

## Simplified Ex-Post Evaluation for Grant Aid Project

Evaluator, Affiliation	Maki Hamaoka Foundation for Advanced Studies on International Development	Duration of Evaluation Study
Project Name	The Project for Improvement of Machinery and Equipment for Construction of Rural Agricultural Road	January 2010 – December 2010

### I Project Outline

Country Name	Kingdom of Bhutan	
Project Period	February 2005-February 2006	
Implementing Agency	Ministry of Agriculture/Department of Agriculture/Central Machinery Unit (CMU)	
Project Cost	Grant Limit: 521 million yen	Actual Grant Amount: 473 million yen
Main Contractors	Mitsubishi Corporation, ITOCHU Corporation	
Main Consultants	Construction Project Consultants, Inc.	
Basic Design	Basic Design Study on “the Project for Improvement of Machinery and Equipment for Construction of Rural Agricultural Road in the Kingdom of Bhutan”, JICA/ Construction Project Consultants, Inc., November, 2004	
Related Projects (if any)	<ol style="list-style-type: none"> <li>1. Development Study “The Feasibility Study on the Lhuntshi Mongar Integrated Agricultural Development Project” (1987), “The Study on Agriculture and Farm Road Development in the Lhuntse and Mongar District”(2003)</li> <li>2. Technical Cooperation “The Agriculture Research and Extension Support Project in Lhuntse and Mongar” (2004-2009)</li> <li>3. Senior Volunteer (1 (2004-2006), 1 (2009-))</li> <li>4. Grant Aid “The Project for the Paro Valley Agricultural Development in The Kingdom of Bhutan” (1989-1995), “The Project for Improvement of Machinery and Equipment for Construction of Rural Agricultural Road” (Phase2)” (January, 2010) (ongoing))</li> <li>5. Other donors: FAO “Second Eastern Zone Agricultural Programme (SEZAP)” (1999-2005), “Agriculture, Marketing and Enterprise Promotion Programme (AMEPP)” (2006-2012), WFP “Food for Work” (2003), UNDP “Decentralized Support Project” (2002-2007)</li> </ol>	
Project Background	<p>The Government of Bhutan (GOB) placed priority on construction of rural agricultural roads for development and enhancement purposes. The six (6) target eastern districts (Lhuntse, Mongar, Pemagatse, Samdrupjongkar, T/Yangtse, and Transhugang) lacked farm roads and the social and economic situations left much to be desired. Despite the urgent need for the improvement of the rural agricultural roads, construction equipment belonging to Department of Agriculture (DOA) of the Ministry of Agriculture (MoA) was obsolescent and unsuitable for the road construction work in the target area due to their low maneuverability and workability. Under such circumstances, the GOB made a request to the Japanese Grant Aid for the supply of equipment for farm road construction to contribute to the effective development of farm roads.</p>	
Project Objective	To procure the machinery and equipment for the targeted roads in order to improve accessibility to the eastern region of Bhutan	
Output[s] (Japanese Side)	<p>Procurement of a range of machinery and equipment for construction of farm roads and power tiller tracks (hereinafter referred to as “Equipment”)</p> <p>(Bulldozer (5), Hydraulic shovel (medium type) (5), Hydraulic shovel (small type) (5), Hydraulic shovel (mini type) (5), Dump truck (5), Vibration roller (5), Hand guide roller (5), Wheel Loader (5), Air compressor (medium type) (1), Air compressor (small type) (5), Wheel Tractor (5), Cargo truck with crane (8 ton) (1), Cargo truck with crane (4 ton) (1), Service truck (4x4) (1), Self loading Truck (1))</p>	

