

Republic of South Sudan

FY2021 Ex-Post Evaluation Report of Technical Cooperation Project

“The Project for Capacity Development on

Sustainable Road Maintenance and Management in Juba, South Sudan”

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0. Summary

The project aimed to enhance the road maintenance and management capacity of the Ministry of Transport, Roads and Bridges (MTRB) and the Central Equatoria State Ministry of Infrastructure (MoPI) through the establishment of a cycle of road maintenance and management (inspection, plan, and maintenance/repair). In South Sudan’s national development policy, from the time of project planning to the completion of the project, improving the quality of road infrastructure was a consistent issue. South Sudan was affected by a long-time conflict, and proper road maintenance and management had not been conducted for many years. Because the population had been concentrating in the capital, and cargo transportation had been increasing, the need for road development and maintenance was expected to increase further. Regarding the project plan and approach, since it was a project in a conflict-affected country, the project plan was adjusted flexibly according to the knowledge level and proficiency of the counterparts (C/P) of MTRB and MoPI and emphasized establishing their ownership of nation-building. The project is coherent with the assistance policy of the Japanese government at the time of planning because basic livelihood assistance including the transportation section was one of the policy’s priority areas for establishing peace. Moreover, the project was expected to yield benefits to neighboring countries and contribute to peacebuilding. In the projects by JICA and the Japan Self-Defense Forces dispatched to the United Nations Mission Republic of South Sudan (UNMISS), C/Ps participated in inventory and road repairs, which could increase opportunities for practical on the job training (OJT), which was limited owing to a lack of budget. With other donors, information was exchanged and harmonized with similar projects. Therefore, the project’s relevance and coherence are high.

As for effectiveness, the environment for establishing a road maintenance and management cycle within MTRB/MoPI was established, and a series of outputs was put into practice. Thus, the road maintenance and management capacity was strengthened, and it can be said that the Project Purpose was largely achieved. Owing to the major conflicts in December 2013, just before the project completion and July 2016, and the lockdown due to coronavirus disease 2019 (COVID-19) from the beginning of 2020, the activities of the implementing agencies related to road maintenance and management were suspended each time. From the time of the project completion to the ex-post evaluation, the road maintenance and management cycle have been fragmented. Thus, the continuity of the Project Purpose was at a limited level. After the two conflicts, the restoration of stability was delayed. There was a danger of attacks, unexploded

ordnance, and landmines on the roads. In addition, the government's financial situation did not improve. Up to the time of the ex-post evaluation, the state of road development in South Sudan had not progressed, making it difficult to achieve the Overall Goal of appropriate and sustainable road maintenance and management. The roads and culverts constructed and repaired in the OJT of the project benefitted people's lives. However, maintenance and management had not been implemented appropriately, which worsened the state of the roads and culverts, and the benefit became limited. Some measures in preventing deterioration of the roads and culverts and cleaning them were necessary with the cooperation of the city government and communities. As mentioned above, the impact of this project is limited. Therefore, effectiveness and impact are moderately low.

Although the project cost significantly exceeded the plan, the additional cost was commensurate with the increase in output, and the project period was within the plan. Thus, the project's efficiency is high.

Sustainability is expected in policy/systems, technical aspects, and preventive measures to risk, but financial sustainability is a significant concern. Some issues have been observed regarding the institutional/organizational, environmental, and the current status of the operation and maintenance system. Prospects for improvement or solution in such aspects are poor.

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

1. Project Description



Project Site

Source: Maps & Geospatial services



OJT of road repair using sand bags (September 2013) Source: Project Team

1.1 Background

In South Sudan, which had been affected by a long-standing conflict, the urban infrastructure in the capital was not sufficiently developed. As for the roads, even if they were repaired, they were not adequately maintained and managed. Consequently, there were many roads with severe irregularities and ditches in the center caused by running water. One of the reasons that roads were not developed and adequately maintained and managed was that both MTRB, which oversaw

improving arterial roads, and MoPI, which oversaw improving roads in Juba, were weak organizations. Both ministries lacked the capacity in planning and designing road projects, contracting and supervising construction, and implementing direct construction work. MTRB was short of human resources; MoPI lacked experience and technologies. In addition, policies, regulations, manuals, and guidelines related to road administration were not developed.

To address the challenges above, the project was implemented to improve the capacity of administrative officers and engineers of MTRB and MoPI regarding road maintenance and management (inspection, planning, maintenance, and repair) and to establish a road maintenance and management cycle in the two organizations. Ultimately, the project aimed to contribute to the safe and sustainable maintenance and management of roads throughout South Sudan. The project's outline is shown below.

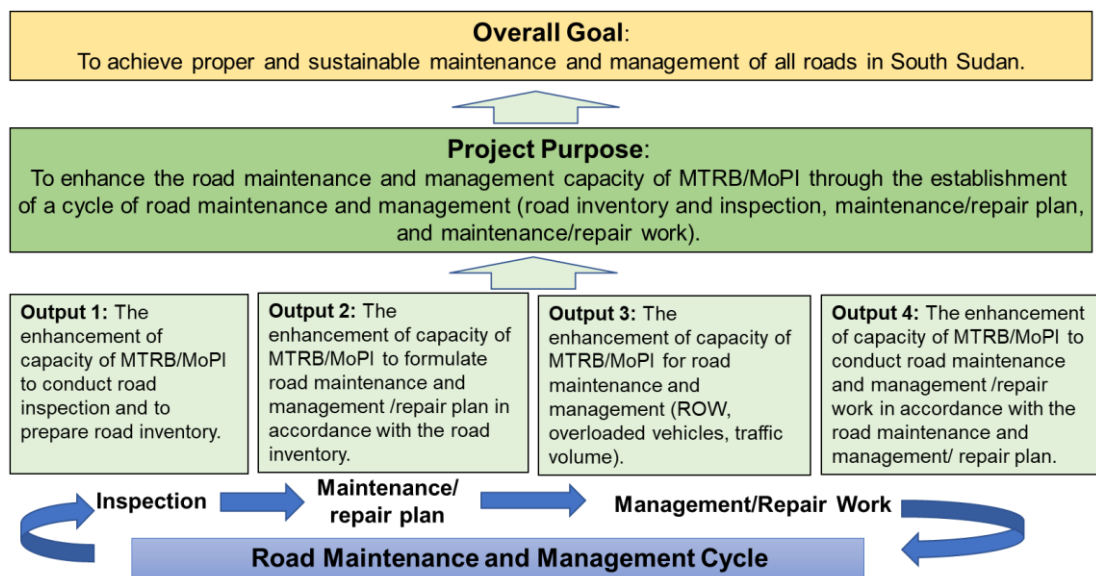


Figure 1: Conceptual diagram of the Road Maintenance and Management Cycle that the Project aimed for

