FY2021 Simplified Ex-Post Evaluation Report of Japanese Grant Aid Project

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Duration of the Study: November 2021 - January 2023

Duration of the Field Study: 2nd April 2022 - 16th April 2022

Country Name	**The Project for Reconstruction of Bridges on New Britain Highway**
Independent State of Papua New Guinea	

Location of the Project Site
(Source: External Evaluator)

The bridges reconstructed under this project:
Aum Bridge (above) and Kapiura Bridge (below)
(Source: External Evaluator)

I. Project Outline

Background	Roads in Papua New Guinea were underdeveloped, with a number of sections not yet opened, roads connecting major cities in the country being fragmented, and there were few detours or alternative routes. This had a serious impact on the economy and the lives of residents, as heavy rains during the rainy season caused landslides and overflowing rivers, making it impossible to move people and transport goods between regions. The New Britain National Highway is a trunk road connecting Kimbe, a major city in West New Britain Province, and Rabaul, a major city in East New Britain Province, and was used by small farmers and marketers in West New Britain Province, where palm oil production was thriving. However, of the bridges on the New Britain National Highway, the Aum and Kapiura bridges, which were built by a Japanese company in the early 1980s, were no longer capable of carrying the design load due to aging and damages to members caused by vehicle collisions. As a result, the Aum Bridge was closed to traffic and the Kapiura Bridge had weight restrictions on passing vehicles, hindering logistics including palm oil transportation. The Kapiura Bridge was also feared to be in danger of falling due to the passage of large vehicles, and the temporary bridge for the Aum Bridge was a fragile bridge constructed of logs, which not only hindered logistics but also posed a major safety issue for traffic. The instability of both of these bridges could have had a negative impact on the livelihood of the residents and the development of key industries in Papua New Guinea, and this project was undertaken in response to a request for cooperation from the Papua New Guinean government for the road sector development plan.
Objectives of the Project	The objective of this project was to improve the performance of the bridges and traffic safety by replacing Aum Bridge and Kapiura Bridge on the New Britain National Highway, thereby contributing to ensuring access to markets for local residents and promoting and facilitating logistics.
Contents of the Project	1. Project Site: West New Britain Province, Independent State of Papua New Guinea 2. Japanese side: 1) Details of civil works and procured equipment (The table shows the actual results. There were minor changes in quantity and specifications compared to the plan.)

Item	Specification
1. Removal of two existing bridges	1-1. Aum Bridge (one-lane) ➢ Bridge length: 50 m, Effective width: 5.8 m, Underpass steel truss bridge 1-2. Kapiura Bridge (one-lane) ➢ Bridge length: 116 m, Effective width: 5.8 m, Underpass stiffened arch bridge (Langer girder bridge)
2. Construction of two new bridges	2-1. Aum Bridge (two-lanes) ➢ Bridge length: 76 m, Effective width: 13.9 m - 9.5 m, Steel 2-span continuous plate girder bridge 2-2. Kapiura Bridge (two-lanes) ➢ Bridge length: 137 m, Effective width: 9.5 m, Steel 3-span continuous plate girder bridge
3. Construction of temporary approach road	Construction of temporary approach roads (including the installation of guardrails, road signs, etc.) ➢ Aum Bridge: 124 m ➢ Kapiura Bridge: 443 m
4. Installation of gabions	Installation of gabions to prevent scouring of abutment

2) Soft component
None

3. Papua New Guinea side:
Lease cancellation of land required for the project, Lease of land as construction yard, Securing land for dumping soil and collecting sand/crushed stones, Construction of approach roads (including pavement, guardrails, road signs and drainage works)

Implementation Schedule	E/N Date	23 January 2015	Completion Date	April 2020[1]
	G/A or L/A Date	30 January 2015		
Project Cost	E/N Grant Limit / G/A Grant Limit: 3,160 million yen, Actual Grant Amount: 3,110 million yen			
Executing Agency	Department of Works (hereinafter referred to as "DOW")[2]			
Contracted Agencies	Main Contractor: Dai Nippon Construction Main Consultant(s): CHODAI CO., LTD. and INGÉROSEC Corporation Procurement Agent: None Equipment Procurement Agent: None			

II. Result of the Evaluation

Summary

This project aimed to improve the performance of the bridges and traffic safety by replacing Aum Bridge and Kapiura Bridge on the New Britain National Highway in West New Britain Province, thereby contributing to ensuring access to markets for local residents and promoting and facilitating logistics.

