

Country Name	Capacity Development Project on Bridge Management
Federal Democratic Republic of Ethiopia	

I. Project Outline

Background	Ethiopia is an agricultural country with 84% of the population living in rural area. Since road transport accounts for 90-95% of inter-urban freight and passenger movements, it is considered essential to improve the road network, especially bridges, in order to achieve the socio-economic development and food security of the country. With support from JICA experts, the Ethiopian Roads Authority (ERA) has developed system and manuals with regard to bridge inspection and management. However, the institutional and individual capacity for bridge maintenance had remained limited. The project was launched for further ERA's capacity development in bridge management.						
Objectives of the Project	Through the trained personnel of the implementing and related agencies, developed manuals and computer-based management system, the project aimed at strengthening ERA's capacity in bridge management, thereby contributing to the improvement of the road network.						
	Overall Goal: Appropriate maintenance and rehabilitation of bridges are implemented, which contributes to the improvement of service level of Ethiopian road network. Project Purpose: Capacity of bridge management in Ethiopia improves.						
Activities of the project	<ol style="list-style-type: none"> Project site: Whole Ethiopia Main activities: 1) Training on the bridge management cycle, bridge inspection, quality control of bridge rehabilitation to ERA, Rural Road Agencies (RRAs), MRA and private companies, 2) Development of the manuals for bridge management, establishment of ERA-BMS (Ethiopian Road Authority - Bridge Management System), introduction of BMSS¹ (Bridge Management Support Service), etc. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Japanese Side 1) Experts: 9 persons 2) Training in Japan: 6 persons 3) Training in the third country: 2 persons 4) Equipment: PC, printer, handy GPS, vehicle, etc. 5) Operation cost: 11 million yen </td> <td style="width: 50%; vertical-align: top;"> Ethiopian Side 1) Staff allocated: 8 persons 2) Land and facilities: Office space and equipment, training facility, etc. 3) Operation cost for BMSS introduction, travel expenses for C/P, contract-out with private companies, etc. </td> </tr> </table> 					Japanese Side 1) Experts: 9 persons 2) Training in Japan: 6 persons 3) Training in the third country: 2 persons 4) Equipment: PC, printer, handy GPS, vehicle, etc. 5) Operation cost: 11 million yen	Ethiopian Side 1) Staff allocated: 8 persons 2) Land and facilities: Office space and equipment, training facility, etc. 3) Operation cost for BMSS introduction, travel expenses for C/P, contract-out with private companies, etc.
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Ex-Ante Evaluation	2006	Project Period	January 2007 to July 2012 (Extended period: December 2010 to July 2012)	Project Cost	(ex-ante) 250 million yen (actual) 271 million yen		
Implementing Agency	Ethiopian Roads Authority (ERA)						
Cooperation Agency in Japan	None.						

II. Result of the Evaluation

< Special perspectives considered in the ex-post evaluation >

- For verification of the achievement of the Overall Goal at the ex-post evaluation, the conditions of the rehabilitated bridges were used as it was set in the ex-ante evaluation sheet; although, the indicator established in the PDM was set as "FBRP (Federal Bridge Rehabilitation Program) is authorized and launched."

1 Relevance
<Consistency with the Development Policy of Ethiopia at the time of ex-ante evaluation and project completion> The project was consistent with Ethiopian development policies, as the government's principles in bridge management were clearly described in the Road Sector Development Plan (RSDP) III (2007-2010) and RSDP IV (2010-2015).
<Consistency with the Development Needs of Ethiopia at the time of ex-ante evaluation and project completion > The road network, especially bridges, is very crucial in Ethiopia where the terrain is complex due to the rift valley and the rain is heavy during the rainy season. However, 32% of the bridges needed to be reconstructed or improved (2006). Thus, there were great needs for bridge rehabilitation and maintenance.
<Consistency with Japan's ODA Policy at the time of ex-ante evaluation> In the "Country Assistance Program for Ethiopia" drafted in 2006, development of transport infrastructure was considered important for facilitating trading of agricultural products and inputs.
<Evaluation Result> In light of the above, the relevance of the project is high.
2 Effectiveness/Impact
<Status of Achievement for the Project Purpose at the time of Project Completion> It is judged that the Project Purpose was not achieved, because rehabilitation and replacement of bridges were conducted as per the