1.2 Project Outline

Overall Goal		To achieve proper and sustainable maintenance and management of all roads in South Sudan.
Project Purpose		To enhance the road maintenance and management capacity of MTRB/MoPI through the establishment of a cycle of road maintenance and management (road inventory and inspection, maintenance/repair plan, and maintenance/repair work).
Output	Output 1	The enhancement of capacity of MTRB/MoPI to conduct road inspection and to prepare road inventory.
	Output 2	The enhancement of capacity of MTRB/MoPI to formulate road maintenance and management/repair plan in accordance with the road inventory.
	Output 3	The enhancement of capacity of MTRB/MoPI for road maintenance and management (Right of Way [ROW], overloaded vehicles, traffic volume).
	Output 4	The enhancement of capacity of MTRB/MoPI to conduct road maintenance/repair work in accordance with the road maintenance and management/ repair plan.
Total cost (Japanese Side)		493 million yen
Period of Cooperation		October 2011–March 2014
Target Area		Juba City in the Republic of South Sudan
Implementing Agency ¹		Ministry of Transport, Roads and Bridges (MTRB), Ministry of Physical Infrastructure of Central Equatoria State (MoPI)
Other Relevant Agencies/ Organizations		None
Consultant/ Organization in Japan		CTI Engineering International Co., Ltd. (CTII)
Related Projects		[Technical Cooperation] “Juba Urban Transport Infrastructure and Capacity Development Study in Southern Sudan” (2007–2010), “Follow-up cooperation for the Project for Capacity Development on Sustainable Road Maintenance and Management in Juba” (2015–2016) [Grant Aid] “Project for Construction and Rehabilitation of Bridges on Main Roads in Juba City” (EN: November 2009), “Project for Construction of Nile River Bridge” (GA: January 2013)

¹ When the government system was in 2020, the implementing agencies were renamed to South Sudan Ministry of Roads and Bridges: MoRB, and Central Equatoria State Ministry of Road and Bridges: CE MoRB.

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of the Project Purpose at the Terminal Evaluation

It was confirmed that the technical levels of the C/Ps who participated in the training under the project had improved and that an environment to establish a road maintenance and management cycle was created within MTRB and MoPI. Moreover, before the project was completed, MTRB was to approve the road maintenance and management manual, which was expected to take root in the organization. Therefore, the Project Purpose was expected to be mostly achieved.

1.3.2 Achievement Status of the Overall Goal at the Terminal Evaluation (Including Other Impacts)

As the Overall Goal, implementation of road maintenance and management nationwide was assumed, but it was unattainable given the scale of the project. Thus, in the terminal evaluation, the Overall Goal was replaced with "functional improvement of the road network in Juba City," which was on a scale that matched the actual situation. Its achievement was confirmed with the replaced indicator, "the length of roads maintained and management and repaired by applying the road maintenance and management cycle established by the project." The Overall Goal was mostly achieved because the project had records of repair works during the project implementation, developed human resources for road maintenance and management cycle, and improved the implementation environment in such aspects as manuals and equipment.

1.3.3 Recommendations from the Terminal Evaluation

In the terminal evaluation, recommendations were made on considering organizations and systems for sustainable road maintenance and management implementation and promoting efforts to establish such organizations and systems at the policy level.

(1) Consideration of organizations and systems:

Measures should be taken within the C/P agencies to maintain the project's achievement as the organizational level. The organizations and systems at MTRB and MoPI for implementing road maintenance and management in the future should be discussed within the South Sudanese government.

(2) Promotion to establish the system at the policy level:

MTRB and MoPI should keep striving to establish a road maintenance and management cycle. Through the project, the working-level staff learned that regular road maintenance and management could reduce road assets' lifetime costs. By using the manuals and other materials developed in the project, the C/Ps and other related organizations are expected to establish the concept of the maintenance and management cycle at the policy level.

2. Outline of the Evaluation Study

2.1 External Evaluator

Shima HAYASE, IC Net Limited

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule:

Duration of the Study: October 2021–October 2022

Duration of the Field Survey: January 23–February 13, 2022, June 1–22, 2022

2.3 Constraints during the Evaluation Study

At the time of the ex-post evaluation, eight years had passed since the completion of the project. As a result, some of the experts and C/Ps who had been engaged in the project had either been transferred or retired, and the interviewees were limited. In addition to the passage of time, data and records have been lost or scattered owing to two major conflicts and organizational restructuring, and some of the data related to the project's effects were difficult to obtain. Some of the data for the evaluation include those collected through recollections in the interviews with C/Ps, JICA experts, and staff of the JICA South Sudan office.

As several JICA projects related to urban infrastructure development were implemented in Juba City, residents and representatives of the local community and the C/P side sometimes confused the projects. Thus, it was difficult to identify and confirm the activities and impacts of this project particularly.

Moreover, at the time of planning, the Overall Goal was to "achieve appropriate and sustainable road maintenance and management for all roads in South Sudan," and it was assumed that the road maintenance and management cycle would be applied throughout the country. However, owing to the conflict that occurred in December 2013, which was just before the project completion, and the government's shortage of financial resources, road development itself was not progressing in South Sudan. The terminal evaluation adopted the alternative indicator of "improvement of the road network in Juba City as the Overall Goal based on the situation at the moment," and it was used for the rating.

