

## Philippines

# Rural Road Network Development Project (I)

Report Date: October, 2002

Field Survey: January, 2002

## 1. Project Profile and Japan's ODA Loan



Location Map of the Project



National Road With Portland Cement Concrete Pavement

### 1.1. Background

The transportation system in the Philippines consists of land, sea, rail and air components, of which land transportation accounted for 90% of passenger traffic and 50% of freight. As of 1985, the total road network in the Philippines extended approximately 161,700km, and the road density was 0.54km/km<sup>2</sup>, representing a relatively high value (In comparison, Thailand is 0.11; Korea, 0.54; and Japan, 2.98). Nevertheless, the pavement ratio was very low (Philippines 14%, as compared to Thailand 40% and Japan 65%), and all-weather roads accounted for less than half of all roads in the Philippines, so road improvement works were necessary to boost the quality of the road network.

The Medium-Term Philippine Development Plan (1987~1992) aimed to improve the quality of the Philippine road network, particularly in rural areas, where bad road conditions impeded the expansion of the economy. In the Plan, 24.6% of the total investment required for infrastructure development was set aside for the transportation sector, of which 70% was targeted at the road sector.

The development program pursued for the rural road network in the Philippines focused on the major trunk roads. As a further step, the Government of Philippines (GOP) aimed to develop rural roads that connected to the major trunk roads. In 1987, GOP requested technical assistance from the Government of Japan (GOJ) to conduct a feasibility study (F/S) for the Rural Road Network Development Project (hereafter referred to as the "RRNDP"). Accordingly, the Japan International Cooperation Agency (JICA) implemented a feasibility study for rural roads. As a result of F/S, the provinces of Cavite, Masbate, Bohol and Tarlac (hereinafter referred to as the "target provinces") were selected as the target sites for the RRNDP, which became the first in a line of projects aimed at continuous development of rural roads.

### 1.2. Objectives

To develop the rural road network in which roads are unpaved or in bad condition in order to promote regional industries and agricultural activities, and to improve the living standard of rural population.

### 1.3. Project Scope

1. Rehabilitation, improvement and/or new construction of several road sections and related bridges of National Secondary Roads, Provincial Roads and Barangay Roads, selected from economic effectiveness point of view, in the provinces of Cavite, Masbate, Bohol and Tarlac (such road sections are hereinafter referred to as the “subprojects”).
2. Consulting services for detailed design, construction supervision and other necessary work.

Japan’s ODA loan was to cover 75% of the total project costs (the total amount of foreign costs and a portion of local costs).

### 1.4. Borrower/Executing Agency

The Government of the Republic of the Philippines/ Department of Public Works and Highways (DPWH)

### 1.5. Outline of Loan Agreement

Loan Amount	5,266 mil. Yen
Loan Disbursement Amount	4,827 mil. Yen
Exchange of Notes	March 1991
Loan Agreement	July 1991
Terms and Conditions	
Interest Rate	2.7%
Repayment Period (Grace Period)	30 Years (10 Years)
Procurement	General Untied
Final Disbursement Date	April 1999

## 2. Results and Evaluation

### 2.1. Relevance

As stated earlier, the Medium-Term Philippine Development Plan (1987~1992) placed emphasis on improving the quality of the Philippine road network, particularly in rural areas, where poor road conditions impeded the expansion of rural economies. The objective of RRNDP -- to develop the rural road network in which roads are unpaved or in bad conditions in order to promote regional industries and agricultural activities, and to improve the living standard of inhabitants -- was consistent with national development policy and, therefore, was relevant at the time of appraisal.

The latest Medium-Term Philippine Development Plan (2001~2004) places priority on improving the quality of existing infrastructure through proper maintenance, rehabilitation and upgrading. According to the plan, the GOP will continue to intervene in the direct provision of basic infrastructure especially in rural areas, such as farm-to-market roads and national secondary roads. In addition, the ongoing RRNDP (II) and (III) subsequent to this project, continues to develop the rural road network still further. Therefore, the objective of RRNDP is still relevant to national development policy at present.

## **2.2. Efficiency**

### **2.2.1 Project Scope**

The original scope of RRNDP was revised based on a change in the priority areas requested by the local government units (LGUs) which were reflected in the detailed design. Revision of scope of works was completed in October 1993. However there was some modification in the revised scope, such as modification of road alignment and upgrade of pavement type, owing to the redesign of some road sections and bridges to adjust to actual field conditions. Actual construction work started in early 1995. In the meantime, several road sections had already been improved<sup>1</sup> by the District Engineering Office (DEO) of DPWH or Provincial Engineering Office (PEO) in some provinces, and consequently, the scope was reduced from that originally planned (For details, please refer to Comparison of Original and Actual Project Scope).