¹ Under BMSS, ERA concludes a 3-year agreement with three private consultancy companies. Under the contract, the contracted companies inspect, evaluate, and conduct prioritization of bridge construction/rehabilitation under supervision of respective RNMDs. The actual bridge construction and rehabilitation works are assigned to a different company by ERA.

priority list, but the achievement was far less than the plan (42.2% and 37.8%, respectively). This is because the budget was not sufficient to cover all the bridges which needed to be rehabilitated or replaced. Another reason was that the government put more emphasis on new construction.

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have partially continued. Bridges have been rehabilitated and replaced, though the achieved number has been far less than planned. The ratio of achievement was far from planned, because the plan shows the number of the bridges which need to be rehabilitated or replaced, rather than the the number of the bridges which is annually estimated based on the secured budget. The reason for insufficient budget is the same as that during the project period; budget shortage for rehabilitation and replacement due to more emphasis on new construction of the bridges. The number of the rehabilitated bridges drastically increased in 2015/16 from the previous year, because the budget for rehabilitation has been increased.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal has been partially achieved. The Federal Bridge Rehabilitation Program (FBRP) was launched in 2011 with the aim of upgrading 80% of the bridges in good condition by 2015/16. According to ERA and the Road Network Management Directorate (RNMD) of Jimma, 62.5% (2014/15) of the bridges were evaluated “good,” which means more than 90% of that bridge condition is “not defective” or having none or only minor deterioration of structural elements.

<Other Impacts at the time of Ex-post Evaluation>

Firstly, rehabilitated or replaced bridges have brought benefits to the nearby residents. For example, a rope bridge was replaced by the Mormora Bridge (steel bridge) in Oromia Region and now students can travel safely to school even when it rains. As another example, women have more job opportunities, as most of the contracted bridge rehabilitation is conducted by micro and small enterprises whose staff are mainly women, according to RNMD of Shashemene. Secondly, the rehabilitated bridges have made vehicle passage easier. As examples, the rehabilitated Gibe Bridge in Oromia Region accommodates transport of heavy equipment for Gilgel Gibe Hydro Power Station, and the vehicle speed increased from 30 km/h to 50km/h on Addis Jimma Road after Simini Bridge was replaced in Oromia Region. Third, the manual on concrete bridge management has been used in the master’s course at Addis Ababa University.

No negative impacts on the natural and social environment have been produced by the project.

<Evaluation Result>

In light of the above, the Project Purpose (bridge rehabilitation and replacement as per the plan) was not achieved by the project completion, but the effects have partially continued. The Overall Goal (improvement of the bridge condition) has been partially achieved, but some positive impacts have been confirmed. Therefore, the effectiveness/impact of the project is fair.