From the project completion to the ex-post evaluation, the government's budget shortfall was not resolved, and a major conflict recurred in July 2016. Thus, it remained difficult to develop and maintain roads throughout South Sudan. Under these circumstances, the ex-post evaluation also applied the same indicators as the terminal evaluation to confirm the achievement of the Overall Goal.

3. Results of the Evaluation (Overall Rating: C²)

3.1 Relevance/Coherence (Rating: ③³)

3.1.1 Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan

The development policy at the time of planning was *the Infrastructure Sector: Budget Sector Plan 2011–2013* of the South Sudanese government. Regarding road infrastructure, it aimed to upgrade 600 km of inter-state earthen roads to asphalt pavement and improve road condition to a level that allows driving at an average speed of 60 km/h. The project's Overall Goal, "roads throughout South Sudan are properly and sustainably maintained and managed," was consistent with this budget plan. At the time of the project completion, *the Infrastructure Sector: Budget Sector Plan 2011–2013*, the same policy as the time of planning, was used as the reference source for the development goal.

The South Sudanese government's infrastructure sector budget plan, both at the time of planning and completion, aimed at asphalt paving and raising the level of domestic roads. This project was to maintain and manage them appropriately and sustainably. Thus, the project's consistency with development policy is high.

3.1.1.2 Consistency with the Development Needs

Owing to long-standing conflicts, roads in South Sudan have been poorly maintained and managed. According to a development study to formulate a transport infrastructure master plan, the road under Central Equatoria State was approximately 614 km. Still, it was almost unrepaired at the beginning of the project, and only about 20 km could be repaired per year. Therefore, the need for road maintenance and management was high and expected for the long term.

Furthermore, the population of Juba City was increasing owing to returnees from Sudan and population influx from rural areas to urban ones. By 2015, the population was expected to be nearly doubled to 520,000, and the economy of Juba City was to grow to 21% of GDP. It was predicted that the need for road development, maintenance and management would increase for the movement of people and transportation of goods.

At the time of planning, such aspects as policies, regulations, guideline systems, and manuals related to road administration had not been developed. Therefore, the project needed to strengthen the capacity of the organization and personnel of MTRB and MoPI while establishing the organizational foundation for road maintenance and management operation. At the time of project completion, the manual for road maintenance and management cycle was developed, but policies and regulations for road administration were still under preparation. For the reasons above, it can be said that this project is highly consistent with the development needs at the time of project

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

³ ④: Very High ③: High, ②: Moderately Low, ①: Low

planning and completion.

3.1.1.3 Appropriateness of the Project Plan and Approach

(1) Appropriateness of the PDM and amendment

Regarding the PDM of the project, there is no specific problem in the logic from outputs to the achievement of the Project Purpose. All the outputs are associated with enhancing MTRB/MoPI's road maintenance and management capacity and contribute to attaining the Project Purpose. The indicators set no specific numerical targets for outputs and the Project Purpose, but this was because the project started by establishing road maintenance and management structure.

The Project Design Matrix (PDM) was modified once, and "Output 3: capacity enhancement for road maintenance and management (right of ways, overloaded vehicle, traffic volume)" was added. This modified PDM, which is the 2nd version, was approved by the 4th Joint Coordination Committee, and it was also used for the terminal evaluation.

In analyzing the results of the first-year activities of the project, Output 3 had to be added for the following reasons. It was necessary to prevent roads from being damaged beyond their planned life. Furthermore, the road zone was unclear, residents disregarded the function and importance of the road zone, and commercial facilities and parked vehicles occupied the road zone. As a result, traffic congestion occurred, and traffic volume concentrated on specific routes. Moreover, because traffic volume surveys were not conducted regularly, the effects of road maintenance and improvement and necessary costs could not be calculated. Thus, activities to reduce road damage and establish a road network were added. In drafting the amended version of the PDM, the experts as a team analyzed problems with the Project Cycle Management method and organized relevant information. Thus, the logic was consistent.

(2) Measures tried in implementing projects in conflict-affected countries

According to the staff of the JICA Sudan Office at the time of planning, South Sudan, which had become independent after years of conflict, was at the stage of starting nation-building; thus, it was necessary to build a relationship of trust between the government and society. The project was intended to show tangible effects at early stage so that people could feel dividends of peace. As this project aimed not only for mere technical transfer but also for the C/P organizations to contribute to nation-building as organizations that provide administrative services, the project's implementation emphasized the formation of ownership.

Implemented immediately after South Sudan's independence, the project was a technical cooperation one to form a foundation for road operation, maintenance, and management from almost scratch. Owing to the country's long-term conflict, the staff of the C/P organizations did not have sufficient learning opportunities and faced challenges such as not being equipped with basic knowledge of road maintenance, management, and operation and being unfamiliar with PCs.

Various measures were devised to meet the needs at the local level, such as the experts volunteering to provide supplementary lessons, and inventory done on paper rather than digitally so that it would take root in the C/P organizations.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

According to the ODA Policy for Sudan in the *Official Development Assistance Country Data Book 2010*, the ODA Charter cites peacebuilding as one of its priority issues. To promote the consolidation of peace, support for basic living, including the transportation sector, was one of the priority fields.

The *Yokohama Action Plan*, formulated in the Tokyo International Conference on African Development (TICAD IV), was held in Yokohama in May 2008, infrastructure development was one of the pillars, and transportation infrastructure development was emphasized. These issues continue to be recognized as a priority at TICAD V (2013).

In addition, this project aimed to strengthen sustainable operation, maintenance and management capacity for basic infrastructure, such as roads and bridges directly linked to people's lives. Those infrastructure items had been supported by the Japanese government since the Comprehensive Peace Agreement (CPA). While other donors had been focusing on humanitarian aid, from the peacebuilding viewpoint, Japan and JICA were aiming to present tangible support so that people could enjoy the dividends of peace.

Thus, the project is highly consistent with Japan's ODA policy.