### **2.2.2 Implementation Schedule**

The start of construction work was delayed by 23 months because of the delays in detailed design described above. Construction work was originally scheduled to be completed in 29 months, but it actually took 57 months, on account of adverse weather conditions such as exceptionally heavy rains, and right-of-way (ROW) acquisition problems. Delays can also be attributed to the fact that the RRNDP consisted of 6~10 subprojects, which were located 13~35 kilometers from each other. This caused difficulties in management and effective operation, since materials, equipment and personnel had to be moved from one place to another.

The executing agency, with the assistance of the consultant, took necessary measures to overcome the problems, so as to minimize delay of works by the contractors and to expedite negotiations for the acquisition of ROW.

### **2.2.3 Project Cost**

Since the project scope was reduced, the total project cost was reduced by 13%<sup>2</sup> from the original estimate of 7,021 million Yen. The cost reduction was also attributed to the depreciation of Peso against Yen (the exchange rate shifted from 1 Peso = 6.8 Yen to 4.0 Yen). The entire construction cost was paid in local currency (Peso).<sup>3</sup> Therefore, the construction cost was reduced by approximately 21% in terms of Yen currency.

## **2.3. Effectiveness**

### **2.3.1 Overall Project Effectiveness**

The overall road network of the Philippines in 2000 measured 201,834km. This was 40,122km more than that in 1988 (161,712km), due mainly to the expansion of Barangay Roads. As a result, road density increased from 0.54km/m<sup>2</sup> to 0.67km/m<sup>2</sup> between 1988 and 2000. The GOP had primarily focused on upgrading and improving the rural road network in the previous 12 years, resulting in the improvement of both paved and all-weather roads (refer to Table 1).

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<sup>1</sup> The improvement of some road sections by the DEOs and PEOs was not related to this project. DEOs and PEOs improved those road sections using their own funds.

<sup>2</sup> The actual project cost was 6,199 million Yen, of which 4,827 million Yen was financed by Japan's ODA loan.

<sup>3</sup> As a consequence of international competitive bidding, the entire subprojects were contracted out to the local construction companies.

**Table 1 Total Road Length and Pavement Ratio, 1988 and 2000**

* <sup>1</sup> Classification	1988			2000		
	Length (km)	* <sup>2</sup> Pavement Ratio (%)	* <sup>3</sup> All-weather (%) in 1992	Length (km)	Pavement Ratio (%)	All-weather (%) in 1999
National Road*	26,260	49	69	29,878	62	84
Provincial Road	28,425	15	N.A.	27,136	21	58
City Road	3,987	67	N.A.	7,052	77	94
Municipal Road	12,826	26	N.A.	15,804	34	66
Barangay Road	90,214	0	N.A.	121,965	7	46
Total	161,712	14	N.A.	201,834	21	56

\* National road, including national arterial and national secondary roads.

\*<sup>1</sup> Classification:

National Arterial Road: Those roads that form part of the main trunk system leading to either primary centers such as major cities and airports or all roads connecting to the primary centers.

National Secondary Road: Those roads that connect a secondary center to another one or to National Arterial Roads.

Provincial Road: Those roads that connect one municipality to another municipality and to National Arterial or Secondary Roads.

City road: Those roads/streets within the urban area of the city.

Municipal Road: Those roads/streets within the municipal town.

Barangay Road: Those roads located either outside the urban area of a city or outside industrial, commercial or residential subdivisions which act as feeder or farm-to-market roads.

\*<sup>2</sup>: Paved road means a road paved with either Portland Cement Concrete (PCC) or Asphalt Concrete (AC).

\*<sup>3</sup>: All-weather road means a gravel or higher standard road

Source: DPWH and World Bank Document

The overall pavement ratio increased from 14% to 21% between 1988 and 2000, though the low pavement ratio of Barangay Roads (7%) pulled down the overall pavement ratio to a relatively low level. On the other hand, the overall ratio of all-weather roads in 1988, according to data at the time of appraisal, was less than 50%, which increased to 56% in 1999, due mainly to the improvement of Barangay Roads.

A total of 405.6km of roads were improved (including 30.9km of newly-constructed roads) under this project, including 116.2km of National Secondary Roads, 228.9km of Provincial Roads, and 60.5km of Barangay Roads, in the target provinces. The RRNDP contributed to an overall increase in the pavement ratio in the Philippines by 0.5% (approximately 0.2% of National Roads, 4.5% of Provincial Roads, and 0.09% of Barangay Roads) between 1988 and 2000, while the project's contribution to that in the ratio of all-weather roads was assumed to be approximately 1.2%.