Achievement of the Project Purpose and Overall Goal

Aim	Indicators	Results																																							
(Project Purpose) Capacity of bridge management in Ethiopia improves.	1. Annual bridge maintenance and rehabilitation plan based on ERA-BMS and bridge management cycle is practiced.	<p>(Project Completion) <u>Not achieved</u>.</p> <p>- The number of the rehabilitated and replaced bridges was less than the plan in 2012/13.</p> <p>(Ex-post Evaluation) <u>Partially continued</u>.</p> <p>- After the project completion (2013/14), the implementation rate of rehabilitation and replacement against the plan has been decreasing.</p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2"># of the bridges to be rehabilitated</th> <th colspan="2"># of the bridges to be replaced</th> </tr> <tr> <th>Plan</th> <th>Actual</th> <th>Plan</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>2010/11</td> <td>N.A.</td> <td>N.A.</td> <td>N.A.</td> <td>N.A.</td> </tr> <tr> <td>2011/12</td> <td>N.A.</td> <td>N.A.</td> <td>29</td> <td>12 (41.4%)</td> </tr> <tr> <td>2012/13</td> <td>443</td> <td>188 (42.2%)</td> <td>37</td> <td>14 (37.8%)</td> </tr> <tr> <td>2013/14</td> <td>555</td> <td>170 (30.6%)</td> <td>25</td> <td>3 (12.0%)</td> </tr> <tr> <td>2014/15</td> <td>728</td> <td>160 (30.0%)</td> <td>31</td> <td>2 (6.5%)</td> </tr> <tr> <td>2015/16</td> <td>1,324</td> <td>240 (18.1%)</td> <td>21</td> <td>N.A.</td> </tr> </tbody> </table>		# of the bridges to be rehabilitated		# of the bridges to be replaced		Plan	Actual	Plan	Actual	2010/11	N.A.	N.A.	N.A.	N.A.	2011/12	N.A.	N.A.	29	12 (41.4%)	2012/13	443	188 (42.2%)	37	14 (37.8%)	2013/14	555	170 (30.6%)	25	3 (12.0%)	2014/15	728	160 (30.0%)	31	2 (6.5%)	2015/16	1,324	240 (18.1%)	21	N.A.
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	2. Necessary funds for planned rehabilitation measures under the annual bridge maintenance and rehabilitation plan are secured and the selected bridge rehabilitation works are implemented.	<p>(Project completion) <u>Not achieved</u>.</p> <p>- The necessary funds were not secured for rehabilitation of all the prioritized bridges in each year.</p> <p>(Ex-post Evaluation) <u>Partially continued</u>.</p> <p>- The budget has not been sufficient for rehabilitation and replacement, because the government places more emphasis on new construction.</p>																																							
(Overall goal) Appropriate maintenance and rehabilitation of bridges are implemented, which contributes to the improvement of service level of Ethiopian road network.	1. Evaluation of the conditions of the rehabilitated bridges on the federal road (Good, fair, bad)	<p>(Ex-post Evaluation) <u>Partially achieved</u>.</p> <p>- 62.5% of the rehabilitated bridges were evaluated “good” in 2014/2015.</p> <table border="1"> <tbody> <tr> <td>Good: More than 90% of the bridge condition is not defective (range from no problems to only minor deterioration of structural elements)</td> <td>62.5%</td> </tr> <tr> <td>Fair: Defect range of the bridge is between 10-15% (Minor section loss, deterioration, cracking or scour)</td> <td>21.3%</td> </tr> <tr> <td>Bad: The defect of the bridge is more than 15% (deficiency such as section loss, deterioration, cracking scour or seriously affected primary structural components)</td> <td>16.2%</td> </tr> </tbody> </table> <p>Source: ERA and Jimma RNMD</p>	Good: More than 90% of the bridge condition is not defective (range from no problems to only minor deterioration of structural elements)	62.5%	Fair: Defect range of the bridge is between 10-15% (Minor section loss, deterioration, cracking or scour)	21.3%	Bad: The defect of the bridge is more than 15% (deficiency such as section loss, deterioration, cracking scour or seriously affected primary structural components)	16.2%																																	
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Source: ERA, RNMD and SNNP Rural Roads Authority

3 Efficiency

Both the project period and cost exceeded the plan (ratio against the plan: 137% and 108%, respectively). The project period was

extended to strengthen BMS. Another reason was the delay of the inspection work due to the shortage of the engineers of the District Engineering Division and delayed dispatch of some JICA experts. Therefore, the project efficiency is fair.

4 Sustainability

<Policy Aspect>

The development of the road network including bridges is prioritized in the Growth and Transformation Plan II (2015/16-2019/20) and RSDP V (2016-2020).