3.1.2.2 Internal Coherence

In the pilot project in the development study "Juba Urban Transport Infrastructure and Capacity Development Study in Southern Sudan" conducted before the project, MoPI participated in a series of technical transfers (planning, designing, construction, monitoring/evaluation). Thus, MoPI was able to strengthen road maintenance and management skills before the project. Moreover, C/Ps could use the below projects for practicing the skills obtained in the project, such as the "Preparatory Study for the Project for Construction of Lologo Bypass" for road inventory (Output 1), and a grant aid project called the "Project for Construction of Nile River Bridge" for the right of way management (Output 3). Although cooperation did not reach a level to yield developmental cooperative relationships or synergistic effects, a certain degree of internal consistency is recognized.

3.1.2.3 External Coherence

(1) Coherence with projects by other Japanese organizations

MoPI participated in the road construction project by the Japan Self-Defense Forces dispatched to UNMISS. The South Sudanese government had suffered chronic budget shortfalls and could not allocate a budget for road construction and repairs. By obtaining this collaboration opportunity, MoPI was able to practice road repair by using the skills learned by the project.

The Japanese embassy, JICA, and the dispatched Japan Self-Defense Forces held joint meetings every week. Information was exchanged, such as the Self-Defense Forces providing information on the security situation, JICA on the progress of ODA projects, and the embassy on visits by key figures and the political situation. The meetings provided ideas for cooperation, and coordination was implemented through them.

(2) Coherence with Other Donors/International Frameworks

The European Union (EU) was one of the donors conducting capacity-building projects in the road sector. The project and the EU devised coordination through participation workshops held by each other and information exchange. With other donors in the road sector, no specific cooperation was implemented because their target areas differed from the project.

As mentioned above, there was specific cooperation with the Self-Defense Forces in road repair work, which contributed to promoting the effectiveness of the project. Harmonization was achieved through information exchange with the EU. Thus, a certain degree of external consistency was confirmed.

Regarding relevance, the project was consistent with the South Sudanese government's development policy and road maintenance and management needs at the time of planning and completion. Regarding the project approach, the PDM was revised through the formal procedures to add an output to enhance the effectiveness of road maintenance and management. As the project was implemented in a conflict-affected country, flexible responses were taken along with the level of C/P organizations. Moreover, to contribute to the new nation-building, the project emphasized establishing C/Ps' ownership.

The assistance policy of the Japanese government at the time of planning prioritized infrastructure development as a priority area for new nation-building; thus, consistency is high. Furthermore, benefits to neighboring countries and contributions to peacebuilding were expected. Cooperation with other JICA projects and the Self-Defense Forces dispatched to UNMISS provided OJT opportunities that had been limited by the ministry's budget shortfalls. In addition, information exchange and harmonization were achieved through participation in each other's workshops with another donor who was implementing a similar project.

Therefore, the project's relevance and coherence are high.

3.2 Effectiveness and Impact⁴ (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Project Outputs

As the outputs of the project, strengthening the capacity of C/Ps in MTRB/MoPI regarding each element of the road maintenance and management cycle was aimed. Although no specific numerical targets were indicated for each output, the results shown in Table 1 were confirmed at the time of project completion. Thus, it can be said that the outputs were achieved largely as expected.

As the project was in a conflict-affected country, the project ensured that consideration was given to the knowledge of the C/P and the level of PC proficiency, and strived to expand opportunities to experience road maintenance and management. These efforts facilitated the activities for outputs and contributed to the achievement of the outputs.

Table 1 Achievement of Outputs (at the time of project completion)

Output 1: The enhancement of capacity of MTRB/MoPI to conduct road inspection and to prepare road inventory.	
Indicator	Achievement Status
1-1: Number of teams who can conduct a series of inventory in accordance with the manual (survey work, road inspection, data input to data management) for road inventory	<p><u>Achieved</u></p> <ul style="list-style-type: none"> • Four teams (comprised of 4-5 staff members) were able to conduct road inspections and create inventory. • The achievement test on road inspection (March 2013), the average score of all trainees reached more than 90%, including knowledge and skill level. • The four teams mentioned above completed the road inventory study covering 136 km of the targeted road network in Juba City.
1-2: Number of updated inspection items specified in Manual	<p><u>Achieved</u></p> <ul style="list-style-type: none"> • Starting from inventory reports prepared on a paper basis, Vehicle Intelligent Monitor System (VIMS), and finally GIS, the inspection items below were introduced to C/Ps. <div style="border: 1px solid black; padding: 5px;"> <p>Inspection Items: 1. Road Network Map, (2) Road Diagram, (3) Road Inspection, (4) Structure Inspection, (5) Road Distress Map, (6) Road Registration List, (7) Traffic Volume Distribution Map & Report, (8) Axle Load Survey Report</p> </div>
Output 2: The enhancement of capacity of MTRB/MoPI to formulate road maintenance/repair plan in accordance with the road inventory	
2-1: Required standards and criteria are prepared and updated by MTRB/MoPI	<p><u>Mostly Achieved</u></p> <ul style="list-style-type: none"> • Standards and criteria for road maintenance and management plan were formulated, and a manual was developed. The manual was expected to be approved by the South Sudanese government in January 2014. <div style="border: 1px solid black; padding: 5px;"> <p>Contents of the manual: (1) Definition of Service Level, (2) Standard Procedure of Road Condition Assessment, (3) Definition of Road Maintenance Work, (4) Unit Cost/ Break Down, (5) Standard Process for Priority Assessment, (6) Standard Annual Road Maintenance Program.</p> </div> <ul style="list-style-type: none"> • Updating would be done once the C/P accumulate experiences in implementation, and in reflecting technical progress; thus, at the time of terminal evaluation, no updating occurred.

⁴ Sub-rating for Effectiveness is to be put with consideration of Impact.