### II Result of the Evaluation

Summary of the evaluation
<p>The Central Machinery Unit of the DOA of the Ministry of Agriculture (hereinafter referred to as “CMU”) constructed a total of 440km of farm roads (hereinafter referred to as “FR”) in the 17 districts in the whole country until 2009 using the Equipment, of which 277 km were constructed in the six eastern target districts. These 277 km were equal to 118% of the initial target expected by the Basic Design Study. In light of the above, it can be concluded that the Equipment has been effectively utilized and that initial objectives of the Project have been achieved.</p> <p>There have been various positive impacts such as reductions in travel time, smoother transportation of agricultural products and reductions in transport cost and increases in transaction quantity of agricultural products. No negative impacts have been reported.</p> <p>The Equipment has been appropriately maintained by CMU. It is well functioning without any serious damage. Organizational structure and managerial responsibilities of CMU in operation and maintenance systems are clear. The technical capacity is sufficient and the total budget of the CMU as well as operation and maintenance budget is sufficiently secured. The sustainability of the Project effects through effective use of the Equipment is thus expected.</p> <p>In light of the above, this project is evaluated to be highly satisfactory.</p> <p>&lt;Recommendations to CMU&gt;</p> <p>It is assumed that the frequency of malfunction of most of the Equipment will increase in 5-6 years when their service lives are</p>

expired. Though there is no problem in current operation and maintenance systems, the total structure of CMU needs to be reviewed in preparation for such inevitable malfunctions. Increasing the number of personnel of the branches nearer to construction sites may be necessary to keep current operation and maintenance status.

## 1 Relevance

### (1) Relevance with the Development Plan of Bhutan

At the time of the Basic Design Study during the 9<sup>th</sup> Five-Year Plan (FYP) (July 2002-June 2008), the construction of a total 550km of FR and power tiller tracks (hereinafter referred to as “PTT”) was planned. Meanwhile, the existing construction equipment and machinery of DOA/CMU was obsolescent and unsuitable for the work, so it was quite difficult for DOA/CMU to meet the requirements of the target roads. For this reason, new construction machinery and equipment were essential. At the time of the ex-post evaluation, the 10<sup>th</sup> FYP (July 2008-June 2013) places priority on improvement of rural infrastructure aiming at bringing 85% of the rural population to within a half day’s travel from a motorable road head. In addition to 1,754km of FR constructed under the 9<sup>th</sup> FYP, another 3,264km of FR are planned under the 10<sup>th</sup> FYP. Thus, it is still quite important to expand agricultural roads in line with such development plans.

### (2) Relevance with the Development Needs of Bhutan

Bhutan is a mountainous country, with farmhouses and isolated villages distributed on steep slopes. In such conditions, the need for construction of FR is high in line with rural population’s needs in access to markets and social services. To achieve the target set under the 10<sup>th</sup> FYP, “To reduce a proportion of rural population living more than 1 hour’s walk from a motorable road head from 40% (2005) to 20% (2013)”, a total 3,264 km of FR are required. The existing equipment belonging to CMU is not sufficient to achieve this target, even though some portions are constructed by privately owned equipment. Thus, the machinery and equipment for agricultural road construction are necessary in the whole country.

### (3) Relevance with Japan’s ODA Policy

There is no “Country Assistance Program” or assistance policy based on well-defined formulation guidelines and policy consultations for Bhutan. The only official document available is the basic policy on ODA to Bhutan contained in the Japan ODA Country Data Book (2004) which specifies main priority areas such as (a) Agriculture and Rural Development (agricultural modernization, agricultural infrastructure development), (b) Economic Infrastructure Development (road network development, improvement of rural electrification), (c) Improvement of Social Services (human resource development and employment generation, improvement of education service and health care service, and (d) Good Governance (decentralization, improvement of information equity).

This project has been highly relevant to the country’s development plan, development needs, as well as Japan’s ODA policy; therefore its relevance is high.

## 2 Efficiency

### (1) Project Outputs

Outputs by Japanese side, namely machinery and equipment for construction of farm roads and power tiller tracks were achieved as planned.

### (2) Project Period (Project Inputs)

The actual Project period was 12 months against a planned period of 12 months.

### (3) Project Cost (Project Inputs)

The actual grant cost was 473 million yen against the planned cost of 521 million yen (equal to 91% of the planned cost). This difference was due to the result of the competitive bidding.

Both project period and project cost were mostly as planned/within the plan, therefore efficiency of the project is high.