Some of the Provincial Roads improved under the RRNDP were upgraded<sup>4</sup> to National Roads as a consequence of the improvements. Unpaved earth roads were improved to gravel, PCC/gravel, AC, or PCC pavement, while gravel roads were improved to either AC or PCC pavement. Unpaved earth roads are usually located in areas where there is no or only seasonal motorized access; therefore, the impact of the RRNDP is considered to be significant not only in the transport sector, but also for the local economy (discussed further in 2.4 Impact).

In addition, a total of 30 bridges (937.2 linear meters) were improved under this project, mostly from one-lane wooden temporary bridges to two-lane concrete permanent bridges, providing better accessibility to the local communities.

### **2.3.2 Traffic Volume and Travel Time**

Annual Average Daily Traffic (AADT) data in 1988 and 2000 were available for 3 road sections in Masbate Province and 3 road sections in Bohol Province (refer to Table 2). The average growth rate on the 6

<sup>4</sup> Note that the number of provincial roads decreased between 1988 and 2000 in Table 1. This indicates that many provincial roads were upgraded to national roads.

road sections was 125.9%, compared with the annual average growth rate of 10.5% for the entire country. The traffic volume of Sagbayan-Danao Road (P300-6), in particular, increased considerably between 1988 and 2000. The road is a shortcut from Sagbayan Town to Danao Town, San Miguel Town, and other barangays, which was, before the project, unpaved and inaccessible when it rained. It was improved with gravel (a portion of the road was improved with PCC) pavement and has now become one of the most important roads for the local community.

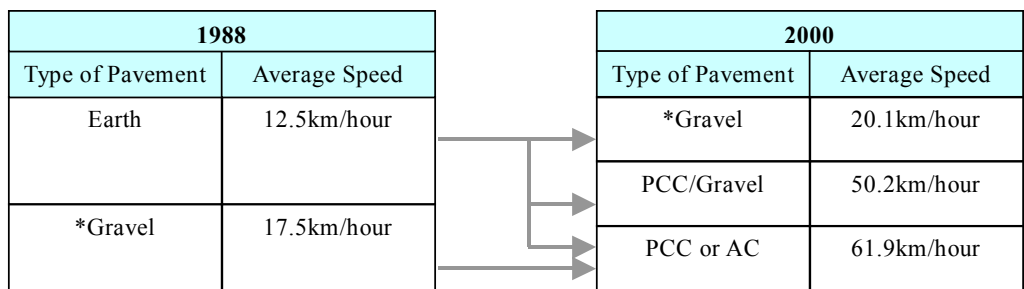
**Table 2 Annual Average Daily Traffic (AADT) 1998 and 2000**

<b>Mastabe Province</b>						
Year	Car/Van	Jeepney	Bus	Truck	Others	Total
<b>Malinta-Baleno Road (*N2-6)</b>						
1988	83	235	1	61	-	380
2000	218	182	21	95	86	602
<b>Buenasuerte-San Ramon Road (*P29-1)</b>						
1988	89	195	2	90	-	376
2000	286	239	9	191	9	734
<b>Asid-Jct. St. Maria Road (*B11-1)</b>						
1988	83	235	1	61	-	380
2000	218	218	21	95	86	638
<b>Bohol Province</b>						
Year	Car/Van	Jeepney	Bus	Truck	Others	Total
<b>Loyal Interior Road (N4)</b>						
1988	95	46	92	24	-	257
2000	201	137	85	128	33	584
<b>Sagbayan-Danao Road (P300-6)</b>						
1988	31	13	59	17	-	120
2000	58	47	58	83	854	1,100
<b>Lobogon-Danao Road (B22-2)</b>						
1988	72	28	104	49	-	253
2000	54	24	40	185	23	326

\*N represents National Secondary Road, P represents Provincial Road, B represents Barangay Road

Source: DPWH, PMO-RRNDP (PMO: Project Management Office)

Travel time was measured by the DPWH, PMO-RRNDP Office on all 43 road sections improved under the RRNDP. The average travel time saving (reduction) between 1988 and 2000 was 22.3 minutes/road section, though the measurement depends on the length of road sections and type of pavement improved under the project. The average vehicle speed for different types of pavement was calculated based on the travel speed and improved length of each road section (refer to Figure 1).



**Figure1 Average Vehicle Speed for Different Types of Pavement in 1988 and 2000**

\*The condition of gravel Roads in 1988 was considered bad, while that of those in 2000 was considered fair.

As illustrated in Figure 1, there was a significant increase in average vehicle speed after the project. For instance, vehicles now can run at an average of 61.9km/hour in those road sections improved with PCC or AC pavement, while vehicles were limited to a speed of 12.5km/hour (on earth roads) or 17.5km/hour (on gravel roads) before the project.