<p>2-2: Number of teams who can conduct a series of work (Long listing, Evaluation, Shortlisting) of road maintenance and management plan in accordance with the manual (Monitor by skill test, long list, and shortlist)</p>	<p><u>Mostly Achieved</u></p> <ul style="list-style-type: none"> • The number of participants was smaller than the plan, but one team that formulated a road maintenance and management/repair plan was organized in MTRB (3 members: Secretary and 2 Engineers), and another one in MoPI (3 members: 2 Deputy Secretaries and 1 Engineer). • Each team had acquired knowledge of maintenance management plans through lectures, workshops, and pilot projects, and formulated a series of road maintenance and management plans by referring to manuals. • The team's OJT had reached the point of creating a shortlist after prioritizing the road sections subject to maintenance and management work based on objective evaluation items. • In a questionnaire to C/Ps, 4 out of 6 respondents answered that they achieved or almost achieved the indicators for the goals.
<p>Output 3: The enhancement of capacity of MTRB/MoPI for road maintenance and management (ROW, overloaded vehicles, traffic volume).</p>	
<p>3-1: Number of proposed countermeasures realized to solve the ROW problem.</p>	<p><u>Achieved</u></p> <ul style="list-style-type: none"> • The following measures were proposed by the project and implemented. <ol style="list-style-type: none"> (1) Piles were installed to visualize the boundaries and to make the roads manageable. At the project site of "Project for Construction of Nile River Bridge," piles were driven, and the road site was confirmed by the related parties. (2) ROW records were prepared with the participation of landowners and road administrators, who confirmed their land titles and details, then agreed on the same records. The record was recognized as the formal land title and ownership of the individual and shared with the administration (MoPI survey department, road and bridges department, MTRB, and Payam) (3) A road cleaning campaign was implemented with a wide range of participants from such parties as businesses and schools. Garbage and deposited sand on sidewalks and roadways were removed and the original functions of the roads were restored.
<p>3-2: Number of the team who can identify overloaded vehicles by simplified axle load scale</p>	<p><u>Achieved</u></p> <ul style="list-style-type: none"> • Two teams consisting of C/Ps were able to conduct the whole process of axle load survey, including planning, preparation, weigh measurement, data processing, and reporting. • The teams surveyed 14 times at Juba-Nimule, Yei, and Terekek roads from June 2012 to October 2013 about 1,100 vehicles and identified 400 overloaded vehicles.
<p>3-3: Number of teams who can conduct a traffic survey</p>	<p><u>Achieved</u></p> <ul style="list-style-type: none"> • Under the guidance of the experts, C/P conducted a traffic survey 9 times between August to December 2012. As a result, MTRB/MoPI became able to conduct traffic surveys regularly. According to the project team, four teams became capable of conducting traffic volume surveys including planning, preparation, traffic counts, and report writing. (target area for traffic survey were 13 locations in Juba City, 8 routes)
<p>Output 4: The enhancement of capacity of MTRB/MoPI to conduct road maintenance/repair work in accordance with the road maintenance and management/repair plan.</p>	
<p>4-1: Number of teams who can implement road maintenance and management work and quality control in accordance with the manual.</p>	<ul style="list-style-type: none"> • Although the number of teams was limited, the number of work items that could be implemented had increased; thus, it is fair to say that the indicator was <u>mostly achieved</u>. • Owing to the number of personnel in the MoPI Machinery Department and the Road Maintenance Department, there were limitations to the number of team formulation. Thus, the number of teams is one. • Through OJT such as pilot projects, the team was able to supervise, implement and control quality as direct management tasks including repair work such as road drainage, damage repair, and culvert construction.

4-2: Average of deteriorate rank of the maintenance and management road	<ul style="list-style-type: none"> • Road cleaning was implemented by Juba City, but other activities remained in the project; thus, the indicator was <u>mostly achieved</u>. • Owing to the austerity budget caused by the suspension of crude oil exports, and the MTRB/MoPI road maintenance and management budget has not been practically allocated, the target section was limited. However, the following was implemented in the pilot project to improve the deteriorating situation. <ul style="list-style-type: none"> (1) Mauna Road (dirt road): Repair of 550 m of the soft area by sandbag construction method and installation of culverts in wetlands; (2) Lologo Road: construction of culvert under the road in wetlands; (3) Orcelem Road: Connection with other roads by replacing road gutters with pipe culverts; (4) Cololo Road: Road repair work; (5) pedestrian crossing of 33 locations: painted and repaired. • In 2012, a road cleaning campaign was organized by the project. Deposited sand was removed from the road of 4.2 km, and traffic volume and drainage function was restored. Since then, MoPI cleaned 6.9 km of roads. Since 2013, it has been taken over by Juba City, and regular cleaning of drainage channels and paved roads in the city has been implemented with the budget from the city.
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Source: Terminal Evaluation Report

3.2.1.2 Achievement of the Project Purpose

The objective of this project was to enhance the road maintenance and management capacity of MTRB/MoPI by establishing a cycle of road maintenance and management (road inventory and inspection, maintenance/repair plan, and maintenance/repair work). Since no specific numerical targets were set for the indicators, it is impossible to measure the degree of achievement. However, as shown in Table 2, the C/P organizations gained the capacity for the road maintenance and management cycle and were able to manage each item in the cycle. Therefore, it can be said that the Project Purpose was largely achieved.

Table 2 Project Purpose: Status of Establishment of Road Maintenance and Management Cycle

Indicator	Achievement	
Level of road maintenance and management capacity of the trained personnel.	<ul style="list-style-type: none"> • At the time of the terminal evaluation, a questionnaire survey was conducted to MTRB/MoPI regarding the achievement of maintenance and management levels. Among the six respondents, four answered that they achieved the goal, and the other two replied that they almost achieved it. • Interviews at the terminal evaluation indicated the following achievement level of each stage. 	
	Inspection	4 teams of C/Ps consisting of 4-5 members were able to implement road inspection activities including inspection and formulating inventory by using equipment according to the road maintenance manual developed by the project.
	Plan	<p>C/Ps had basic understanding of planning techniques of road maintenance and management.</p> <p>One team of the MoPI Planning Department was able to draft the shortlist considering the priority of road maintenance and management. (Output 2)</p> <p>To prepare a budget plan necessary for road maintenance and management, it was necessary to be in a situation where crude oil exports were resumed, and a budget was allocated.</p>
Maintenance/Repair	One team of 12 people consisting of staff from the Machinery Department and Road Maintenance Department was formulated. The team members acquired techniques to implement regular road maintenance and small-scale repair work according to the manuals created in the project. (Output 4)	

Source: Terminal Evaluation Report

The following factors promoted the achievement of the Project Purpose.