This project has high level of relevance and coherence as it was consistent with the development policy, development needs of Papua New Guinea and Japan's development cooperation policy at the time of planning. In addition, the collaboration and coordination with other JICA-assisted projects and projects of non-JICA organizations were also found as initially expected, and concrete outcomes were confirmed.

The effectiveness and the impact of this project were also high as it had achieved the logistics promotion and facilitation, secured traffic in the event of a disaster, ensured pedestrian safety and ensured access to markets for the residents as expected at the time of planning. No negative impacts on the social and natural environment and resettlement were identified. As for the outputs of the project, the Japanese portion of the project, including the bridge replacement and construction of temporary approach roads, was completed as planned, but the Papua New Guinea portion of the project, including the revetment work and removal of a log bridge, was partially incomplete due to a change in the scope of the Japanese and Papua New Guinean portions of the project, mainly as a result of bidding failure. As for inputs, both the total project cost and the project period exceeded the plan, mainly due to bidding failure. Therefore, the efficiency of this project is moderately low.

In terms of policies and systems, the national development plan emphasizes the maintenance of road and bridge infrastructure, and in terms of institutional and organizational aspect, the DOW-West New Britain Office (DOW-WNB) has no shortage of personnel to implement maintenance activities. In terms of the technical aspect, the educational background and work experience of the DOW-WNB staff are both sufficient for maintenance, and there are no particular issues in terms of environmental and social considerations and preventative measures to risks. On the other hand, from a financial point of view, sufficient financial resources have not been secured as a budget for regular maintenance, and with regard to actual operation and maintenance, the inspection items assumed at the time of planning have not been carried out regularly, the maintenance manual has not been utilized, and an alternative maintenance management plan has not been clearly defined. Therefore, the sustainability of the project is moderately low.

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

[1] The completion date for the Japanese side was 27th March 2019 (see "Efficiency" for details).

[2] In this report, DOW means the Department of Public Works as a whole. When it is necessary to distinguish between the DOW head quarter and the DOW West New Britain office, they are hereafter referred to as DOW-HQ and DOW-WNB, respectively.

Overall Rating[3]	B (Satisfactory)	Relevance & Coherence	③[4]	Effectiveness & Impacts	③	Efficiency	②	Sustainability	②

1 Relevance/Coherence

<Relevance>

・Consistency with the Development Policy of Papua New Guinea at the Time of Ex-Ante Evaluation

At the time of ex-ante evaluation, The *Medium Term Development Plan 2011-2015* developed by the Papua New Guinea Government identified the importance of maintaining existing highways in good condition in order to improve access to markets and public services for local residents. Also, the *Development Strategic Plan 2010-2030* state that sixteen priority roads, including the New Britain National Highway, will be drastically upgraded by 2030. Therefore, this project was consistent with the government's development policy at the time of ex-ante evaluation.

・Consistency with the Development Needs of Papua New Guinea at the Time of Ex-Ante Evaluation

At the time of ex-ante evaluation, the area along the New Britain National Highway, located in West New Britain Province, was the area where the palm oil and lumber industries were thriving and the highway was the only lifeline. However, the Aum and Kapiura bridges on the New Britain National Highway were dilapidating due to damages to members caused by vehicle collisions and aging. The Aum Bridge was closed to traffic and the Kapiura Bridge had weight restrictions on passing vehicles. In this regard, there was a high need to promote and facilitate logistics, ensure market access, and secure traffic in the event of a disaster by improving bridges. In addition, as the replacement bridge for the Aum Bridge was a fragile bridge constructed of logs, and the Kapiura Bridge was at risk of falling due to lack of durability, there was a high need for rapid safety assurance through bridge improvement. Given these factors, this project was consistent with the development needs of Papua New Guinea at the time of ex-ante evaluation.

<Coherence>

・Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation

At the 6th Pacific Islands Leaders Meeting in 2012 (PALM 6), the Government of Japan expressed the importance of developing a reliable transport network to ensure sustainable development and human security. In addition, in "JICA Country Analysis Paper for Papua New Guinea," socio-economic infrastructure was identified as an important area. Also, "Strengthening of the Socio-Economic Infrastructure" was mentioned as a priority area in "Japan's ODA: Rolling Plan for Papua New Guinea," which focused on the development and maintenance of economic infrastructure, including transport infrastructure. For these reasons, this project was highly consistent with Japan's ODA policy at the time of ex-ante evaluation.

