

(Field Survey: July 2007)

## Ex-post Monitoring Report

Evaluator: Atsushi Hashimoto (Maenam Advisory Co., Ltd.)

Project Name: Philippines "Rural Road Network Development Project (I)" (L/A No. PH-P118)

### Loan Outline

Loan Amount / Disbursed Amount: 5,266 million yen / 4,827 million yen

Loan Agreement: July 1991

Final Disbursement Date: April 1999

Ex-post Evaluation: FY2002

Executing Agency: Department of Public Works and Highways (DPWH)

### Project Objective

To develop the rural road network including national secondary roads, provincial roads and barangay roads in the provinces of Cavite, Masbate, Bohol and Tarlac to facilitate efficient land transport and thereby contribute to socio-economic development in this region. (To develop the rural road network in which roads are unpaved or in bad condition in order to promote exchanges between people and of goods, to stimulate the rural economy and to improve the welfare of residents.)

Consultant: Katahira & Engineers Inc. (Japan), etc.

Contractor: PERSAN CONSTRUCTION (Philippine), R.R. MAURICIO CONST. (Philippine), SCP CONST. (Philippine), etc.

### Overview of Results

Item	At the Time of Ex-post Evaluation	At the Time of Ex-post Monitoring
<b>Effectiveness &amp; Impact</b>  <b>Effectiveness</b>	<p>This project was to develop the rural road network (the roads under the jurisdiction of the provincial governments and those under the jurisdiction of the municipal governments (barangays)) in the provinces of Cavite, Tarlac, Bohol and Masbate. The original scope covered 64 roads with a total length of 466.5 km and 49 bridges, while the actual scope covered 43 roads with a total length of 405.6 km and 30 bridges. These changes are the result of the change in the target sections of the roads and bridges rather than the reduction in the original scope. Three types of pavement were used for the improved road sections: gravel, asphalt, or concrete.</p> <p>(1) Traffic Volume (Annual Average Daily Traffic) and Travel Time a) Traffic Volume</p>	<div><p>Almost all the roads constructed or improved under the project are trafficable and are frequently used by local residents as community roads or commuter roads. The effectiveness of the project has not been lost at the time of ex-post monitoring. The project helped improve access to medical facilities, farmland, market, school, etc., and activate the economic activities of local residents.</p></div> <p>(1) Traffic Volume (Annual Average Daily Traffic) and Travel Time a) Traffic Volume</p> <p>The traffic census of the road sections covered by the project has not been conducted recently and therefore no data is available. Table 1 shows</p>