Even if the project strengthened the knowledge of the road management cycle through lectures, there was a problem that C/Ps' motivation declined because there was no place to make use of that knowledge owing to budget shortage. Thus, as described in the consistency section, by expanding opportunities for OJT through cooperation with other projects and peacekeeping operation (PKO) units, the project strived to improve the C/Ps' capability for practical application.

Owing to the large-scale conflict in December 2013, the Japanese experts were forced to evacuate from South Sudan immediately. Although they attempted to continue their work remotely, under the communication environment at that time, it was difficult to contact the C/Ps frequently. As OJT sessions were conducted intensively between June and November 2013, a series of OJT sessions were completed before the evacuation. As a result, the opportunities for practical training were not greatly reduced.

Harassment by the police and others was an inhibiting factor toward the achievement of the Project Purpose. When the experts conducted surveys for inventorying road maintenance, road siding, traffic, and overloaded vehicles, they were repeatedly arrested. In particular, the police strictly prohibited photo taking by foreigners. The following countermeasures were taken by the project team. When conducting field surveys, Japanese experts would not take photos, but the local staff did instead. Through land allocation coordination for roads, MoPI was familiar with the police; thus, the experts asked the C/Ps of MoPI to accompany the surveys. However, the project vehicle was once stopped by the police, and its Ugandan driver was beaten. An expert was traumatized by this incident and resigned.

For the indicators for effectiveness, no specific numerical targets had been set, and the degree of achievement cannot be verified numerically. However, the environment to make the road maintenance and management cycle take root in the C/P organizations was established, and each relevant activity was implemented to a certain extent, it can be said that capability for road maintenance and management had been strengthened. Therefore, the Project Purpose was mostly achieved.

3.2.2 Impact

3.2.2.1 Achievement of the Overall Goal

At the time of the terminal evaluation, owing to the conflict that occurred in December 2013, which was just before the completion of the project, and the lack of financial resources of the government, the road development itself was not progressing. It was pointed out that the Overall Goal, which is "to achieve proper and sustainable maintenance and management of all roads in South Sudan" was not a realistic goal for evaluating the achievement of the project. Therefore, as the alternative indicator, "improvement in the function of the road network in Juba City" through

the improvement of road drainage, leveling, and cleaning of dirt roads was applied and evaluated.

Between the time of project completion and the ex-post evaluation, there was another major conflict in July 2016, no improvement in government finances, and no significant improvement in the state of road network development. Furthermore, after the conflict, there were problems such as the possibility of armed groups' assaults, and remaining unexploded ordnance and landmines. Thus, it was impossible to deploy maintenance and management throughout the country. Since there was no improvement in the possibility of implementing road maintenance and management, this ex-post evaluation also applied "improvement in the function of the road network in Juba City" as the Overall Goal and assessed the achievement status from the number of times of road repair and the road cleaning distance.

The evaluation team requested the MTRB, one of the implementing agencies, to provide data on indicators related to the Overall Goal, but was unable to obtain any data. According to interviews, after two large-scale conflicts, it was not possible to conduct regular inspections of domestic roads because of the difficulty in ensuring safety.⁵ When the risk level became slightly better, in 2021, outsourced contractors conducted inspections limited to the suburbs of Juba, and road repair work for 0.2 km was done with an emergency budget.⁶

Table 3 shows the length of roads maintained and repaired by MoPI, the other implementing agency, applying the road maintenance and management cycle.

Table 3 Length of Road Maintained and Repaired by MoPI

Indicator	2014	2015	2016	2017	2018	2019	2020	2021
Number of repairs implemented in Juba City	0	5	0	6	2	1	0	0
Length of road cleaning in Juba City (km)	0	4.4	0	5.9	5	2	0	0
Reference: Length of road maintained and repaired outside of juba City (km)	0	0	0	0	0	68	63	9

Source: CE MoRB's response to the questionnaire

According to the MoPI's road maintenance data from the time of project completion to the ex-post evaluation, neither repair work nor cleaning has been implemented stably. The factors cited by MoPI are as shown below in chronological order. However, as various factors occurred in multiple ways, it is not possible to explain the causal relationship between individual factors and data on a one-to-one basis.

In 2014, after the project was completed, owing to the conflict in December 2013, MoPI's activities including repair work and cleaning were suspended. In 2015, the following year, the activities resumed as the security situation improved. However, in October 2015, the president announced a restructuring of the government system, and the Central Equatoria state was divided

⁵ When the government system was in 2020, MTRB was renamed the Ministry of Roads and Bridges (MoRB).

⁶ Repair work was limited to the sections requiring urgent measures (roads around Juba University, repair of Juba Bridge, and roads around the airport), and the distance was only about 200 m, and the construction work was outsourced.

into three.⁷ MoPI's functions were also divided, and the organization's road maintenance management staff and equipment were divided into three. Until reunification in 2020, MoPI was forced to continue the project's activities with limited resources.

In July 2016, another large conflict occurred, and MoPI's activities were suspended. In 2017, activities were resumed, but owing to the economic crisis, the government's 2018–2019 budget was reduced greatly, and the number of activities was reduced. Furthermore, from January 2020, Juba was locked down because of the COVID-19 pandemic, and activities regarding road maintenance and management were suspended almost for one year.

However, these were ad-hoc measures regarding regular activities, which are for reference because they do not correspond to the Overall Goal of the project, which is "maintenance and management of sustainable roads." Road works in Central Equatoria (outside Juba City) were implemented with special funding from such sources as the vice president. The length of road maintained and managed was 68 km in 2019, 63 km in 2020, and 3 km in 2021.

As mentioned above, from the completion of the project to the time of the ex-post evaluation, both implementing agencies were unable to conduct repair work and clean the roads in Juba City on a continuous basis because of the constraints such as budget, and organizational aspects. These were affected by an uncontrollable external factor of the project, security.