・Internal Coherence

JICA had implemented a technical cooperation project "The Project for Capacity Development on Road Maintenance" (2013-2017) in parallel with this project. These projects provided opportunities for engineers with limited field experience to implement projects and use equipment. They were also able to acquire further knowledge through communication with Japanese counterparts and experts. Interviews with the executing agency confirmed that these elements contributed to the smooth implementation of the project. Therefore, JICA's other projects are considered to have contributed to the generation of the project outcomes and the securing of project sustainability.

・External Coherence

In 2018-2020, at around the same time as the implementation of this project, the Asian Development Bank (ADB) implemented the "Bridge Replacement for Improved Rural Access Project (BRIRAP)" for 27 small simple steel (Bailey) bridges on five arterial roads, including the New Britain National Highway. In addition, a "Major Bridge Survey" was conducted to investigate the need to replace bridges that were not covered by BRIRAP on the same five routes as BRIRAP. There was no overlap between this project and those of other donors including ADB, and the two projects can be said to have complemented each other, as the ADB project and this project together reduced the travel time on the New Britain National Highway.

Although no concrete quantitative outcomes were confirmed in terms of consistency with the international framework, from the perspective of improving traffic safety, ensuring access to markets for local residents, and promoting and facilitating logistics by replacing bridges , this project is considered to have been consistent with several goals of SDGs, such as "1. End poverty in all its forms everywhere," "9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation," and "11. Realize inclusive, safe, resilient, and sustainable cities and human settlements."

<Evaluation Result>

In light of the above, the relevance and coherence of the project are high[5].

2 Effectiveness/Impacts[6]

<Effectiveness>

As the quantitative and qualitative effects of the project have been generated as expected at the time of ex-post evaluation, the project

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ④ : Very High ③: High, ②: Moderately low, ①: Low

[5] Relevance: ③, Coherence: ③

[6] When providing the sub-rating, Effectiveness and Impacts are to be considered together.

objective can be said to have been achieved.

a. Quantitative Effects

The Aum and Kapiura bridges replaced in the project were observed to be in use for traffic without any major problems. According to DOW, the bridge load carrying capacity (Indicator 1) for both bridges satisfied the target value of 88 tonnes, and it was observed that some 45-tonne trucks fully loaded with palm oil and logs passed through the bridges during the field survey. The average driving speed on each bridge (Indicator 2) was set at the target value of 60 km/h. It was confirmed that the speed of vehicles passing on both bridges were generally above 60 km/h by visually checking at the field survey although the actual speed was not measured according to DOW. Therefore, it is considered that Indicator 2 has been achieved. The annual average daily traffic volume (Indicator 3) refers to the number of vehicles per day between Kimbe and Bialla. According to DOW, the target of 772 vehicles/day has been achieved. In addition, all vehicles were observed to be passing smoothly during the field survey though it should be noted that the traffic volume survey has not been conducted after the completion of the project and it is DOW's estimate of traffic volume.

Table 1 Quantitative Effects

Quantitative Effects (Effect Indicators)		Baseline 2014	Target 2020 3 Years after Completion	Actual 2022 3 Years after Completion
Indicator 1 Bridge load carrying capacity (tonne)	Aum Bridge	44	88	・According to DOW, the actual value is 88 tonnes as targeted. ・It was observed at the field survey that there was no weight limit for the traffic on either bridges, and that some 45-tonne trucks with full of palms and logs frequently passed through the bridges.
	Kapiura Bridge	44	88	
Indicator 2 Average driving speed on each bridge (km/h)	Aum Bridge	11.0	60	・According to DOW, the actual value has not been measured. ・It was observed at the field survey that vehicles were passing on both bridges at about 60-80 km/h.
	Kapiura Bridge	18.4	60	
Indicator 3 Annual average daily traffic volume (number of vehicles/day)	Kimbe-Bialla	493	772	・According to DOW, although no traffic volume survey has been conducted since the project was completed, the actual number of vehicles traveling is more than 772 vehicles/day, based on their road management experiences.