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	<p>The table below shows the data on the annual average daily traffic in Masbate and Bohol Provinces in 1988 and 2000. The average growth rate on the 6 road sections where measurement was conducted 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) 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. After it was paved with gravel the traffic improved and, as a result, it has now become one of the most important roads for the local community.</p>	<p>the data based on the traffic statistics complied by DPWH for selected sections in each region. In every region, the traffic volume increased by approximately 10% between 2000 and 2003, indicating that the project helps meet the increase in traffic volume.</p>																																																																																																																																																																																																																																																																			
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	<p>Source: DPWH, PMO-RRNDP (PMO: Project Management Office)</p> <p>b) Travel Time</p> <p>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. As illustrated in the figure below, there was a significant increase in average vehicle speed after the project.</p> <p>Figure 1: Average Vehicle Speed for Different Types of Pavement 1988 and 2000</p> <table><tr><th colspan="2">1988</th><th colspan="2">2000</th></tr><tr><th>Type of Pavement</th><th>Average Speed</th><th>Type of Pavement</th><th>Average Speed</th></tr><tr><td>Earth</td><td>12.5 km/hour</td><td>*Gravel</td><td>20.1 km/hour</td></tr><tr><td>*Gravel</td><td>17.5 km/hour</td><td>PCC/Gravel</td><td>50.2 km/hour</td></tr><tr><td></td><td></td><td>PCC or AC</td><td>61.9 km/hour</td></tr></table> <p>*The condition of gravel Roads in 1988 was considered bad, while that of those in 2000 was considered fair.</p> <p>c) Overall Project Effectiveness (road length, pavement ratio, etc.)</p> <p>The overall road network of the Philippines in 2000 measured 201,834 km. This was 40,122 km more than that in 1988 (161,712 km), due mainly to the expansion of barangay roads. Road density (road length per 1 ha) also increased from 0.54 km/m<sup>2</sup> to 0.67 km/m<sup>2</sup> between 1988 and 2000. The table below shows the state of roads by classification.</p>	1988		2000		Type of Pavement	Average Speed	Type of Pavement	Average Speed	Earth	12.5 km/hour	*Gravel	20.1 km/hour	*Gravel	17.5 km/hour	PCC/Gravel	50.2 km/hour			PCC or AC	61.9 km/hour	<p>b)Travel Time</p> <p>Traffic slowing down due to congestion does not occur except for some sections in Tarlac and Cavite. On these roads, the travel time has been reduced as a result of the pavement work. On the gravel-paved sections that used to be impassable for vehicles, it has become possible for buses and jeepney to go through and the transport of people and goods has substantially increased (according to the interview with the DPWH Bohol Provincial Office).</p> <p>c) Overall Project Effectiveness (road length, pavement ratio, etc.)</p> <p>No data was obtained concerning the road length, pavement ratio, etc. &lt;For reference&gt; The number of registered mobiles increased between 2003 and 2006 in every province. Particularly in Cavite Province, the number of automobile registrations has been increasing at a rate higher than that of the whole Philippines.</p>
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	Table 2: Total Road Length and Road Pavement Ratio, 1988 and 2000						Table 2: Changes in the Number of Registered Automobiles				
		1988			2000				2003	2006	Increase Rate (% /year)
	Classifica tion <sup>1</sup>	Total Length (km)	Pavem ent Ratio (%)	All-weath er (%) in 1992	Total Length (km)	Pavemen t Ratio (%)	All-weath er (%) in 1999				
	National Road	26,260	49	69	29,878	62	84	Bohol	50911	57321	4.0
	Provincia l Road	28,425	15	N.A.	27,136	21	58	Cavite	128971	168719	9.4
	City Road	3,987	67	N.A.	7,052	77	94	Masbate	8226	9484	4.9
	Municipa l Road	12,826	26	N.A.	15,804	34	66	Tarlac	58663	63831	2.9
	Barangay Road	90,214	0	N.A.	121,965	7	46	Whole Philippines	4292272	5331574	7.5
	合計	161,712	14	N.A.	201,834	21	56	Source: Land Transportation Office			
	Source: DPWH and World Bank Document										
<p>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%<sup>2</sup>, which increased to 56% in 1999, due mainly to the improvement of barangay roads.</p> <p>(2) Recalculation of EIRR For selected 6 sections in Masbate and Bohol: 6.0–42.2 % (average: 23%) (*EIRR was recalculated for selected road sections in the provinces of Masbate and Bohol using figures for travel time savings and vehicle operating cost savings as project benefit. The economic cost (construction cost and consulting service cost) and maintenance cost were used as the</p>							<p>(2) Recalculation of EIRR EIRR is not calculated because the traffic volume data are not available.</p>				

<sup>1</sup> Road classification: (1) national road: a) national arterial road (forming part of the main trunk system), b) national secondary road (connecting a secondary center to another one ), (2) provincial road (connecting one municipality to another municipality and to national arterial or secondary roads), (3) city road (roads/streets within the urban area of the city.), (4) municipal road (roads/streets within the municipal town), (5) barangay road (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> According to project appraisal documentation

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	project cost (assuming that the project life is 25 years).)	
<b>Impact</b>	<p>(1) Impact on Socio-economic Aspects</p> <p>The overall goal of the project is to sustain regional industries and agricultural activities, and to improve the living standards of inhabitants. Before the project was implemented (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. The followings are the effects brought by the project impacts in each province (qualitative description).</p> <p>a) Cavite Province Increase in agricultural production, activation of agricultural industries, and inducing of investment in the province</p> <p>b) Masbate Province Increase in income from the sale of agricultural products, improved access to medical services and improvement of the health of residents</p> <p>c) Bohol Province Promotion of the exchange of agricultural products for marine products as a result of the construction and improvement of the short-cuts between agricultural production areas and fishing ports</p> <p>d) Tarlac Province Increase in employment opportunities for local residents due to the construction of manufacturing factories following the construction of the roads connecting every city</p> <p>(2) Impact on Environment There has been no negative environmental impact reported.</p>	<p>(1) Impact on Socio-economic Aspects</p> <p>Improvement of the rural road network improved access to the market and social services (school, medical services) and contributed to the development of the local economy.</p> <p>a) Cavite Province: Cavite is a boom city that successfully constructed the coastal road and the export processing zone and induced foreign investment. Improvement of the roads surrounding the city contributed to facilitating commuting to offices and schools and transport of agricultural products to markets.</p> <p>b) Masbate Province: Masbate Province is the largest livestock province of the Philippines. The project contributed to facilitating the development of grazing land and farmland and the transport of agricultural products. New settlements were formed along the constructed roads where no settlement existed before the project was implemented. Overland access to the urban area is available in addition to the existing sea traffic route. From the farm houses scattering along the road, convenience for going to the clinic (medical services) in the village and commuting to the elementary and junior high schools (education) improved.</p> <p>c) Bohol Province: The rice producing area in the island increased. Construction and improvement of the roads between the inland and coastal areas facilitated and promoted distribution of agricultural and marine products. The comfort and convenience for tourists to travel increased (reduction in the travel time). As is the case in Masbate, new settlements were formed along the constructed roads. Access to medical services and education improved.</p> <p>d) Tarlac Province: The project covered the road connecting the rural areas around the central region of the province and contributed to the improvement of access of agricultural products to the market.</p> <p>(2) Environmental Impact There has been no negative environmental impact reported.</p>

