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| Country Name | Project for Improvement of Road Maintenance Equipment |
| Independent State of Papua New Guinea | |

I. Project Outline

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|---------------------------|---|-------------------|-----------------|--|
| Background | Road network in Papua New Guinea (total length: 19,800 km as of 2012) was not sufficiently developed with many unopened blocks, disjunct trunk roads, and few bypass and alternative routes. Therefore, when heavy rains in rainy season caused landslides or slope failures, roads were closed, people and goods in the areas had no means to transport, and the local economies and the people's life had been seriously affected. The pavement ratio of roads in the country was low. About 74% of the national roads (total length: 8,700 km as of 2012) maintained by the Department of Works (DOW) were unpaved gravel roads which required periodical maintenance such as unevenness correction and refilling of gravels. However, proper maintenance and prompt restoration after disasters were poorly conducted because of the insufficient and aged construction equipment owned by the Plant and Transport Division (PTD) who was responsible for the maintenance and management of road maintenance equipment. | | | |
| Objectives of the Project | To conduct proper maintenance of roads and restoration of roads after disasters by four Provincial Offices of DOW by procuring equipment for grading and restoration works of roads, thereby contributing to ensuring stable transportation and traffic routes in the target areas. | | | |
| Contents of the Project | <div>1. Project Site: Western Highlands Province, Morobe Province, East Sepik Province and West New Britain Province</div> <div>2. Japanese side: provision of grant necessary for procurement of equipment for road grading and restoration (bulldozers, excavators, motor graders, wheel loaders, vibration rollers, water tankers, dump trucks, mobile workshops, and spare parts)</div> <div>3. Papua New Guinean side: logistical arrangements and clearances</div> | | | |
| Project Period | E/N Date | February 20, 2013 | Completion Date | April 1, 2014 (installation completion date of procured equipment) |
| | G/A Date | February 20, 2013 | | |
| Project Cost | E/N Grant Limit / G/A Grant Limit: 864 million yen, Actual Grant Amount: 765 million yen | | | |
| Executing Agency | Department of Works (DOW) | | | |
| Contracted Agencies | Main Contractor: ITOCHU Corporation Main Consultant: INGEROSEC Corporation Agent: INGEROSEC Corporation | | | |

II. Result of the Evaluation

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| 1 Relevance |
| <p><Consistency with the Development Policy of Papua New Guinea at the Time of Ex-Ante and Ex-Post Evaluation></p> <p>The project was consistent with the Papua New Guinea's Medium Term Development Plan (MTDP) (2011-2015) at the time of ex-ante evaluation, which aimed at realizing easy accesses for local people to social services. It was also consistent with the MTDP 2 (2016-2017) at the time of ex-post evaluation, which aimed at improving transportation system that allows efficient movements of goods from the points of production to the points of consumption and easy access to social services such as education and health. MTDP 3 (2018-2022), which is in drafting process as of August 2018, is supposed to focus on 'maintenance first' for transportation facilities.</p> <p><Consistency with the Development Needs of Papua New Guinea at the Time of Ex-Ante and Ex-Post Evaluation></p> <p>The project was consistent with the needs of Papua New Guinea. DOW was in the position to directly perform maintenance and restoration of national roads, but the equipment owned by PTD for maintenance of gravel roads (grading work) and restoration of roads after a disaster (restoration work) was insufficient and aged. Therefore, DOW was forced to outsource the works to private contractors at the time of ex-ante evaluation. The needs for road maintenance were further increasing along with the extension of roads at the time of ex-post evaluation.</p> <p><Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation></p> <p>The project was consistent with the Japan's ODA policy for Papua New Guinea at the time of ex-ante evaluation. In the "Japan's ODA Policy for Papua New Guinea" (August 2012), strengthening of the foundation of economic growth focusing on transport and energy/electricity infrastructure by developing and maintaining roads, bridges, sea/air ports was raised as one of the three priority areas.</p> <p><Evaluation Result></p> <p>In light of the above, the relevance of the project is high.</p> |
| 2 Effectiveness/Impact |
| <p><Effectiveness></p> <p>The project has achieved its objectives by employing maintenance equipment procured by the project for grading and restoration works of roads in four target provinces effectively and efficiently. As for grading works, operation hours of equipment and the total work lengths in a month in 2017 exceeded the targets set at the time of ex-ante evaluation (Table 1). As for restoration works, according to the answers to the questionnaires to the Provincial Offices and interviews with the Provincial Work Managers and the Civil Engineers, the equipment was highly effectively mobilized for restoration works. For instance, it was so when flash floods and landslides took place in February 2015 in West New Britain Province and in October 2016 in Morobe Province, and at the time of Mt. Kadovar eruption in East Sepik Province in January 2018. According to the Provincial Plant Manager and the Maintenance Supervisor in Western Highlands Province, a restoration work that used to take a week (40 to 80 hours) before the project could be completed within 3 days (24 hours) after the project.</p> |