Source：Data from ex-ante evaluation paper of JICA and the data provided by DOW

b. Qualitative Effects

The qualitative effects of the project were expected to be “securing traffic in the event of a disaster,” “ensuring pedestrian safety,” and “effective use of river water,” At the field survey, it was observed that both bridges were constructed in accordance with the originally planned specifications and that the bridges were passable even in the event of a disaster. Therefore, it is assumed that “securing traffic in the event of a disaster” has been achieved without any problems. “Ensuring pedestrian safety” is also considered to have been achieved since it was found during the field survey that both bridges have pedestrian walkways installed on one side of the bridges. Regarding “effective use of river water”, stairway construction was to be carried out on both bridges in the original plan. This was because the installation of stairways for river water use by women was supposed to be a standard component in ADB's BRIRAP project from a gender perspective. However, it was found in the field survey that no stairways were installed on either bridge. According to the project consultant, the stairway construction was supposed to be done by DOW together with the revetment construction, but as the revetment construction has not been commenced, the stairway has not been constructed either. Although it was initially assumed that water from the river would be used by the residents of the neighborhood, according to DOW-WNB, the fact is that there have been no residents living in the neighborhood since before the construction of both bridges, and it is unlikely that residents will use the river in the vicinity of either bridges. Therefore, no negative impact is expected due to the lack of stairway construction.

<Impacts>

In this project, the impacts were assumed to be “promotion and facilitation of logistics” and “ensuring access to markets for local residents”. Regarding the “promotion and smoothing of logistics,” according to interviews with major users of the bridges including DOW, a palm oil company, a logging company and the General Hospital in Kimbe, the volume of goods transported such as logs, palms and foodstuffs has increased, transport efficiency has improved and traffic safety has been ensured. Specifically, the bridges can now be used to transport palms and logs with a full load. In addition, traffic safety is ensured at all times because the log bridge to bypass the Aum Bridge, which was dangerous during the rainy season when the river was rising, was replaced by the new one. The traffic on the Kapiura Bridge and the approach road was also observed to be smooth after the project was implemented, although the bridge and road were previously unstable due to the bumpy surface. As for “ensuring access to markets for the residents,” according to DOW-WNB, the project has improved the convenience of transportation of food and other goods to markets.

No adverse impact on the natural environment was found due to the implementation of the project (the guideline for environmental and social considerations applied to the project is the “JICA Guidelines for Environmental and Social Considerations” (2010), with the environmental category of “B”). According to the interview with the Environmental Unit of DOW, the environmental impact assessment

was conducted at the time of project implementation. Also, regarding monitoring during project implementation, monthly site inspections of both bridges were conducted and reports were provided to the Conservation and Environment Protection Authority (CEPA). As for the environmental monitoring items assumed at the time of planning, the waste generated during construction was properly disposed of. No negative impact was also found for other items (water, soil and air pollutions). Regarding land acquisition, according to the interview with a logging company, the state-owned land that had been leased to them was returned to the government for use as a construction yard. They gladly accepted the government's request because, as a road and bridge user, the construction of the two bridges would bring benefits to them in the form of improved traffic convenience. In addition, it was confirmed that resettlement did not occur and the project did not cause any negative impacts on gender and the marginalized people.

The revetment construction, which was to be carried by the Papua New Guinea side, has not yet been started. It may have a negative impact on the structural stability of the piers of the bridges in the long-term. According to the project consultant, the piers of the bridges have been built to the depth of the river bedrock in accordance with regulations of river management structures in Japan. Therefore, there is no immediate risk of the piers flowing out and the bridges falling due to floods in normal scale. However, depending on the magnitude of the flood, the stability of the piers may be affected by scouring due to levee sediment runoff near the piers.

<Evaluation Result>

In light of the above, the effects were generated as planned through the implementation of this project, and the effectiveness and impacts of the project are high.

A truck with full of palms is passing through the Aum Bridge (Source: External Evaluator)

Palms are waiting for collection (At a house of a small farmer along the New Britain National Highway) (Source: External Evaluator)

An approach road leading to the Kapiura Bridge has been constructed (Source: External Evaluator)

Curbside walkway has been installed on the Aum Bridge (Source: External Evaluator)

3 Efficiency

Both the total project cost and the project period exceeded the original plan mainly due to bidding failures during the selection stage of the contractor.

