

## Summary of Terminal Evaluation result

I. Outline of the Project		
Country: Mozambique		Project title: The Project for Capacity Development of Road Maintenance
Issue/Sector: Transportation		Cooperation scheme: Technical Cooperation
Division in charge: Infrastructure and Peace Building Department		Total cost: about JPY 470 million
Period of Cooperation	(R/D): 19 March 2011 July 2011 to August 2014	Partner Country's Implementing Organization: National Road Administration (ANE)
		Supporting Organization in Japan: West Nippon Expressway Co., Ltd., Katahira & Engineers International Co., Ltd.
Related Cooperation:		
<p>1. Background of the Project</p> <p>Since the independence from Portugal in 1975, the Republic of Mozambique had been plagued by the civil war which seriously hampered road development. Out of the existing road network totalling 33,000 km only 16% are paved, and most of unpaved roads become unpassable during the rainy seasons. Administração Nacional de Estradas (ANE) is the authority in charge of construction and maintenance of the road network in Mozambique. Road maintenance work is managed by the Maintenance Department under the Directorates of Maintenance (DIMAN). Most works including design, construction and supervision are outsourced. ANE has many experiences in the implementation of road and bridge construction projects financed by national budget and development partners. Still, there is need for ANE to strengthen its institutional and technological capacity to deliver quality road service with a limited number of staff.</p> <p>The "Project for Capacity Development of Road Maintenance" aims at establishing proper procedures for the road maintenance management, including planning, inspection and repair works in Maputo and Gaza provinces, to enhance the capacity of ANE staff in this field. Prior to the project completion, JICA formed a terminal evaluation team to evaluate the achievements of the Project, suggest ways forward for both remaining period of the Project and after the Project completion, and draw lessons for similar type of projects in the future.</p>		
<p>2. Project Overview</p> <p>(1) Project Purpose</p> <p>Institutional capacity of road maintenance is strengthened.</p> <p>(2) Outputs</p> <p>Output 1: Road inspection and planning method is improved in the model area. Output 2: Appropriate maintenance / repair method for paved road is established in the model area.</p> <p>(3) Inputs</p> <p>Japanese side:</p> <p><u>Dispatch of Experts</u>: Two (2) long-term experts: (a) Chief Advisor / Leader and (b) Coordinator / Road Maintenance and Seven (7) short-term experts <u>Trainings in Japan</u>: They were conducted 6 times and 20 C/Ps in total participated. <u>Equipment</u>: about JPY28 million <u>Total Cost</u>: about JPY 470 million</p> <p>Mozambican side:</p> <p><u>Appointment of counterpart (C/P) personnel</u>: 28 persons in total <u>Facilities</u>: 3 rooms in the ANE Headquarters Building as office space for the Japanese expert team. It also bore local costs such as utility costs and others. <u>Project expenditure</u> for the experimental work and the pilot project.</p>		
II. Review Team		
Members of Evaluation	Mr. Jitsuya Ishiguro, Leader/Evaluation Management, Advisor, Transportation and ICT Division 2, Infrastructure and Peacebuilding Department, JICA	