<Impact>

Although no quantitative data is available, it is a collective opinion of managers in the Provincial Offices that the transportation of goods and access for people to public services has been highly improved by providing smooth surface of roads, shortening traveling time and increasing the traffic volume with less frequency of road closures. Before the project, due to insufficient and aging equipment owned by PTD, significant amount of grading works used to be outsourced to private sectors. However, according to the First Assistant Secretary of DOW, after the project, since most of the works were directly done by the Provincial Offices with new equipment procured by the project, about 70% of the outsourcing cost was reduced.

The procured equipment is also being used for new construction works which used to be outsourced. The missing link construction work in the West New Britain Province, which significantly benefits rural population, has been implemented by DOW in its own capacity. Besides, the Provincial Offices earn revenue by leasing the equipment to private sectors and provincial and district administrations, and the income is deposited into the DOW's trust account¹ which is for covering operation and maintenance of equipment of PTD. For instance, the East Sepik Provincial Office has earned the revenue about 3 million Kina in a year (Table 2). No resettlement and land acquisition, and no other negative impact by project has been observed.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is high.

3 Efficiency

Outputs were produced as planned. Both of the project cost and period were within the plan (ratio against the plan: 89% and 100%, respectively). Therefore, efficiency of the project is high.

4 Sustainability

<Institutional Aspect>

There was no significant change neither in organizational structures nor in responsibilities and mandates of the Provincial Offices, PTD and DOW from the time of ex-ante evaluation of the project. The number of staff members engaged in road grading and restoration in the Provincial Offices changed or slightly increased (Table 3), and it is sufficient according to the interviews with managers of the Provincial Offices. In Provinces of East Sepik and West New Britain, the number of mechanics which used to be sufficient for a small number of equipment before the project became inadequate for the equipment increased after the project. The official request for additional mechanics was submitted to DOW by the East Sepik Provincial Office in 2017 but it has not been realized yet. There is no prospect of changing the institutional structures of Provincial Offices, PTD and DOW in near future.

<Technical Aspect>

The technical level of the staff engaged in road grading and restoration is sufficiently high since the equipment procured by the project was the selection of conventional and familiar ones that had been used for long time for their works. The technical level of staff in the four Provincial Offices has been further improved through the on-the-job and off-the-job training provided by the technical cooperation project the "Project for Capacity Development on Road Maintenance" (2013-2017) assisted by JICA. Besides, DOW provided technical training programs in 2017 with its own funds on line drain construction, culvert installation, gravelling, and patrol grading inviting approximately 100 participants in total from all the Provincial Offices.

<Financial Aspect>

It is hard to find the financial trends and foresee the financial sustainability of Provincial Offices with the limited data

Table 1. Performance of equipment for grading works in 2017

| | Baseline (2012) | Target (2017) | Province | | | |
|---|--------------------|------------------|----------------------|--------|---------------|---------------------|
| | | | Western Highlands | Morobe | East Sepik | West New Britain |
| Operation hours of equipment (hours/month) | 0 | 84 | 192* | 110* | 220* | 160* |
| Total work lengths (km/month) | 0.8 | 8.0 | 21.6** | 21.3** | 8.8** | 9.0** |

Source: Provincial Offices of DOW

*: operation hours = (operation hours/day) x (operation days/month)

e.g. 8 hours/day x 24 days/month = 192 hours

**: work lengths = (work lengths/day) x (operation days/month)

e.g. 0.9 km/day x 24 days/month = 21.6 km

Table 2. Revenue from leasing equipment in East Sepik Province

| Year | 2014 | 2015 | 2016 | 2017 |
|--|------|------|------|------|
| Revenue from leasing equipment (million Kina) | 3.3 | 3.2 | 2.8 | 1.7 |