The bidding failures were mainly due to the fact that the unit prices of sand and crushed stone actually offered by the bidders were significantly higher than the values initially estimated. Specifically, the unit prices used in the estimation were based on the one used by DOW when they directly procure sand and crushed stones. However, the DOW procurement unit price was not applied when the private companies procured the materials. Normally, the prices are determined through direct negotiations with the sand and stone operators (landowners), which means that the unit price is to be significantly increased. This resulted in a large gap between the both unit prices[7]. As

[7] Two contractors participated in the first round of bidding but were not awarded the contract because their bid prices were significantly higher than the

a result, it was decided to transfer the initially planned project scopes that used a large amount of sand and stone to the component to be borne by the Papua New Guinean Government. The initial scope was divided into Japanese Grant Aid and DOW's own budgeted projects (as shown in the table below).

Table 2 Contents after changing the project scope

Phase	Project operator	Planned contents after changing the project scope
Phase 1	Japan (Grant aid)	・ Demolition of old Aum Bridge and Kapiura Bridge ・ Construction of new Aum Bridge and Kapiura Bridge (including paving of bridge with asphalt) ・ Construction of temporary approach roads (including installation of guardrails, road signs, etc.) ・ Construction of gabions
Phase 2	Papua New Guinea (DOW's own budget)	・ Construction of approach roads (including DBST pavement, installation of guardrails, road signs, drainage etc.) ・ Construction of revetment ・ Demolition of log bridge which was an alternative route to the old Aum Bridge ・ Cancelation of lease contract, lease of land for yard, and securing land for sand and crushed stones

Source：Project completion report and Defects inspection report of JICA

The outputs at the time of the ex-post evaluation are generally as described in "I. Project Outline, Contents of the Project" above although there were minor design changes. It was confirmed that there are no particular problems with road access for vehicles. While it was also confirmed that the Japanese portion of the project was completed, it was found in the field survey that the demolition of the log bridge as an alternative route to the old Aum Bridge and the construction of revetment for both bridges, which were the items to be borne by the Papua New Guinea side, have not been completed. At the time of the ex-post evaluation, no major problems due to non-implementation of the construction were specifically identified. However, there is a concern that the stability of the piers may be adversely affected in the long run in the cases of scouring due to major flooding, etc. though there was no immediate negative impact.

With regard to the inputs, the project cost on the Japanese side was within the planned amount (planned project cost: 3,160 million yen, actual cost: 3,110 million yen). As for the Papua New Guinea side, the actual project cost was approximately 294 million yen[8] and exceeded the original plan of 18 million yen due to the change of project scope. Therefore, the total project cost was 3,404 million yen, exceeding the plan (107% of the plan).

Table 3 Comparison of Planned and Actual Project Costs

Unit: Million Yen

	Plan	Actual	Difference
Japanese side	3,160	3,110	▲50
Papua New Guinea side	18	294	+276
Total project cost	3,178	3,404	+226

Source：Ex-ante evaluation paper of JICA, Preparatory survey report of JICA and Interview with DOW

Regarding the project period, the planned period was 28 months from February 2015 to May 2017, whereas the actual period was 63 months, 225% compared to the plan, from February 2015 to April 2020. The project period exceeded the plan by 35 months, due to the delays in the construction period of the Papua New Guinea side of the project because of tender failures and heavy rainfall disasters.

<Evaluation Result>

Based on the above, although the project effects initially expected are considered to have been achieved even with partially unimplemented part of outputs on the Papua New Guinea side, the total project cost and period were 107% and 225% respectively compared to the plan. Therefore, the efficiency of the project is moderately low.

estimated prices. The main reason was that there was a significant difference in the construction prices for the approach road and the river embankment, which used a lot of sand and stones. The project was affected by the unique business practice in Papua New Guinea whereby foreign contractors were required to pay higher royalties to landowners when they purchased sand. The project had a large price difference between DOW's direct purchase and the Japanese contractor's purchase of the materials. The prices of sand and stones in the estimated price were almost the same as DOW's purchase price. DOW was not in a position to coordinate price negotiations between the private company and the landowner, and DOW could not directly purchase sand and crushed stones so that the Japanese contractor could do the construction. Therefore, the project was divided into two phases and the construction work that used a lot of sand and stones was transferred to the Papua New Guinea side.