Team	Dr. Makoto Tanaka, Evaluation Analyst, Senior Consultant, ICONS Inc.	
Period of Review	31 May 2014 to 19 June 2014	Type of Evaluation: terminal evaluation
<b>III. Results of Review</b>		
<p>1. Summary of Achievements</p> <p>(1) Achievement of Output 1:</p> <p>The Output 1 “Road inspection and planning method is improved in the model area.” was almost achieved. The Project took a province-wide approach to systematically collect and compile past maintenance records for the road networks of both Maputo and Gaza provinces totaling 465.9 km and 627.3 km respectively. The road sections that had frequent repairs were identified and tabulated on a diagram showing repair frequencies and locations. Workshops were held for counterparts to show how to use the compiled data. (Indicator 1.1) The Road Inspection Handbook prepared by the project provides useful technical reference and information on the field. The Image Processing System for Road Conditions (IPSRC) can serve as electronic kilo posts and can potentially be expanded to a tool to manage the road networks by incorporating a variety of geo-referenced road information. The project digitized as-built drawings selected from the road projects completed in the last 10 years. The digitized drawings were stored in electrical formats and made available to ANE staff. If the drawing data is uploaded on ANE’s intranet “i-DOC,” the achievement level is expected to be further enhanced. (Indicator 1.2) These are expected to save time and cost required for road inspection and maintenance planning and implementation.</p> <p>(2) Achievement of Output 2</p> <p>The Output 2 “Appropriate maintenance / repair method for paved road is established in the model area.” was almost achieved. The Project prepared the road maintenance guidelines “Guião para Manutenção de Rotina de Estradas Revestidas” based on the “Routine Road Maintenance Manual” published by the South African National Roads Agency (SANRAL) with their permission to translate in Portuguese. Its contents were revised reflecting technical capacities and availability of materials in Mozambique. Also site photographs were replaced by those taken in Mozambique which show typical field conditions in Mozambique. (Indicator 2.1) The guidelines were used as reference material during the pilot project (Indicator 2.2) and are expected to be widely used by ANE staff, consultants and contractors, particularly for those who wish to revisit basics of road maintenance techniques. To strengthen ANE’s management capacity, the Project prepared a technical audit manual showing the checkpoints when they undergo technical audit. ANE’s person in charge of technical audit answered in interview that the manual is useful and it is very inconvenient to receive technical audit without the manual. (Indicator 2.3) Knowledge dissemination seminars and workshops were held 10 times in total having 10 to 86 participants from ANE and the private sector. (Indicator 2.4)</p> <p>(3) Achievement of Project Purpose: Almost Achieved</p> <p>The institutional capacity of ANE for road maintenance is strengthened in terms of the inspection, planning and maintenance aspects as given in the indicator 1. The Project prepared the Road Inspection Handbook and the guidelines for road repair works, enhancing ANE’s and contractor’s knowledge. The Image Processing System for Road Conditions (IPSRC) was created, helping road inspectors confirm the road conditions and make decisions at office. The pilot project together with the guidelines for repair work enhanced capacities of both ANE and contractors. Their enhanced knowledge of and exposure to the hot mix asphalt <i>in situ</i>, is having impact on their choice of pavement repair methods. The contractor who carries out the pilot project began to apply the hot mix asphalt in situ to road sections outside of the pilot project scope. As for the Indicator 2, the evaluation team could not obtain road maintenance budget data that shows systematic tendency. The prospect for achieving the project purpose is assessed based on the degree of achievement of the Indicator 1.</p>		
<p>2. Summary of Evaluation Results</p> <p>(1) Relevance - High</p> <p>The Mozambican government places transport infrastructure development high on its development</p>		

agenda, as it is stated in the Five-year Program of the Government for 2010-2014 (Programa Quinquenal do Governo para 2010-2014) to increase the mobility of people and goods throughout the country. The Road Sector Strategy (RSS) 2012 – 2014 (ROADS-4) prepared for the government emphasizes the importance of “asset preservation” and “maintainability” of the roads in Mozambique. The project is to help ANE strengthen its institutional capacity for road maintenance and is aligned with the national policy. The Project is also relevant to Japanese ODA policy for Mozambique. The Yokohama Action Plan 2013-2017 adopted at the Fifth Tokyo International Conference on African Development (TICAD V) advocates as one of its key initiatives/activities, acceleration of infrastructure and capacity development. Assistance in road development and maintenance will contribute to the achievement of revitalization of regional economy through corridor development with enhanced mobility of people and goods.