### 2.3.3 Recalculation of Economic Internal Rate of Return

During the detailed design of the project scope, the target road sections were selected from economic effectiveness point of view. There were, however, some exceptions to this basic condition, when road sections were selected in order to respond to local concerns.

In this report, the EIRR was recalculated for selected road sections<sup>5</sup> in the provinces of Masbate and Bohol using figures for travel time savings and vehicle operating cost savings as project benefit. Economic cost (construction cost and consulting service cost) and maintenance cost were used as project cost, assuming that the project life was 25 years.

**Table 3 Recalculation of EIRR for Selected Road Sections**

Province	Road No.	Road Section	EIRR (%)	
			Original	Recalculated
Masbate	N2-6	Malinta-Baleno Road	40.3%	23.3%
	P29-1	Buenasuerte-San Ramon Road	23.7%	32.5%
	B11-1	Asid-Jct. St. Maria Road	20.8%	29.6%
Bohol	N4	Loyal Interior Road	15.7%	6.9%
	P300-6	Sagbayan-Danao Road	11.1%	42.2%
	B22-2	Lobogon-Danao Road	20.6%	6.0%

Table 3 shows that the average recalculated EIRR of the 6 selected road sections is 23.4%, which is 1.4% higher than the original average. However, the EIRR varies from 6.0% to 42.2%. Since the recalculation of the EIRR cannot include development benefits<sup>6</sup> due to unavailability of data, it is conceivable that the actual EIRR of each road section is higher than what is indicated in the table above. It is because the impact of road sections includes non-quantitative benefit, such as increase of agricultural products as described in “2.4 Impact.”

## 2.4. Impact

### 2.4.1 Impact on Socio-economic Aspects

The overall goal of the RRNDP is to sustain regional industries and agricultural activities, and to improve the living standards of inhabitants. At the time of appraisal, it was assumed that improvements to the rural road network had brought about increases in agricultural production, an acceleration of industrialization, and an increase of employment opportunities. Such impacts were recognized particularly around certain road sections and bridges, and were qualitatively evaluated by DEOs in each target province. Examples of project impacts in each province are as follows:

#### *Cavite Province*

<sup>5</sup> Road sections were selected based on the availability of required data (such as AADT and travel time).

<sup>6</sup> The development benefit was included in the original estimation of the EIRR. Development benefit was calculated using changes in the volume and value of agricultural production in the original estimation. It was based on the hypothesis that substantial road improvements that removed constraints on development would permit and encourage farmers to adopt modern agricultural techniques and inputs.

After the improvement of Gen. Trias Amadao-Tagaytay Road from gravel to PCC pavement, production of the main agricultural products, including coffee and pineapples, increased because it was easier to transport these products from Tagaytay City, the major agricultural production area, to Trece Martires City, the capital city of Cavite Province. The improvement of Saluysoy Bridge, which serves as a very important link among the cities of Indang, Tagaytay and Trece Martires, accelerated agricultural activities, since the bridge now accommodates all types of vehicles, whereas previously the maximum vehicle weight was limited to 5 tons. Overall, agricultural industries have been stimulated, inducing more investment in the province as a result of improved access to Metro Manila<sup>7</sup>.

#### *Masbate Province*

All of the road sections in this province were improved from unpaved earth roads<sup>8</sup> to all-weather roads. The residents living in areas where there was no motorized access or only seasonal access now have access to urban areas throughout the year. As a result, farmers can sell more agricultural products and have increased their earnings. Moreover, all-weather roads have facilitated health services for the local residents, improving their health status.

#### *Bohol Province*

The construction of Nabuad-Ma Rosario Road and improvement of Sagbayan-Danao Road from unpaved earth road to gravel/PCC pavement significantly reduced travel time and increased transportation among the cities of Sagbayan, Buenavista, Inabanga and Danao. Both road sections serve as short-cuts between agricultural production areas and fishery areas, promoting the exchange of crops for fish within the local areas.

#### *Tarlac Province*

Bamban-San Jose Road is a very important road section that connects the cities of Bamban, Capaz, Sula, and Lawacamulag, and serves as an alternative route going to Pangasinan Province. After the construction of the road section, factories and industrial estates were established nearby or along the road section, creating more employment opportunities for local residents.

### **2.4.2 Impact on Environment**

This project was designed mostly to improve existing road surfaces or bridges; only two road sections were newly constructed. ROW acquisition was undertaken in the project. There has been no negative environmental impact reported so far.