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Sustainability	<p>(1) Technical Capacity</p> <p>According to the Local Government Code, the responsibility of maintaining national and barangay roads was transferred from the District Engineering Offices (DEOs) of DPWH to the Municipal Engineering Office (MEOs) of the local governments. However, as many of the MEOs lack maintenance personnel and equipment, they borrow equipment or request technical assistance from Provincial Engineer Offices (PEOs). It is feared that the sufficient technical level may not be maintained.</p> <p>(2) O&amp;M System</p> <p>The DEOs, PEOs and MEOs are in charge of maintaining national roads, provincial roads, and barangay roads, respectively. Some portions of the maintenance work of national roads and provincial roads are contracted out to the private sector. The devolution of responsibility for maintaining barangay roads is still underway as of the time of ex-post evaluation. Many of the MEOs are not yet well organized.</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>The minimum necessary level of maintenance work is performed within a limited budget in order to secure road traffic and sustainability has been maintained.</p> </div> <p>(1) Technical Capacity</p> <p>At the time of ex-post evaluation, the maintenance work was performed by the Municipal Engineering Offices (MEOs) whose technical and budget capacity was questioned. Today, most of the roads covered by the project are managed by the Provincial Engineer Offices (PEOs) except for some sections and a certain level of maintenance is secured. The maintenance capacity of the PEOs of Cavite and Bohol seems sufficient. The PEOs of Tarlac and Masbate complain about the lack of engineers and budget, though they do not have any serious problems. According to DPWH and PEOs, many of the MEOs lack technical capacity and budget.</p> <p>(2) O&amp;M System</p> <p>Most of the roads covered by the project are now classified as provincial roads, which are maintained mainly by PEOs. Each PEO has a provincial engineer and (usually two) assistant engineers under whom supervisors are assigned. Under the Supervisors, maintenance teams called “kapatás” are organized. There are 20 maintenance teams in Cavite, 37 in Bohol, and 8 in Masbate. Each team has around 6 workers and each supervisor leads 4–5 teams. Each team is responsible for maintaining a road section of approximately 20 km. They conduct rounds of their areas of responsibility and conduct road maintenance when necessary (routine maintenance). There seems to be no problem in this system.</p> <p>However, in spite of the need for periodic maintenance, only the points that are found severely damaged in the round are repaired under the current practice.</p> <p>&lt;Reference&gt; The “periodic maintenance” referred to here is to predict deterioration of the road by aging, traffic volume and climate based on the information on when and how the road was paved and perform maintenance of the road before it is damaged. It is said that the cost of the periodic maintenance is lower than the cost of repairing the damaged road.</p>