## 3 Effectiveness / Impact

### (1) Quantitative Effects

After the procurement of the Equipment, CMU constructed a total 277km of agricultural roads (232km of FR and 45 km of PTT) in the 6 target eastern districts until 2009. This achievement equals 118% of the target total length planned by the basic design study (total length 235km (161km of FR, 74km of PTT)). In light of this, the initial objective of the Project is deemed to be achieved.

### (2) Impacts (Impacts on the natural environment, Land Acquisition and Resettlement, Unintended Positive/Negative Impact)

A total 1,156km of agricultural roads were constructed during the period of the 9<sup>th</sup> FYP. With this achievement, the total length of the agricultural roads in the country increased from 598 km to 1,754km at the end of the 9<sup>th</sup> FYP. Of the expanded length of 1,156km, 440 km was constructed by CMU equipment procured by Japanese grant aid. The road expansion allowed 25% of the rural population to live within a half day from a motorable road head at the end of the 9<sup>th</sup> FYP (2008). The construction equipment and machinery procured under the Japanese grant aid made a large contribution to this progress. After completion of the Project, travel time was greatly reduced for the target population. In most of the target areas, the population traveled by foot or by horse (5 hours for traveling 10km on average. One day for 15-20 km’s replacement in Lhuntse district, the most mountainous area). Now, people are able to take taxis, private cars and power tillers taking only 2-4 hours for the same journeys. No negative impacts have been reported including land acquisition or environmental impacts.

This project has largely achieved its objectives, therefore its effectiveness is high.

## 4 Sustainability

### (1) Structural Aspects of Operation Maintenance (O & M)

CMU was established under the DOA, Ministry of the Agriculture in 2002, as a unit for dispatching and maintaining construction machinery and equipment in response to a request from the districts. CMU has its headquarters in Bumthang district and 2 branch offices in Khangma and Gelephu. Currently, 100 personnel are employed including 91 technical personnel working for operation and maintenance of the construction machinery and equipment. More than half of the drivers, operators, engineers and mechanics have more than 10 years' experience. When a diagnosis of malfunction of the equipment requires relatively high technical capability, such experienced personnel execute the diagnosis. Regarding the internal personnel training, newly hired technical personnel are trained through on-the-job training basis training over several months at worksites under instruction of senior operators and drivers. The number of operators and drivers has not been changed even after the procurement of the Equipment; however, it is efficiently operated through multi tasking, rotating with free operators among different machinery when they are stationed in the same worksite. In light of the above, there is no problem in O&M systems since managerial responsibilities are clear.

### (2) Technical Aspects of Operation Maintenance

Maintenance works of small and medium repairs are executed by CMU mechanics, and major repairs are done by private workshops or agencies of manufacturers. For strengthening CMU technical capability, a JICA senior volunteer (hereinafter referred to as "SV") has been dispatched to CMU to develop the standard operation and maintenance package. The dispatch of SV has been continued still now. The linkage between the Project and SV was deemed to be effective for technical capacity development of CMU. No problems are observed in technical aspects for operation and maintenance.

### (3) Financial Aspects of Operation Maintenance

The operation and maintenance cost for CMU equipment and machinery is allocated from the central government's general budget via the MoA. The total budget to CMU has been largely increased since the procurement of the Equipment in February 2006 compared with previous years. The average operation and maintenance cost for 5 years after the procurement of the equipment corresponds to 40% of the total expenditure of CMU. The operation and maintenance cost borne by CMU is sufficient to cover annual O & M cost estimated at the time of the Basic Design Study (11.817 million Nu). According to a related project implemented after this Project, CMU has been allocated an appropriate budget for operation and maintenance. In light of the above, no problems are observed in financial status of O & M of the Equipment.

### (4) Current Status of Operation Maintenance

There has been no major breakdown of the 55 units of the Equipment procured in the Project, though 5 units were under repair at the time of the ex-post evaluation. Consumable parts and spare parts remain in the stock and are replaced appropriately. Periodical maintenance and replacement of parts are recorded in machine history books and the stock of spare parts is recorded in a parts inventory. CMU keeps the same number of manuals such as operation manuals and parts catalogues as provided at the time of procurement of the Equipment. There is no problem in status of operation maintenance.

No major problems have been observed in the operation and maintenance system; therefore, sustainability of the project effect is high.