## **2.5. Sustainability**

### **2.5.1 Organizational Structure and Technical Capability**

The District Engineering Offices (DEOs) of DPWH were designated as the party responsible for maintaining National and Barangay roads, while the Provincial Engineering Offices (PEOs) were assigned responsibility for Provincial Roads in each province at the time of appraisal. However, in accordance with the Local Government Code of 1991, the responsibility for maintaining local roads was transferred to local

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<sup>7</sup> Cavete Province is adjacent to Metro Manila. Most of the agricultural products were transported to Metro Manila.

<sup>8</sup> Some road sections were paved with gravel but were in bad condition (not considered all-weather roads) before the project.

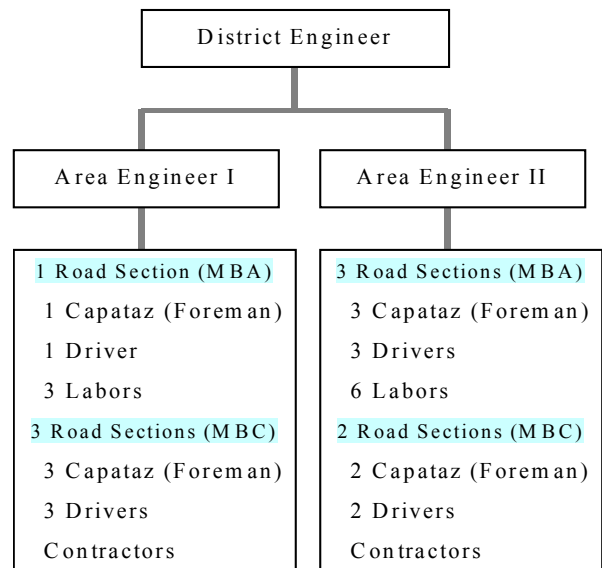
government units (LGUs). Therefore, the DEOs, PEOs, and Municipal Engineering Offices (MEOs<sup>10</sup>) are in charge of maintaining National Roads, Provincial Roads, and Barangay Roads, respectively.

The DPWH is currently using two maintenance systems, Maintenance By Administration (MBA<sup>11</sup>) and Maintenance By Contract (MBC<sup>12</sup>). In accordance with the Republic Act 8760, 70% of maintenance work was undertaken by MBC, and remaining 30% was conducted by MBA in 2001. Both MBA and MBC include routine and periodic maintenance works<sup>13</sup>, which are carried out in accordance with a maintenance manual. In general, a maintenance foreman (Capataz) organizes 4 to 6 maintenance workers for every 20km of national road, and conducts daily routine inspections and periodic maintenance. In the case of MBC, a foreman supervises the work

of a private contractor to make sure it meets the Activity Standard set by the DPWH. The DEOs usually lack maintenance equipment, leading to work inefficiency, while private contractors usually have sufficient and better-quality equipment. Figure 2 shows the organizational structure of Bohol I DEO (maintenance section only).

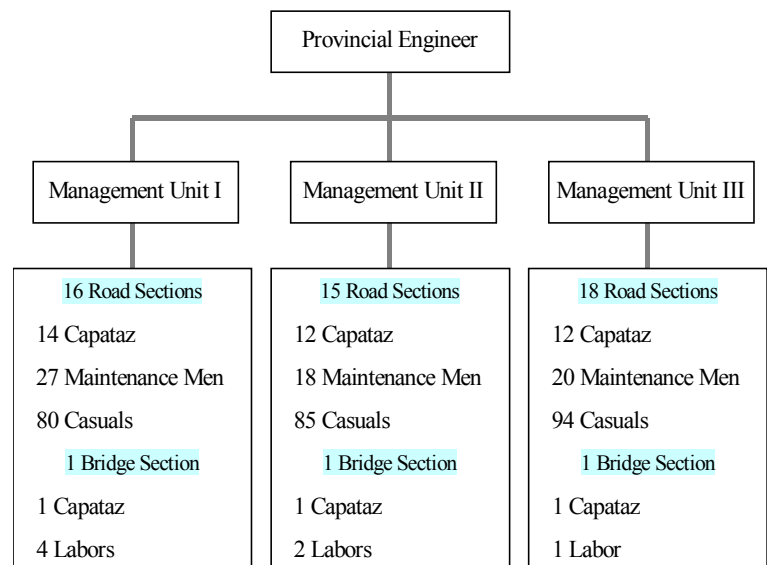
The maintenance division of PEOs maintain all the roads and bridges by MBA. The maintenance work includes routine and periodic maintenance, though no written maintenance standard has been established yet. Each PEO sets its own annual target and maintenance standard,<sup>14</sup> and evaluates the results by itself. In general, the PEO maintenance divisions have an organizational structure similar to that of the DEOs with an adequate number of maintenance personnel (refer to Figure 3). The PEOs also suffer from a lack of funds, resulting in insufficient maintenance equipment.