[8] According to DOW, the actual project cost on the Papua New Guinea side was 8,535,185 Kina. The IMF annual average exchange rate was used for the yen exchange rate (based on the average for the project period, February 2015 - April 2020).

Log bridge incompletely demolished near the Aum Bridge
(Source: External Evaluator)

Unimplemented revetment works of the Aum Bridge
(Source: External Evaluator)

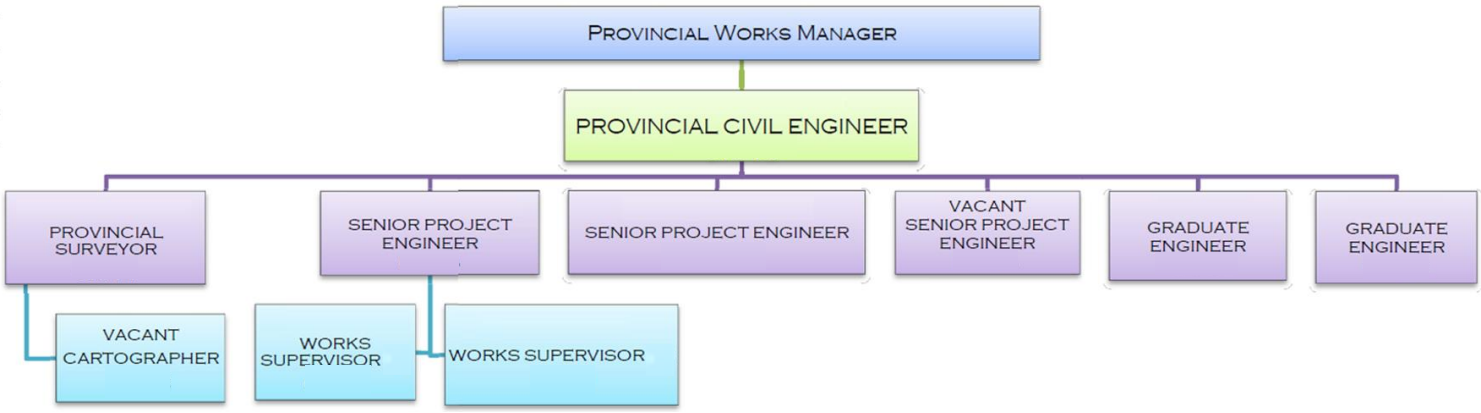
4 Sustainability

・Policy/System

The Government of Papua New Guinea places a high priority on road infrastructure. Specifically, the road infrastructure sector has been identified as a key area in the national development plans and sector plans such as *the Connect PNG Road Program, the Papua New Guinea Vision 2050, the Medium Term Development Plan III 2018-2022* and *the National Road Network Strategy 2018-2037*. In addition, DOW, the executing agency of this project, is responsible for the development and maintenance of the road network. Therefore, the policy and system necessary to sustain the project's effectiveness are considered to be secured.

・Institutional/Organizational Aspect

According to DOW-WNB, the number of posts in the Civil Engineer Section which covers maintenance services is 11 and unchanged since the project was completed. The number of employees is ten under the Provincial Works Manager, including one Civil Engineer, five Engineers, two Supervisors, and one Surveyor. There are two vacant posts being advertised. The maintenance structure is considered to be adequate, but securing the staff is an urgent issue.



Source：Materials provided by DOW-WNB

Figure 1 Organizational structure of Civil Engineer Section in DOW-WNB

・Technical Aspect

According to DOW-WNB, most of the staff members have academic degrees at a Diploma level or higher and between three and 15 years of work experience. In terms of training, the staff participate in training programs arranged by DOW's Human Resources Department as necessary, and also attend disaster-related training courses of JICA. In addition, the engineers were able to acquire knowledge and improve their ability to operate the equipment through guidance from Japanese engineers through the implementation of the grant aid project "The Project for Improvement of Road Maintenance Equipment" (2013-2014) and the technical cooperation project "The Project for Capacity Development on Road Maintenance" (2013-2017). According to DOW, participation in Japanese cooperation projects was also a good opportunity for the engineers with limited field experiences to gain practical experiences.