<Institutional Aspect>

There has been some organizational restructuring of ERA, but the function for maintaining the road network has been kept. RNMDs and RRAs conduct bridge inspection, evaluation and prioritization for rehabilitation and replacement, and manage the contracts for rehabilitation and replacement works. The Bridge Management Team (BMT) of ERA assists these responsibilities of RNMDs and RRAs and manages ERA-BMS. BMT supervises RNMDs work through monitoring, meeting and review of the documents submitted by RNMDs. BMT provides training for RNMDs and RRAs in the areas of inventory, inspection, use of BMS software, etc. BMT has 4 engineers against the supposed number (7). The reason of the shortage is the high turnover, and the government provides opportunities for getting the master's degree to retain the young staff. Interviewed staff answered that it is an incentive to remain in ERA. Four of the surveyed five RNMDs answered that the number of the personnel is sufficient. At RRAs, the figures were not available, but they answered that the staff number is sufficient, as they are assigned as planned. According to ERA and RNMDs, BMSS has been still effective for bridge management due to high quality work of the contracted companies which have better skills than themselves. The consultants under BMSS enter the data base of ERA-BMS after annual inspection and every three year detailed inspection.

<Technical Aspect>

According to ERA, the staff of BMT has sufficient knowledge and skills on data management but not quality control of bridge management because they are not given any specific training though newly joined staff receives introductory trainings on ERA. As for RNMDs, only half of the interviewed staff answered that they have sufficient knowledge and skills on bridge management, though trainings are conducted once or twice per year. Training topics include surveying with the total station, GPS, etc. and laboratory work such as material test and asphalt mix design. The bridge inspection manual developed by the project was revised in 2013 by BMSS consultants and distributed to RNMDs including their satellite offices and RRAs. The manual is also utilized for bridge inspection by RNMDs and BMSS consultants and training for RNMDs staff. Also the manual on concrete bridge maintenance developed by the project has been used by RNMDs, RRAs and contractors.

<Financial Aspect>

The budget of ERA comes from the Federal Government and has increased (21,835 million ETB in 2012/13 to 46,394 million ETB in 2016/17). The budget for BMT allocated from ERA and the Road Fund has increased to (991,170 ETB in 2013/14 to 1,393,340 ETB in 2015/16). However, the budget for RNMDs has been on a slightly decreasing trend (931,150,000 ETB in 2012/13 to 889,148,375 ETB in 2015/16), because it is affected by the annual amount of the Road Fund which is collected from the fuel levy, license renewal fees and tax from the fuel sell. Thus, while the budget for expansion of the whole road network has been increasing, the budget for bridge rehabilitation and replacement has not been sufficient, as earlier mentioned.

<Evaluation Result>

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

5 Summary of the Evaluation

The Project Purpose (bridge rehabilitation and replacement as per the plan) was not achieved by the project completion, but the project effects have partially continued. In other words, bridge rehabilitation and replacement have been conducted based on the plan, though the achievement was less than the plan. The reason was the budget shortage for rehabilitation and replacement as the government has put more emphasis on new construction. Regarding the sustainability, some issues have been confirmed such as the staff shortage at BMT and insufficient budget allocation for road rehabilitation and replacement. As for the efficiency, both of the project period and cost exceeded the plan. The project period was extended to strengthen BMS and make up the delayed inspection work.

Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing agency:

- It is recommended to develop a feasible road maintenance plan for each year, and clearly indicate how many bridges need to be rehabilitated/replaced and how many bridges will be rehabilitated/replaced in the following year based on the actual achievements in the previous years.

Lessons learned for JICA:

- In the project, the concept of "bridge management cycle" which covers the bridge inspection, evaluation, prioritization, and formulation of annual maintenance and rehabilitating plan was introduced to the implementing agency and the personnel was trained for operation based on this concept. As a result, the implementing agency successfully developed the priority list for maintenance, but not all the plan could not be realized due to the unrealistic plan. In the projects for road/bridge maintenance, there should be capacity development of the counterpart organization so that it can set a practical plan with the given budget based on the assessment of the maintenance achievement.



(Wabe Bridge in Southern Nation Nationalities and Peoples Region before replacement)



(Wabe Bridge in after replacement)