents (%)
Excellent	26.3
Good	36.8
Neutral	26.3
Slightly Negative	0.0
Very Negative	0.0
No answer	10.5

Other results of interviews concerning the project's impact are summarized below:

- Two drivers for one bus company operating regularly on the project road estimated that the company's net income may have increased by about 10% due to the effects of shortened travel time.
- One private-sector firm operating a rice-cleaning mill near the project road reported that the effects of shortened travel time resulting from this project had led to benefits including the ability to ship greater volumes of cargo and a lessening of the impact of typhoons. It estimated that these may have resulted in an increase of roughly 30% in the company's net income.
- Seven barangay captains (the equivalent of town or village mayors) of communities near the project road reported that residents enjoyed the benefits of shortened travel time, with six grading the project "Excellent" on a five-grade scale and one grading it "good." However, there were some calls for installation of streetlamps and paving of the road's shoulder.

### 3.4.2 Other Impacts

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

In 2002 the Department of Environment and Natural Resources (DENR) issued an Environment Compliance Certificate (ECC)<sup>16</sup> indicating that the Environment Impact Assessment (EIA) was properly conducted prior to the project. The ECC contains activities necessary to protect the environment during the project implementation and are reflected in the Terms of Reference (TORs) for construction contractors as well. During actual construction, a Multiparty Monitoring Team<sup>17</sup> met monthly to monitor the environmental impact of construction based on ECC and confirmed there was no particular problem.

When the executing agency was interviewed, using the standard environmental checklist used in past appraisal of yen loan projects, generally positive conditions were confirmed regarding the natural

<sup>16</sup> This ECC is an additional ECC based on supplementary EIA at the time of D/D.

<sup>17</sup> Local offices of the DENR, the regional office of the DPWH, local governments, and others participated.

environment in aspects such as air, water quality, noise, vibration, and soil pollution. As seen in the results of the recipient survey, community residents also generally judged the environment have improved after this project in areas such as air, noise, and water quality.

However, there have been sporadic cases of earth and sand to flow downstream caused by rainfall, requiring responses on an individual basis.

## (2) Land Acquisition and Resettlement

No residents were resettled in connection with this project, as this project was to improve the already existing road. However, although no necessity of land acquisition had been confirmed at the detailed design stage, in the end a certain number of parcels of privately held land needed to be acquired in order to secure a road width 15 meters from the center line in low-lying land at Aritao. According to the executing agency (regional and district DPWH offices), land was acquired from 34 local residents. While the related procedures took some time to complete, the acquisition of land appears to have come to a peaceful resolution<sup>18</sup>.

To summarize the above points, this project has realized the originally anticipated impact to some degree, for example by increasing shipments of agricultural produce from farmers in the vicinity of the road and increasing numbers of tourists.

### **3.5 Sustainability (Rating: ②)**

#### 3.5.1 Structural Aspects of Operation and Maintenance

The maintenance structure of the project road is stable, unchanged from expectations as of the time of the appraisal and from the time of PCR preparation. The chain of command is defined clearly at each office in the area and staffing is stable. However, as outlined below, the scale of staffing for the project road cannot be said to be adequate.

As originally planned, the DPWH regional office is responsible for maintenance following completion of the project, and actual maintenance work is conducted by district offices under the supervision of the regional office.

Specifically, the following three district offices carry out maintenance of the project road:

- Benguet 1<sup>st</sup> District Engineering Office
- Nueva Vizcaya 2<sup>nd</sup> District Engineering Office
- Baguio City District Engineering Office

When the two offices in Benguet and Nueva Vizcaya, which are responsible for the most of the project road, were interviewed, they reported that the chains of command, led by highly experienced engineers, were clearly defined and staffing was stable. However, they also reported that current staffing was inadequate, when taking into consideration the conditions of the area, where landslides occur frequently. It was reported in the interview in Benguet that while budget allocation was

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<sup>18</sup> Confirmed by PCR and individual interviews. Details of compensation amount at land acquisition were not available.



conducted uniformly on a nationwide basis in accordance with government rules calling for assignment of personnel at a rate of one worker per 3.5 km, there would be a need to assign workers at a rate of one person per 2 km to maintain roads in this area, where landslides are highly frequent. It also was reported that while the office currently had 24 workers, it needed 12 more.

At the Nueva Vizcaya office as well, the view was expressed that while the office currently had 10 workers, it needed at least 20 more.

It was reported (by both offices) that since there was an actual shortage of personnel, tasks such as cleaning of gutters, cutting overgrown trees, and improving unpaved shoulders were not being conducted adequately.

The evaluator also confirmed that in a number of locations the road's gutters were buried in earth and sand. It affects road quality in the long run and some corrective measures need to be implemented.

### 3.5.2 Technical Aspects of Operation and Maintenance

While there are no particular technical problems, the shortage of personnel mentioned above and shortages of materials and equipment are factors limiting the implementation of full maintenance activities.