The devolution of responsibility for maintaining Barangay Roads is still underway. Many of the MEOs are not yet well organized, lack manpower, or have no maintenance equipment. The MEOs usually borrow



**Figure 2 Organizational Structure of Bohol DEO**

Source: Bohol I DEO



**Figure 3 Organizational Structure of Bohol PEO (Maintenance Division)**

Source: Bohol PEO

<sup>10</sup> Municipal governments are responsible for maintaining existing municipal and barangay roads by organizing the MEOs.

<sup>11</sup> Under MBA, routine maintenance is undertaken by the DEOs of DPWH while periodic maintenance is contracted out to private contractors.

<sup>12</sup> Under MBC, both routine and periodic maintenance are contracted out to private contractors through competitive public bidding.

<sup>13</sup> Currently, 60% of the maintenance fund (EMK) is programmed for routine maintenance and 40% of that is programmed for periodic maintenance. Routine maintenance includes shoulder, drainage, and roadside maintenance, pothole patching, and reshaping of gravel surface, while periodic maintenance includes rehabilitation of various pavement.

<sup>14</sup> Maintenance standard includes 3km of road maintenance/person/day, 1.5cm<sup>2</sup> of patching/person/day, and 100m of vegetation control/person/day.



equipment from the PEOs or maintain roads manually. Occasionally, the MEOs request technical assistance from the PEOs through the Governor. In cases where there is no MEO, some Barangay Roads are maintained by barangay captains.

### 2.5.2 Current Condition of Roads and Bridges

The current surface condition of roads and bridges improved under the RRNDP was evaluated by each DEO in the respective provinces. The results are summarized in Table 4.

**Table 4 Current Condition of the Target Roads and Bridges in the Respective Provinces**

Unit: km

Road Type	Rating	Cavite	Masbate	Bohol	Tarlac	%
National Secondary	Good	7.5	78.2	12.3	-	80.7
	Fair	-	23.4	-	-	19.2
	Bad	-	0.2	-	-	0.1
	Very Bad	-	-	-	-	0
Provincial	Good	24.0	37.6	36.5	32.1	58.2
	Fair	18.7	40.0	24.5	3.2	38.6
	Bad	2.1	0.8	-	4.1	2.8
	Very Bad	-	-	-	-	0
Barangay	Good	-	27.7	-	-	70.9
	Fair	-	7.0	-	-	26.7
	Bad	-	0.4	-	-	0.6
	Very Bad	-	-	-	-	0
Bridge (linear meter)	Good	171.1	N.A.	153.3	203.4	100
	Fair	-	N.A.	-	-	0
	Bad	-	N.A.	-	-	0
	Very Bad	-	N.A.	-	-	0

- Good: No potholes or rutting or corrugation. Less than 5 potholes per 1000 meters. Cracking which does not affect driving condition may be ignored.
- Fair: More than 5 but less than 20 potholes per 1000 meters and/or slight cracking and/or rutting and/or corrugated (less than 50% of the section length). Passenger car speed will exceed 30 km per hour.
- Bad: More than 20 potholes per 1000 meters and/or slightly rutted and/or corrugated (more than 50% of the section length) and/or corrugated over approximately the entire length. Pavements, if any, starting to break up. Maximum comfortable travel speed (car) is 30 km per hour.
- Very Bad: Pavement breaking up and gravel surface deteriorated into numerous potholes. Just passable for cars. Maximum comfortable travel speed (car) is about 20 km per hour.

Source: DPWH, PMO-RRNDP

Since the improvements were made between 1995 and 1999, the condition of most of the road sections and bridges are rated either good or fair (above 95% for National Secondary, Provincial, and Barangay Roads, and 100% for bridges). It should be taken into account that portions of some road sections have been upgraded by DEOs and PEOs after the project completion.

Based on site inspections conducted in Cavite and Bohol provinces<sup>15</sup>, most of the road sections improved with AC or PCC pavement were in good condition. Portions of road sections (particularly Provincial and Barangay Roads) improved with gravel pavement, however, were bumpy and rough, and were considered in bad condition. The deterioration of those gravel roads was attributed to exceptionally heavy rains, particularly during the rainy season. According to the DEOs, gravel roads are reshaped twice a year, particularly after the rainy season. However, gravel roads that are classified as either Provincial or Barangay Roads were less well maintained, compared to those classified as National Secondary Roads. Vegetation control and drainage

<sup>15</sup> In site inspections, 4 road sections (16.35km) and 5 bridges in Cavite Province, and 4 road sections (48.81km) and 2 bridges in Bohol Province were covered.

maintenance along Provincial and Barangay Roads were also lacking. In addition, some Provincial and Barangay Roads have not yet been turned over to the LGUs because the improvement work done by contractors has not met the minimum standard set by the DPWH.<sup>16</sup> All the bridges inspected were in good condition.