In addition, during the field study for the ex-post evaluation, the evaluation team visited and confirmed the sites where the project OJT and follow-up work were implemented. The team found that culverts were blocked by illegally dumped waste and soil, the road was flooded during the rainy season owing to the lack of water flow, and the repaired dirt road had been scraped away again in all the sites. The leveled roads also deteriorated to a level that hinders traffic because they were not managed properly.

There are difficulties in maintaining and managing the culverts because of the severe natural conditions and insufficiency in the budget. However, MoPI should have considered preventive measures with the cooperation of the city government and local communities.

In light of the above, the achievement of the Overall Goal was confirmed to a limited degree compared to the plan.

⁷ At the time of independence, there were 10 states. In 2015, it was divided into 28 states, and in 2017 32 states. When the 28-state system was established in October 2015, Central Equatoria State was divided into three states: Telekeka, Jubek, and River Yei. The function of MoPI was also divided into three. On February 15, 2020, when the unified Interim Government was established, they decided to return to the 10-state system. The divided three states were reunited into Central Equatoria State.



A new culvert (left) and a road after repair can be driven straight through. (right) (September 2013) source: Project Team



On the same road at the time of the ex-post evaluation, the culvert was filled with garbage, and the road was curved owing to sediment runoff. (February 2022) Source: Evaluator

3.2.2.2 Emergence of Project Effects after the Completion of the Project

The evaluation team confirmed MoRB and CE MoRB regarding the emergence of project effects after completion to the time of the ex-post evaluation by questionnaires and interviews. The results and supporting data are shown in Table 4 to Table 9.

(1) Output 1: The enhancement of the capacity of MTRB/MoPI to conduct road inspection and to prepare road inventory.

After the project completion, MoRB resumed the inspection and inventory in 2019, which had been suspended because of the deterioration of security caused by conflicts and budget shortages. The actual inspection was outsourced to external contractors, and MoRB provided supervision and technical support. Owing to the budget shortage, CE MoRB has reduced the number of teams from four to one since 2014. Activities were suspended in 2016 owing to the conflict, but the teams continued inspection and inventory until the time of the ex-post evaluation.

Table 4 Continuation Status of Output 1

Organization	Indicator	2013	2014	2015	2016	2017	2018	2019	2020	2021
MoRB	1-1 Number of road inventory team(s)	0	0	0	0	0	0	(4)	(4)	0
	1-1 Length of road inspected (km)	0	0	0	0	0	0	(247)	(400)	0
	1-2 Number of updated inspection items specified in manual	0	0	0	0	0	0	0	0	0
CE MoRB	1-1 Number of road inventory team(s)	4	1	1	0	1	1	1	1	1
	1-1 Length of road inspected (km)	136	813	4.6	0	576	67	54	126	6.7
	1-2 Number of updated inspection items specified in manual	3	3	0	0	0	0	0	0	0

Source: MoRB and CE MoRB's response to the questionnaire

* The number of instances of implementation outsourced by contractors is indicated in parentheses.

(2) Output 2: The enhancement of capacity of MTRB/MoPI to formulate road maintenance/repair plans in accordance with the road inventory.

MoRB abolished the team because they could not conduct inventory until 2019, and the budget for road repair was not allocated. At the time of the ex-post evaluation, there is no prospect for resuming repair. The update status of the manual was unclear owing to personnel changes. CE MoRB has one team that has been continuing the activities despite the difficulties, such as two conflicts and the restructuring of the state government organization. They also have not updated the manual.

Table 5 Continuation Status of Output 2

Organization	Indicator	2013	2014	2015	2016	2017	2018	2019	2020	2021
MoRB	2-2 Number of teams that can formulate a road maintenance plan	1	0	0	0	0	0	0	0	0
CE MoRB	2-2 Number of teams that can formulate a road maintenance plan	1	2	1	0	1	1	1	1	1

Source: MoRB and CE MoRB's response to the questionnaire

(3) Output 3: The enhancement of the capacity of MTRB/MoPI for road maintenance and management (ROW, overloaded vehicles, traffic volume).

MoRB continues activities only on ROW problems. The ROW problems were identified by the information from community calls and reports from the contractors conducting inventory. Since it is impossible to find a solution under the current legal system, the problems are referred to the city government and the police. Overloading and traffic volume survey were not conducted because of harassment by the police and a broken axle weight scale.

CE MoRB identified ROW problems when they conducted road inspections and construction work and addressed issues. They stopped the overloading survey in 2015 and the traffic volume survey in 2014. The main reasons for this are security problems and police harassment.

Table 6 Continuation Status of Right of Way

Organization	Indicator	2013	2014	2015	2016	2017	2018	2019	2020	2021
MoRB	3-1 Number of ROW problems identified. (number/year)	Joint with CE	(5)	(5)	0	(5)	(5)	(5)	(5)	(6)
	3-1 number of countermeasures implemented (number/year)		(3)	(3)	0	(3)	(3)	(3)	(3)	(3)
CE MoRB	3-1 Number of ROW problems identified (number/year)	3	3	5	0	0	1	3	2	0
	3-1 Number of countermeasures implemented (number/year)	3	2	3	0	0	0	3	5	0

Source: MoRB and CE MoRB's response to the questionnaire

* The number of instances of implementation outsourced by contractors is indicated in parentheses.

Table 7 Continuation Status of Axle Load Survey

Organization	Indicator	2012/2013	2014	2015	2016	2017	2018	2019	2020	2021
MoRB		Joint with CE	not implemented							
CE MoRB	3-2 Number of teams for axle load survey	2	4	4	0	0	0	0	0	0
	Number of surveys conducted in the year (times/year)	14	4	7	0	0	0	0	0	0
	Number of vehicles surveyed (units)	1,100	424	720	0	0	0	0	0	0
	Of which number of overloaded vehicles identified (units)	400	30	92	0	0	0	0	0	0

Source: MoRB and CE MoRB's response to the questionnaire

Table 8 Continuation Status of Traffic Count

Organization	Indicator	2012/2013	2014	2015	2016	2017	2018	2019	2020	2021
MoRB	Number of teams for traffic count survey	Joint with CE	0	0	0	0	0	0	0	0
	Number of traffic surveys conducted (times/year)		0	0	0	0	0	0	0	0
CE MoRB	Number of teams for traffic count survey	4	4	0	0	0	0	0	0	0
	Number of traffic surveys conducted (times/year)	4	3	0	0	0	0	0	0	0

Source: MoRB and CE MoRB's response to the questionnaire

(4) Output 4: The enhancement of the capacity of MTRB/MoPI to conduct road maintenance/repair work in accordance with the road maintenance and management/repair plan.