#### (2) Effectiveness – High

The institutional capacity of ANE for road maintenance is strengthened in terms of road inspection / planning / maintenance through the Project activities. The manuals and guidelines are expected to strengthen ANE’s as well as the private sector’s capacity for road inspection and maintenance, providing hands-on technical reference material for practitioners. The Image Processing System of Road Conditions (IPSRC) can be used as an effective and time-saving management tool through integration with other systems and incorporation of geo-referenced information. The digitization of the as-built drawings together with its future uploading at the i-DOC system may facilitate information sharing necessary for road maintenance among those who are in charge of road repair planning and implementation. The experimental work in Moamba, R401 and the pilot project in Goba, N3 created awareness among ANE, contractors and consultants on do-ability and advantages of the appropriate repair methods. These project activities contributed to the accomplishment of the project outputs and the project purpose.

In addition, the assumptions made in the PDM for budget allocation and project ownership on the ANE side remained valid throughout the project period. There were cases where counterpart personnel were transferred to other departments, but this did not affect the delivery of the project outcomes.

#### (3) Efficiency – High

The inputs from the Japanese side were as a whole mobilized as planned. The assignment of the project coordinator was shortened. The Chief Advisor took over his task, assisted by local staff and the JICA office. Provision of equipment was done as planned, and subsequent activities to use the equipment went well. The “experimental work” in Moamba, R401 and the “pilot project” in Goba, N3 were delayed due to ANE’s financial and administrative arrangement. The delivery of both could have been made at an earlier stage of the project to further assist ANE in dissemination of the hot mix repair method. However, this did not hinder the generation of the project outputs. Counterpart trainings in Japan were conducted targeted separately at either managerial and engineer levels with different training contents tailored to different tasks and duties.

Appropriate levels and the number of counterpart personnel were assigned to the Project. ANE’s participation in seminars and workshops was satisfactory occasionally participated by the private sector depending on topics. Offices with ample space and facilities were provided to the Japanese expert team throughout the project period, providing the team with comfortable working spaces. Cost for both the experimental work and the pilot project were financed, albeit some delays, showing ANE’s strong commitment to the project activities to deliver quality road service.

#### (4) Impacts - Moderate

ANE’s capacity of road maintenance was enhanced through the Project activities in the model areas (Maputo and Gaza) and there are good prospects for duplicating this achievement in other provinces through trained counterparts and dissemination of the manuals and guidelines prepared under the Project. ANE as well as consultants and contractors concerned in road maintenance are becoming aware of the advantage and appropriateness of the maintenance/repair methods introduced through the experimental work and the pilot project. The Image Processing System for Road Conditions (IPSRC) added as an additional project activity may contribute to effective road management and time-saving at

low cost. ANE intends to introduce this system to other provinces with an aim to install electronic kilo posts where no physical kilo post system exists. ANE constantly allocates road budget into maintenance, which is a pre-condition for ANE to achieve the Overall Goal: improve the conditions of its road network. As such, the outputs generated from the Project are sufficient to lead to the attainment of the project objective. The impacts are mainly observed in those coming from the hot mix repair method introduced by the project. Achievement of the Overall Goal requires middle to long time horizons. Yet the hot mix method is having impact on the choice of local pavement repair methods. The contractor who carries out the pilot project began to apply the hot mix asphalt to other road sections which were outside of the pilot project scope.

#### (5) Sustainability – High

The Mozambican government in its policy continues to recognize the importance of maintenance of roads vis-à-vis new road construction. ANE's procedural documents and manuals necessary for the road service delivery are well-established, and ANE has the department (DIMAN) specialized in maintenance of its road assets. In terms of both policy and institutional aspects, accordingly, ANE is expected to retain a favorable environment for continuation and extension of the project activities. The budget for road and bridge maintenance is kept at around 3.8 billion MZN from 2010 to 2012. At the time of the evaluation there is no negative news to cut the yearly budgetary allocation for road maintenance.