### 2.5.3 Financial Status

The maintenance budget for National Roads and bridges is allocated to each DEO by the DPWH, based on the equivalent maintenance kilometer (EMK<sup>17</sup>) and the basic cost<sup>18</sup> of EMK, while the maintenance budget for local roads (including Provincial and Barangay Roads) comes from the local government's general fund. Table 5 shows the maintenance budget allocation of Bohol I DEO and Bohol PEO, as an example.

**Table 5 Maintenance Budget Allocation of Bohol I DEO and Bohol PEO, 1996~2001**

Unit: Thousand Peso

Year	Distribution	Bohol I DEO	Bohol PEO
1996	Road	38,137	30,256
	Bridge	2,539	3,880
	<b>Total</b>	<b>40,676</b>	<b>34,136</b>
1997	Road	40,235	24,621
	Bridge	2,678	4,654
	<b>Total</b>	<b>42,913</b>	<b>29,275</b>
1998	Road	18,109	34,047
	Bridge	1,099	1,500
	<b>Total</b>	<b>19,208</b>	<b>35,647</b>
1999	Road	20,547	37,469
	Bridge	468	4,500
	<b>Total</b>	<b>21,015</b>	<b>41,969</b>
2000	Road	22,142	40,695
	Bridge	500	5,791
	<b>Total</b>	<b>22,642</b>	<b>46,486</b>
2001	Road	22,078	33,121
	Bridge	499	6,547
	<b>Total</b>	<b>22,577</b>	<b>39,669</b>

Source: Bohol I DEO and Bohol PEO

The maintenance budget of the DEO decreased sharply in 1998, due to the Economic Crisis. Since then, the budget allocation has been kept below pre-1998 amounts. Meanwhile, the maintenance budget of the PEO has been relatively constant over the past six years. It must be noted that there are three DEOs in Bohol Province and the Bohol I DEO covers only 174.4km of National Roads, while the PEO covers all the Provincial Roads in the province (975km). Table 6 compares the maintenance budget allocation per kilometer of the DEO and the PEO.

<sup>16</sup> In this case, the contractors have a responsibility to maintain and improve road sections until they are approved by the DPWH.

<sup>17</sup> A formula converting the road network in each district into a standard length of road, by applying factors to each road section and bridge reflecting width, pavement type, terrain, rainfall, traffic, etc.

<sup>18</sup> Cost to maintain one EMK for one year.

**Table 6 Maintenance Budget Allocation/km of Bohol I DEO and Bohol PEO**

Unit: Peso

	1996	1997	1998	1999	2000	2001
DEO	218,675	230,705	103,836	117,815	126,961	126,594
PEO	31,032	25,252	34,920	38,429	41,738	33,971

The average maintenance budget allocation/km for the DEO is approximately 154,000 Pesos, while that of the PEO is only 34,000 Pesos, approximately 22% of the DEO average. The PEO's insufficient maintenance budget constrains maintenance activities, so that the lowest priority road sections, such as gravel roads located in rural areas, are not regularly maintained. The same condition can be seen in the other provinces. Even for the DEOs, the maintenance budget is not enough to cover all road sections. There was no available data for the MEOs. According to World Bank documents, however, the LGUs (municipal governments) lack the financial resources to maintain existing road sections.

#### **2.5.4 Sustainability of the Project**

In general, the technical capacity and human resources of the DEOs and PEOs are adequate. However, both engineering offices lack financial and physical resources. Seventy percent (70%) of the maintenance work assigned to the DEOs is now contracted out to the private sector in order to facilitate private sector participation and thereby increasing efficiency through competitive bidding. The PEOs are also planning to adopt an MBC maintenance system, with 33% of maintenance work undertaken by the private sector. Private sector participation may increase the efficiency of the maintenance work.

On the other hand, most LGUs lack financial, physical and human resources, and many do not even organize MEOs to maintain existing local roads. All of the Barangay Roads improved under the RRNDP were paved with gravel, which requires particularly frequent maintenance. Under the circumstances, attention may need to be paid on sustainability of Barangay Roads even though they are currently in good condition.

### **3. Recommendations**

Considering the current situation as can be seen in Provincial and Barangay Roads, it is required to take certain measures, either on GOP level or on provincial governmental level, to secure fund for maintenance works to make this project more sustainable.