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	<p>(3) Financial Status</p> <p>There are no data showing the financial status of DPWH, DEO and PEO. The maintenance budget for national roads and bridges is as shown below. The maintenance budget is allocated to each DEO by the DPWH, while the maintenance budget for local roads (including provincial and barangay roads) comes from the local government’s general fund. The table below shows the maintenance budget allocation of 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.</p> <p style="text-align: center;">Table 3: Maintenance Budget Allocation of Bohol I DEO and Bohol PEO, 1996-2001</p> <table><tr><th></th><th>Distribution</th><th>Bohol I DEO</th><th>Bohol PEO</th></tr><tr><td rowspan="3">1996</td><td>Road</td><td>38,137</td><td>30,256</td></tr><tr><td>Bridge</td><td>2,539</td><td>3,880</td></tr><tr><td>Total</td><td><b>40,676</b></td><td><b>34,136</b></td></tr><tr><td rowspan="3">1997</td><td>Road</td><td>40,235</td><td>24,621</td></tr><tr><td>Bridge</td><td>2,678</td><td>4,654</td></tr><tr><td>Total</td><td><b>42,913</b></td><td><b>29,275</b></td></tr><tr><td rowspan="3">1998</td><td>Road</td><td>18,109</td><td>34,047</td></tr><tr><td>Bridge</td><td>1,099</td><td>1,500</td></tr><tr><td>Total</td><td><b>19,208</b></td><td><b>35,647</b></td></tr><tr><td rowspan="3">1999</td><td>Road</td><td>20,547</td><td>37,469</td></tr><tr><td>Bridge</td><td>468</td><td>4,500</td></tr><tr><td>Total</td><td><b>21,015</b></td><td><b>41,969</b></td></tr><tr><td>2000</td><td>Road</td><td>22,142</td><td>40,695</td></tr></table>		Distribution	Bohol I DEO	Bohol PEO	1996	Road	38,137	30,256	Bridge	2,539	3,880	Total	<b>40,676</b>	<b>34,136</b>	1997	Road	40,235	24,621	Bridge	2,678	4,654	Total	<b>42,913</b>	<b>29,275</b>	1998	Road	18,109	34,047	Bridge	1,099	1,500	Total	<b>19,208</b>	<b>35,647</b>	1999	Road	20,547	37,469	Bridge	468	4,500	Total	<b>21,015</b>	<b>41,969</b>	2000	Road	22,142	40,695	<p>Some of the road repair works for maintenance of provincial roads are contracted out to the private sector. However, no case of entrustment to the private sector has been found.</p> <p>It was not confirmed that MEOs are proceeding with the establishment of more effective system. As mentioned above, they lack budget and personnel, according to DPWH and PEOs.</p> <p>(3) Financial Status</p> <p>The maintenance budget for rural roads consists of the portion earmarked for the road maintenance expenses from the provincial budget allocated by the central government to local governments (provincial government portion) and the local portion the Road Fund (Special Local Road Fund). Generally speaking, the road maintenance budget is inadequate in every region, though the degree varies. The road maintenance budget is allocated based on the standard maintenance cost known as EMK (Equivalent Maintenance Kilometer) and the total road length. The EMK in 2005 was 36,788 Pesos (source: DPWH), while the actual maintenance cost per kilometer is around 71,000 Pesos (source: JBIC report). The amount of road maintenance budget is inadequate. The provincial road maintenance budget situation in each province is as described below.</p> <p>a) Bohol</p> <p>Responsible for the maintenance of the roads totaling 920 km, for which 8.6 million Pesos from the provincial budget and 6.2 million Pesos from the Special Local Road Fund are allocated.</p> <p>b) Cavite</p> <p>The PEOs in Cavite are responsible for the maintenance of the roads totaling approximately 500 km. The maintenance budget consists of 10 million Pesos from the provincial budget and 4 million Pesos from the Road Fund.</p> <p>c) Masbate</p> <p>The PEOs are responsible for the maintenance of the roads totaling approximately 117 km. The maintenance budget is 1.5 million Pesos.</p> <p>d) Tarlac</p> <p>The total length of the provincial roads is approximately 600 km. The maintenance budget consists of 8 million Pesos from the provincial budget</p>
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Item	At the Time of Ex-post Evaluation				At the Time of Ex-post Monitoring	
		Bridge	500	5,791	and 6 million Pesos from the Special Local Road Fund. The budget is inadequate. While the provinces of Masbate and Tarlac suffer serious shortage of the road maintenance budget, the provinces of Bohol and Cavite do not have a sense of urgency. As Bohol and Cavite are relatively wealthy provinces, flexible allocation of the provincial budget to the road maintenance budget as necessary seems to be possible.	
		Total	22,642	46,486		
	2001	Road	22,078	33,121		
		Bridge	499	6,547		
		Total	22,577	39,669		
	Source: Bohol I DEO and Bohol PEO					
	However, 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.					
	Table 4: Maintenance Budget Allocation/km of Bohol I DEO and Bohol PEO					
	Unit: Peso					
		1996	1997	1998	1999	2000
	DEO	218,675	230,705	103,836	117,815	126,961
	PEO	31,032	25,252	34,920	41,738	33,971
	(4) O&M Status				(4) O&M Status	
Although some road sections improved by gravel pavement were found deteriorated in the on-site inspection, according to DEOs of each province, most of the target road sections and bridges are rated in “good” or “fair” conditions and there is no problem in general.						
				The O&M status has not been changed from the time of the ex-post evaluation. Some sections improved by gravel pavement are difficult to drive, and cracks and subsidence are found on some asphalt paved sections. However, most road sections and bridges are in conditions that do not cause difficulty in driving and mostly have no problem. In this project, not all of the target sections (ranging from several		