Maintenance is conducted based on the Philippine Highway Maintenance Management System, the standard manual of the DPWH. At the Benguet 1st District Engineering Office, it also was reported that engineers, staff, and workers were provided with periodic training.

Main maintenance activities are listed below.

Daily maintenance, conducted at both offices:

- Cleaning gutters
- Cutting trees
- Repairing cracks
- Repairing road painting

Special maintenance, conducted at the Benguet 1st District Engineering Office:<sup>19</sup>

- Maintenance of road conditions in the event of landslides

At the Benguet 1st District Engineering Office, a shortage of vehicles such as bulldozers was identified as a technical problem. It was reported that particularly in the event of a large-scale landslide the vehicles, machinery, and equipment on hand were insufficient for responding, and as such the office was forced to ask to rent vehicles from private-sector contractors. This is one leading factor putting pressure on the office's finances.

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<sup>19</sup> At the Nueva Vizcaya 2nd District Engineering Office, the comment was heard that, other than daily maintenance, preventive maintenance was not being conducted because of budget shortfalls. It would appear that the situation probably is the same at the Benguet 1st District Engineering Office as well.

### 3.5.3 Financial Aspects of Operation and Maintenance

While a certain degree of budgeting has been secured, basically both offices clearly feel a shortage of workers in comparison to the ideal conditions and also lack funding for rental of vehicles, machinery, and equipment to respond to large-scale landslides. Taking into consideration the conditions in both offices, it would be desirable to increase the amounts of both personnel and budget.

The conditions of budgeted and actual costs at both offices over the past three years are shown below.

Table 6-1: Maintenance Budget and Results (Benguet)

Unit: Philippine pesos

FY	Original Budget	Results
2008	2,503,055	2,658,696
2009	3,251,060	3,878,040
2010	2,154,209	2,474,659

Table 6-2: Maintenance Budget and Results (Nueva Vizcaya)

Unit: EMK\*

FY	Original Budget	Results
2008	34,515	34,515
2009	13,475	13,475
2010	33,990	33,990

\*Maintenance costs of national highways and bridges in the Philippines are calculated as follows based on the EMK system:

Maintenance cost = Basic Cost multiplied by EMK

Basic Cost: The cost required to maintain a single kilometer of road for one year, decided by the Bureau of Maintenance each year taking into consideration the rate of inflation in cost accounts

EMK: An index determined based on pavement type, road width, and traffic volume

In this way, both offices have been authorized expenditures of a scale roughly equal to or above the amounts budgeted originally. However, basically both offices feel strongly that they are short of personnel and budget in comparison to the ideal, and neither can be said to be in a good budgetary state.

For reference, the table below shows trends in annual road maintenance budgets in recent years for the entire DPWH, which apportions maintenance budget for this project<sup>20</sup>. While a certain amount of maintenance budget is secured each year, it showed somewhat a decreasing trend until 2010.

Table 7: Trends in DPWH Road Maintenance Budgets

Unit: million pesos

FY	Regular Road Maintenance	Regular Shoulder Maintenance	Preventive Maintenance	Total Length of National Highways (km)
2008 <sup>*1</sup>	4,021	1,850	6,690	30,224
2009	3,500	2,020	7,300	30,594
2010 <sup>*2</sup>	2,000	2,020	2,960	29,579

Source: DPWH Bureau of Maintenance

\*1 In 2008, approximately 663 million pesos were secured as road safety costs not included in the table above.

\*2 In 2010, approximately 200 million pesos were secured as road safety costs not included in the table above.

<sup>20</sup> Major sources of DPWH's budget of operation and maintenance of roads are GAA (General Approved Allocations) and MVUC (Motor Vehicle User's Charge).

#### 3.5.4 Current Status of Operation and Maintenance

Visual inspection by the evaluator confirmed that the road appeared to be in very good condition, with almost no visible holes or cracks. Guardrails too are installed in each location where there is a precipice on one side of the road. However, here and there the gutters were covered in earth and sand. Since clogged gutters will cause earth and sand to come into contact with the road directly, damaging the road surface, the gutters need to be cleaned. At a point 20 km from Baguio, a large-scale landslide had occurred (more than 10 meters long both vertically and horizontally), although it was not a location subject to reinforcement works in this project<sup>21</sup>, and the ground surface of the roadside was exposed clearly. While the earth, sand, and other debris already had been cleaned up, the guardrails appeared to have been destroyed, so that there were no guardrails at all in the portion of road affected by the landslide. These need to be repaired completely.

A look at the results of the recipient survey shows that residents in the vicinity of the project road are satisfied with the state of the road's maintenance. Specifically, of the 118 local residents surveyed the vast majority of 112 reported being satisfied with the state of road maintenance.

At present, no cases have been confirmed of damage to the road resulting from overloading as a result of improvements to road conditions through this project.