The project interventions were designed to deliver adequate technology tailor to local conditions. Mozambican counterparts had generally high levels of understandings on theoretical aspects of road maintenance technology. The Project created an enabling environment for ANE to bridge the technical gap with provision of tools and equipment and arrangement of materials to make changes in road repair works. As for the IPSRC, trainings were provided for ANE staff members who were quick to acquire the knowledge and now capable of creating road image database in other Provinces. Also the contractor who carried out the pilot project uses the hot mix asphalt for repairing other road sections to be maintained under performance based contract. This can be regarded as an examples showing technical sustainability of the pavement repair method introduced in the Project.

### 3. Factors that promoted realization of effects

#### (1) Factors concerning to Planning

The counterpart trainings in Japan were conducted targeted separately at both managerial and engineer levels with different training contents tailored to thier duties.

#### (2) Factors concerning the Implementation Process

Maputo and Gaza provinces were selected as the model area. At the later stage the on-site workshop on the hot mix *in situ* method, for example, was open to staff from other provincial offices to give them opportunities to get exposed to the new repair method.

The Project sought linkage with the “*dono*” method initiative advocated by Prof. Kimura, Kyoto University - an inexpensive and labour-based rural earth road repair method. The *dono* method is to be applied to disaster recovery work in Gaza province as a pilot project financed by World Bank. A Portuguese version of its explanatory materials was prepared under the project and its copies were shared with Japan Overseas Volunteers.

### 4. Factors that impeded realization of effects

#### (1) Factors concerning to Planning

None.

#### (2) Factors concerning to the Implementation Process

None.

### 5. Conclusions

The project activities have been implemented with minor changes and some delays but are expected to successfully generate the outputs 1 and 2 as planned, which may contributed to achieving the Project

Purpose at a sufficient level. The evaluation team proposes that the Project end in August 2014 as planned in the Record of Discussions.

#### 6. Recommendations

- (1) ANE should disseminate within the head office and with the provincial offices the road inspection handbook and the guidelines prepared under the Project, preferably, also with the private sector who is actually engaged in the road inspection and maintenance. Also, the other products like the technical audit manual should obtain formal approval by ANE.
- (2) ANE should take actions to promote the hot mix *in situ* method to make it as one of the standard pavement repair methods in the model area by encouraging local contractors to employ the method for road maintenance through supply of necessary assistance.
- (3) ANE should make an arrangement to make the digitized as-built drawing data widely accessible within ANE including its Provincial offices. The issue to upload them on the i-DOC needs to be solved to make the drawings accessible to all ANE staff.

#### 7. Lessons Learnt

- (1) The Project's approach to seek appropriate technology fit for local needs and conditions helped to establish a durable and cost efficient alternative pavement repair method in the model area. The "hot mix *in situ*" method introduced by the Project through the pilot project was well received by workshop participants and its easiness and durability were understood through field demonstration. The contractor who carried out the pilot project began to replace the "cold mix" by the "hot mix," realizing its durability and cost effectiveness.
- (2) Aligning the project activities with the partner institution's regular work contributed to enhanced sustainability of the project interventions. The pilot project and the experimental work were conducted within ANE's regular procedural framework and financed by ANE's own budget. This made it possible for the project activities at par with local conditions.
- (3) Careful assessment of the counterpart organization's needs and fine-tuning of the project activities tailored to their needs contributed to efficient delivery of the project outputs. The Project carried out an extensive stock-taking exercise whereby it reviewed existing ANE manuals and guidelines related to road repair and maintenance. Most technical and managerial documents were found to be at high standards. By avoiding duplication of various past efforts, the Project was able to focus its assistance on the areas where ANE needs project interventions.
- (4) Involvement of the private sector (contractors and consultants) in the project activities was effective for assistance to the road agency that outsources a large part of its tasks. Enhancement of the private sector's capacity together with a road administrator is essential for upgrading the overall level of road management. The project allowed both contractors and consultants to attend workshops and seminars, enhancing their capacities.

#### 8. Follow-up Situation

(Not applicable)