Item	At the Time of Ex-post Evaluation	At the Time of Ex-post Monitoring
	<p>(5) Conclusion on Sustainability (possibility of utilization of the private sector)</p> <p>The technical capacity and human resources of the DEOs and PEOs are inadequate. Both engineering offices lack financial and physical resources.</p> <p>In order to increase efficiency through competitive bidding, i.e. to facilitate private sector participation, seventy percent (70%) of the maintenance work assigned to the DEOs is now contracted out to the private sector. The PEOs are also planning to entrust 33% of maintenance work to the private sector. Private sector participation may increase the efficiency of the maintenance work. (The DEOs usually lack maintenance equipment, leading to work inefficiency, while private contractors usually have sufficient and better-quality equipment.)</p>	<p>kilometers to over ten kilometers) were paved with concrete or asphalt. Even on the same section, some portions were paved with concrete or asphalt and others were covered with gravel. In some cases the unpaved sections were paved by the provincial government with the provincial budget (in all provinces) or the concrete pavement was overlaid with asphalt (Cavite). Also the maintenance work is performed to maintain the roads trafficable, though not sufficient. Therefore, sustainability of the project has been ensured.</p> <p>(5) Conclusion on Sustainability (possibility of utilization of the private sector)</p> <p>Some of the road maintenance works are contracted out to the private companies. However, entrustment of the maintenance to the private sector has not been implemented. Before discussing the transfer of maintenance responsibility to the private sector, the issue of budget shortage, which is the ultimate factor that may impede sustainability of rural road projects in the Philippines, needs to be addressed. An adequate amount of budget cannot be allocated even for highly urgent and needed works such as repair of the severely damaged points on the existing roads and therefore no budget is allocated for the periodic maintenance. Thus the maintenance work is not implemented until it is too late and as a result a large amount of repair cost is required. However, the constructed roads are served for smooth transport of people and goods with no sections abandoned and they have been maintained in a trafficable condition. On the sections where the traffic volume is increasing, pavement work is implemented with the provincial budget. The current situation is that the local governments are short in budget in spite of their capability and willingness for road maintenance. Securing an additional source of funding utilizing the existing Road Fund and promoting implementation of the periodic maintenance are considered as measures currently needed.</p>
<b>Lessons Learned, Recommendations, Information</b>		<div style="border: 1px solid black; padding: 5px;"> <p>This project is highly effective and sustainable. The issues facing the rural road projects are how to secure the maintenance budget and the maintenance capacity of the Road Maintenance Bureau. Efforts are</p> </div>

Item	At the Time of Ex-post Evaluation	At the Time of Ex-post Monitoring
<p><b>Resources and Monitoring Methods</b></p> <p>(1) Follow up on lessons learned and recommendations made in ex-post evaluation report or in later evaluations</p> <p>(2) Proposals for securing sustainability and instructions given at time of ex-post monitoring</p>	<p>(1)N.A.</p> <p>(2) Proposals for securing sustainability Considering the current situation as can be seen in provincial and barangay roads, it is required to take certain measures, either on a GOP level or on a provincial governmental level, to secure funding for maintenance works to make this project more sustainable.</p> <p>At the same time, the new system may have to be established by the GOP or the provincial government to stimulate more participation of private sector in the maintenance works to lessen the financial burden of provincial governments.</p>	<div data-bbox="1234 228 2031 331" style="border: 1px solid black; padding: 5px;"> <p>needed to secure the maintenance budget in a systematic manner and promote understanding of the importance of and implement the periodic maintenance.</p> </div> <p>(1) Recommendations at time of ex-post evaluation N.A.</p> <p>(2) Proposals and instructions given at the time of ex-post monitoring (Instructions) This is a good example of an economically effective rural road development project. Especially in Bohol, it seems to produce the effects of acceleration of the exchange of goods between the coastal and inland regions, expansion of farmland in the inland region and increase in the convenience for tourists as well as the economic effect generate combination with the coastal road going around the island.</p> <p>(Proposals) a) Currently some portions of the Road Fund are allocated to the local government. However, the road maintenance budget is still insufficient. Although there remains a question of how to secure the revenue source, continued efforts are needed to secure the maintenance budget. b) Implementation of periodic maintenance needs to be encouraged. Although the budget is limited, it will be effective to train the staff of PEOs/MEOs on effective implementation of the routine maintenance and the periodic maintenance.</p>