In summary, while road conditions, which are an assumption of sustainability evaluation, are not flawless, they have been evaluated as good. Next, evaluation was conducted of each of the aspects of organizations and structures, technology, and finances, using a three-grade (high, fair, low) scale, and each of these aspects was judged to be fair.<sup>22</sup>

For the above reasons, some minor problems have been observed in terms of structures, technology, and financial conditions, and therefore the sustainability of the project effect is fair.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

The objective of this project is to promote transportation for people and materials and improve the efficiency and reduce the costs of shipping by improving main roads in the Cordillera region in the mountainous area of north-central Luzon. Since the project suits the Philippines' development policies and development needs and is in agreement with the aid policies of the Japanese government, the relevance is high. It also is highly effective since the volume of transportation on project roads has increased steadily, local residents' access to various facilities has improved, and travel time has decreased. Furthermore, the project also is having a gradual impact on the local economy, for example by increasing volumes of agricultural produce shipped by farmers in the vicinity of the project road and increasing numbers of tourists.

However, the project's efficiency is assessed to be fair, as the project period was significantly longer than originally planned. There also are issues that should be improved in the areas of road conditions and maintenance, so that the sustainability of the project's effects is fair.

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<sup>21</sup> The landslide appears to have been caused by rainfall.

<sup>22</sup> In this project's case, organization and structure, technology, and finance problems are interrelated.

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

## **4.2 Recommendations**

### **4.2.1 Recommendations to the Executing Agency**

(1) Since a large-scale landslide has occurred on part of the project road (at a point roughly 20 km from Baguio) and, while the earth and sand has been cleaned up, repairs are not complete, the guardrails need to be repaired. Since on the road as a whole there are spots here and there in which the gutters are covered in earth and sand, it would be desirable to clean the gutters thoroughly in order to maintain good road conditions.

(2) The maintenance budget and numbers of personnel at the district offices of the DPWH responsible for the road cannot be said to be adequate for purposes of appropriate maintenance, at least as far as the interviews are concerned. In consideration of the nature of this locale as a place with steep terrain susceptible to landslides caused by rainfall, it would be desirable to increase the maintenance budget.

### **4.2.2 Recommendations to JICA**

No particular recommendations

## **4.3 Lessons Learned**

In the process of interviews conducted in this survey, it was confirmed that budget allocation was conducted uniformly on a nationwide basis in accordance with government rules calling for assignment of personnel at a rate of one worker per a certain length. Since road conditions and terrain vary by locale, it would be desirable to apply a more flexible rule in accordance with local conditions, allowing more staff allocated in the mountainous area or the area with frequent landslide.

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

Item	Original	Actual
1. Project Outputs		
<b>Baguio - Pangawan</b>		
1) Road distance (km)	59.20	68.128
2) Pavement method: PCC (km)	59.20	66
3) Shoulder improvements (gravel, km)	118.40	121.50
4) Spillways		
- Gutters (km)	20.00	59.18
- RCPC (m)*1	3,300	2,203
- RCBC (m)*2	300	948.50
5) Structures (n.l. [m])		
- Construction	2	As planned
- Repairs (existing bridges)	120	As planned
6) Slope protection	22,000 m or 66,000 m <sup>2</sup>	117,129 m <sup>2</sup>
7) Flooding countermeasures (m)	6,100	700
8) Bridges	2	As planned
<b>Pangawan - Aritao</b>		
1) Road distance (km)	41.5	35.616
2) Pavement method: PCC (km)	41.5	30
3) Shoulder improvements		
- Gravel (km)	76.00	As planned
- AC/PCC (km)	7.00	3.50
4) Spillways		
- Gutters (km)	20.00	19.60
- RCPC (m)	2,000	850
- RCBC (m)	200	72
5) Slope protection	15,000 m or 45,000 m <sup>2</sup>	47,102 m <sup>2</sup>
6) Flooding countermeasures (m)	3,500	As planned
7) Bridges	7	As planned
8) Additional items	N/A	Installation of road signage, landscaping, etc.
2. Project Period	September 1999 - October 2004 (62 months)	December 1999 - March 2008 (100 months)
3. Project Cost		
Amount paid in Foreign currency	4,317 million yen	3,508 million yen
Amount paid in Local currency	2,568 million yen (Local currency: 856 million pesos)	2,720 million yen (Local currency: 1,265 million pesos)
Total	6,885 million yen	6,228 million yen
Japanese ODA loan portion	5,852 million yen	5,522 million yen
Exchange rate	1 Peso = 3 yen (as of January 1999)	1 Peso = 2.15 yen (weighted average for years 2001 - 2008)

\*1. Reinforced Concrete Pipe Culvert, Drainage passing under road or railway, whose cross section is circle.

\*2. Reinforced Concrete Box Culvert, Drainage passing under road or railway, whose cross section is square.