At the same time, the new system may have to be established by GOP or provincial government to stimulate more participation of private sector in the maintenance works to lessen financial burden of provincial government.

### Comparison of Original and Actual Scope

Item	Plan	Actual
<b>Project Scope</b>		
1. Province of Cavite		
1-1. Number of Target Roads	- 14	- 11
1-2. Improved Length	- 80.0km	- 52.4km
1-3. Number of Target Bridges	- 8	- 6
1-4. Improved Length	- 153.0 linear meter	- 171.1 linear meter
2. Province of Masbate		
2-1. Number of Target Roads	- 24	- 12
2-2. Improved Length	- 208.0km	- 215.1 km
2-3. Number of Target Bridges	- 22	- 16
2-4. Improved Length	- 616.0 linear meter	- 409.4 linear meter
3. Province of Bohol		
3-1. Number of Target Roads	- 22	- 15
3-2. Improved Length	- 122.0km	- 98.7 km
3-3. Number of Target Bridges	- 12	- 5
3-4. Improved Length	- 158.0 linear meter	- 153.3 linear meter
4. Province of Tarlac		
4-1. Number of Target Roads	- 4	- 5
4-2. Improved Length	- 56.5km	- 39.4 km
4-3. Number of Target Bridges	- 7	- 3
4-4. Improved Length	- 585.9 linear meter	- 203.4 linear meter
5. <b>Total</b>		
5-1. Number of Target Roads	- 64	- 43
5-2. Improved Length	- 466.5 km	- 405.6 km
5-3. Number of Target Bridges	- 49	- 30
5-4. Improved Length	- 1,512.9 linear meter	- 937.2 linear meter
6. Consulting Services		
	- Foreign: 30 M/M	- Foreign: 146 M/M
	- Local: 128 MM	- Local: 422 MM
<b>Implementation Schedule</b>		
1. Loan Agreement	July 1991	July 1991
2. Selection of Consultant	Aug. 1991 to Mar. 1992	N.A.
3. Tendering/Contract	July 1992 to July 1993	June 1994 to Jan. 1995 (1st Package)
4. Construction	Feb. 1993 to July 1995	Jan. 1996 to May 1996 (2nd Package)
5. Consulting Services	Apr. 1992 to July 1995	Jan. 1995 to Oct. 1999
		July 1992 to Apr. 1999
<b>Project Cost</b>		
Foreign Currency	3,920 mil. Yen	547 mil. Yen
Local Currency	456 mil. Peso	1,413 mil. Peso
Total	7,021 mil. Yen	6,199 mil. Yen
ODA Loan Portion	5,266 mil. Yen	4,827 mil. Yen
Exchange Rate	1 Peso = ¥ 6.8	1 Peso = ¥ 4.0
	(As of July 1990)	(Weighted Average)

## **Independent Evaluator's Opinion on Rural Road Network Development Project (I)**

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The Rural Road Network Development Project is highly relevant.

The Philippines remains to be predominantly rural and majority of its population still resides in the rural area. Road network program improves access to the rural areas as well as access of the rural folks to services, facilities and opportunities that are mostly available in the urban areas. The Project is responsive to the needs of the target groups, especially the rural folks.

Accelerating infrastructure development, which includes the rehabilitation, improvement and/or construction of rural roads, continues to be a high priority in the Medium Term Philippine Development Plan (MTPDP) for the years 2001 to 2004. Modernizing the agriculture and fisheries sector is another priority of the MTPDP and the Rural Road Network Development Project is a means towards this end.

The Project falls within the priority areas of the Philippine Country Assistance Strategy, for the year 2001 to 2004: the turn goal of accelerating environmentally sustainable development and developing infrastructure, particularly in the provinces. The objectives of the Project have been achieved even if there were changes in project scope.

The Project provided for the improvement of different rural roads from gravel or unpaved earth roads to all-weather roads. As a result, improved agricultural production is now happening since road catchment/service areas are now linked to bigger markets. Agricultural production has been stimulated not only for cash crops but also for fisheries, as the road network facilitated commodity exchange. Farmers and fisherfolks can now sell more products, hence, improved rural income is expected. The Project has been instrumental in increasing rural income.

Another impact of the road project is the generation of employment opportunities for local residents brought about by the establishment of factories and industrial estates along and nearby road sections.

The construction of all-weather road also facilitated access to health and education services. Thus, it is expected that health and education status in the service area would also improve.

Frequency of travel, reduction in travel time, savings in operation and maintenance costs of vehicles are other benefits from the road project.

No negative environmental impact attributed to the Project has been reported.

More benefits and impact can be gained from the Project if proper maintenance will be continuously provided.