Source: Provincial Office of East Sepik

Table 3. Number of staffs engaged in road grading & restoration

| Province | | Year | 2014 | 2015 | 2016 | 2017 |
|----------------------|-----------|------|------|------|------|------|
| Western Highlands | Total | | 26 | 26 | 26 | 26 |
| | Mechanics | | 12 | 12 | 12 | 13 |
| Morobe | Total | | 36* | 27 | 27 | 27 |
| | Mechanics | | - | - | - | - |
| East Sepik | Total | | 18 | 18 | 19 | 21 |
| | Mechanics | | 2 | 2 | 2 | 2 |
| West New Britain | Total | | - | - | 30 | 30 |
| | Mechanics | | 5 | 5 | 5 | 5 |

Source: Provincial Offices

* This included the number of vocational trainees on 6-month training program.

Table 4. Annual Budget of Provincial Offices

Unit: thousand Kina

| Province | 2014 | 2015 | 2016 | 2017 |
|-------------------|-------|-------|-------|-------|
| Western Highlands | 377 | 1,034 | 715 | 422 |
| Morobe | 585 | 548 | 909 | 1,732 |
| East Sepik | 3,028 | 3,336 | 2,486 | 1,049 |
| West New Britain | 528 | 743 | 783 | 251 |

Source: DOW

¹ Trust accounts are held by public agencies across the country and were initially established to hold counterpart funding between the government and donor agencies, but their roles have varied over the years. In the case of the trust account for maintenance equipment of DOW, the rental fee of equipment is the primary source of revenue, and it is the source of funds to cover the expenses for maintenance, repair and replacement of equipment.

available (Table 4). According to the First Assistant Secretary of DOW who is responsible for the allocation of budget for Provincial Offices, the budget for grading and restoration works of roads including O&M of equipment will be secured in the future. The fund for road maintenance of the country is fully controlled by the headquarters of DOW leaving limited control by Provincial Offices. Therefore, it takes time for Provincial Offices to mobilize budget and it has caused the delay of procurement of consumables and spare parts.

<Current Status of Operation and Maintenance>

Sufficient and adequate manuals for road maintenance and O&M of equipment including O&M schedule were provided by the project and the technical cooperation project mentioned above. O&M of equipment has been conducted by the Provincial Offices mostly in accordance with the manuals and schedule, and the conditions of equipment were confirmed by the field survey to be well maintained meeting the relevant standards. The delay of procurement of consumables and spare parts stated above occasionally causes the delay of O&M.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of institutional and financial aspects of the implementing agency. Therefore, the sustainability of the project effect is fair.

5 Summary of the Evaluation

The project has achieved its objectives by enhancing the capacity of the four Provincial Offices of DOW to maintain and restore national gravel roads through the procurement of road maintenance equipment. Utilizing the equipment procured, the road conditions have been improved ensuring stable transportation of goods and people. As for sustainability, the number of technical staffs has been in short in some provinces, and the budget mobilization mechanism limits quick actions for road maintenance in provinces. Technical level of staff of the Provincial Offices for road maintenance including O&M of equipment was improved and has been sustained through the project and the technical cooperation project assisted by JICA. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- It is recommended for DOW to allow the Provincial Offices to control some parts of the budget for O&M of road maintenance equipment in order to promote prompt actions for appropriate grading and restoration works of roads at site.
- For realizing the recommendation above, it is recommended for DOW and the Provincial Offices to improve the capacity of data management including actual operation hours of equipment, staff allocation in offices, revenue and expenditure, and others.

Lessons Learned for JICA:

- Because conventional and familiar equipment for the counterpart was selected for the project, the soft-component to train the staff for new unfamiliar machines was unnecessary in this project, and technical sustainability has been secured at high level. Equipment procured by a grant aid project is suggested to be conventional and familiar ones for the counterpart as much as possible so that the efficiency and sustainability of the project can be ensured.
- Adding to the selection of equipment, collaboration with the technical cooperation project assisted by JICA has significantly contributed to the improvement of technical capacity of the counterparts resulting high technical sustainability of the project. In case of a grant aid project, in order to make the equipment procured fully functional and sustainable, specific collaboration with any technical cooperation project(s) is recommended.



Fig 1: Disaster restoration work in Southern Highlands Province using equipment lent by Western Highlands Provincial Works



Fig 2: Road grading and maintenance work in Western Highlands Province using the procured equipment