・Financial Aspect

According to DOW-WNB, there is no budget allocation from the DOW Headquarters for the maintenance of bridges and approach roads developed under this project and the financial situation is not adequate in terms of maintenance budget. According to DOW Headquarters, the maintenance budget is not secured on a nationwide basis. Also, the budget is secured mainly through donor assistance when the need for repairs arises (see also "Current Status of Operation and Maintenance" below). In terms of other donor support, "Transport Sector Support Program (TSSP)" from Australia provides between 3 and 5 million Kina per year for routine maintenance of roads and bridges along the New Britain National Highway. However, the assistance is only used for minor maintenance items such as signage and guardrail painting maintenance and does not include the necessary maintenance of the bridges themselves.

・Social and Environmental Aspect

As mentioned in “Impacts” above, there has been no significant adverse impact on the society and the environment. Also, it is not assumed that negative impacts will be generated in the future.

・Preventative Measures to Risks

No particular risks which had been estimated at the time of planning have occurred. Similarly, no particular risks against the sustainability of the project effects generated can be assumed. However, it is critical to carry out the revetment works to ensure the long-term stability of the abutment structure.

・Current Status of Operation and Maintenance

It was confirmed that both bridges were in good condition at the time of ex-post evaluation. According to DOW-WNB, however, maintenance inspections are being carried out irregularly and the maintenance items specified at the time of planning are not comprehensively inspected. In addition, the maintenance manual developed at the time of project completion has not been utilized, and a maintenance plan has not been formulated. Under such circumstances, there is a concern that the bridges could be deteriorated earlier in the future. Therefore, there are issues in the current operation and maintenance status. Spare parts and other components need to be funded from the above-mentioned Australia-assisted budget and the regular budget of DOW-WNB. The drain covers that had been stolen at the time of project completion were installed through the donation of a private company. (At the time of ex-post evaluation, the covers had been replaced with bolt-fixed ones with anti-theft measures).

It was found during the field survey that there have been betel nuts spitting and graffiti on the footpath, concrete barrier walls and guardrails, and driftwood retention near the piers of the bridges. These will not have significant impacts on the generation of project effects of the bridges themselves but appropriate measures through regular maintenance work were considered to be required.

<Evaluation Result>

Based on the above, no major problems were identified in terms of policy/system, institutional/organizational, technical, social and environmental aspects and the preventative measures to risks. On the other hand, it was observed that the budget for maintenance was not secured, manuals on maintenance were not utilized, maintenance plans or other guidelines were lacking, and the items required for the maintenance work were not regularly carried out. There is still room for improvement in terms of the financial aspect as well as operation and maintenance. Therefore, the sustainability of the project effects is moderately low.

III. Recommendations & Lessons Learned

・Recommendations to Executing Agency

In order to sustain the effectiveness of the two bridges developed under this project, it is necessary that DOW-WNB utilizes the maintenance manual, develops a maintenance plan for the New Britain National Highway that it covers and performs regular maintenance work. In the ex-post evaluation, it was found that the maintenance manual prepared by the Japanese side during the implementation of the project was not utilized and that regular maintenance work was not being carried out. If this situation continues, there is concern that the future deterioration of the bridges will be accelerated. Therefore, it is important that the DOW Headquarters allocate sufficient maintenance budget to DOW-WNB and realize adequate outsourcing and supervision of maintenance contractors.

In addition, in order to ensure the long-term structural stability of the abutment, it is necessary to complete the revetment works and the demolition of the log bridge which have not yet been completed by the Papua New Guinea side.

・Recommendations to JICA

None

・Lessons Learned

<u>Necessity to estimate the project costs considering the specific context in the project site.</u>

In this project, the project period increased significantly, mainly due to the unsuccessful bidding process. In addition, the implementation of the executing agency's share of the project was delayed after the separation of the project components due to the bidding failures, which resulted in the delay of more than one year for the full effects of the project to be generated. When implementing a project in Papua New Guinea, it is important to avoid delays in project implementation as much as possible by thoroughly estimating project costs in consideration of geographical and social conditions at the planning stage, and by allocating reserve funds because of the potential for additional expenses, which vary from region to region, as well as the factor of rising construction costs. In addition, when separating the components, it is desirable to provide support in terms of construction supervision, such as procurement of materials and continued use of equipment, by separately signing a construction supervision contract for the portion of the work to be borne by the counterpart government so that it can promptly implement the work, rather than the Japanese side leaving all the work to be performed by the counterpart government and terminating the project.

IV. Non-Score Criteria

None