MoRB outsources actual repair work to external contractors, and MoRB provides technical support and supervision to contractors. Therefore, no team for regular monitoring was formulated. CE MoRB has a dedicated department for monitoring the state of deterioration and repairing roads. Still, owing to budget shortage, the actual implementation is irregular. Thus, they no longer form a team, especially for the project. Repair work was implemented only when the budget became available from other resources.

Table 9 Changes in Number of Teams for Maintenance and Quality Control

Organization	Indicator	2013	2014	2015	2016	2017	2018	2019	2020	2021
MoRB	4-1 Number of teams for maintenance and quality control	N/A	0	0	0	0	0	0	0	0
CE MoRB	4-1 Number of teams for maintenance and quality control		0	1	0	0	0	0	0	0

Source: MoRB and CE MoRB's response to the questionnaire

(5) Project Purpose: To enhance the road maintenance and management capacity of MTRB/MoPI through the establishment of a cycle of road maintenance and management.

As shown above, in both MoRB and CE MoRB, activities on Outputs 1 to 4 have been only at partial continuation from the project completion to the time of the ex-post evaluation, and the road maintenance and management cycle was not continuously implemented. Therefore, the emergence of the Project Purpose is also limited.

3.2.2.3 Other Positive and Negative Impacts

(1) Impact on the Natural Environment

In the ex-ante evaluation, according to the JICA Guideline for Environmental and Social Consideration (April 2010), the project was classified as Category C because it was likely to have a minimal or no adverse impact on the environment and society. According to the Implementing Agency, no negative impact on the natural environment was observed at the time of the ex-post evaluation.

(2) Land Acquisition and Resettlement

In the ex-ante evaluation, because the project focused on the maintenance and management of the existing roads and no new construction was planned, the occurrence of land acquisition or resettlement was not expected. As confirmed with the Implementing Agency, the project did not require land acquisition or resettlement.

(3) Social System, living standard, People's Well-being, and Human Rights

In this project, OJT was provided to put knowledge into practice in such aspects as road repair and culvert construction. The areas for OJT were important transportation hubs in the city, places where roads tend to be flooded and significantly impact people's living, and places where more people move, such as hospitals and schools. Consideration was given so that a larger population could be benefitted.

According to the survey of the residents about the impact on their living yielded by the project's road repair and culvert construction, the benefits below were reported.⁸

- | |
|---|
| <ol style="list-style-type: none">(1) Access to hospitals, markets, and schools has improved.(2) Transportation to the market has become faster and easier. Thus, economic activity has been activated.(3) Traveling at night has become faster and safer.(4) The police and ambulance are now coming sooner.(5) Cars had to slow down on bad roads, making them easy targets for robberies. As roads improved, the cars no longer needed to slow down, making them less likely to be attacked. |
|---|

⁸ The survey consisted of interviews with representative of the areas (4 people), Men/Women/Youth Group interviews (15 participants in total), road users at the repaired spots (2 locations with a total of 15 people).

In the OJT, pedestrian crossings were painted on 20 paved roads near kindergartens, schools, and hospitals in the city. Owing to budget constraints, ordinary paint was used instead of paint tailored for crosswalks. Thus, at the time of the ex-post evaluation (2022), most of the paint had disappeared, and the actual effects could not be confirmed. According to the experts, C/Ps' motivation increased after seeing children happily crossing the newly painted pedestrian crossing. It can be said that it became an opportunity for the C/P organizations to contribute to people's well-being as those that provide administrative services.

Although the effects of the road repair were confirmed, at the time of ex-post evaluation, the road has deteriorated again. In interviews with residents' groups and community leaders regarding this issue, it was found that they have strong awareness that illegal dumping was the problem and that some measures must be taken. However, in interviews, it was also reported that the root of the problem was that garbage was not regularly collected. The interviewees proposed measures, such as requesting the city for regular garbage collection, raising funds to buy trucks for garbage collection, cleaning, and informing residents not to dump garbage illegally. In South Sudan, challenges include severe natural conditions and insufficient road maintenance and management due to the lack of budget allocation for the implementing agencies. However, it is possible to examine prevention measures and implement cleaning with the cooperation of the city government and communities.

The effectiveness and impact of the project are moderately low, as only a certain degree of emergence has been confirmed compared to the plan. As for the Project Purpose, the environment for establishing the road maintenance and management cycle was established, and a series of activities were put into practice. Thus, it can be said that the capacity for road maintenance and management was strengthened; therefore, it was mostly achieved. The achievement of the Overall Goal was affected by multiple external factors which were beyond the control of the project, such as major conflicts, government budget shortages, and the division of functions of the implementing agency due to organizational restructuring. Thus, the project's appropriate and sustainable road maintenance and management were limited. The OJT improved road conditions and brought benefits to people's lives. However, the effects did not continue until the time of the ex-post evaluation because maintenance and management were not conducted appropriately.

3.3 Efficiency (Rating: ③)

3.3.1 Inputs

The plan and the actual inputs of the project were as follows.

Table 10 Comparison of Planned and Actual Inputs

Inputs	Plan	Actual (at the time of Project Completion)
Dispatch of Experts	Short-Term in 6 fields, 6 person (Total 51 MM)	Short-Term in 10 areas, 16 persons (77.1 MM) Long-Term 1 person (13 MM)
Trainees Received	Training in Japan, Training in a third country (Number of the person not provided)	Training in Japan 15 persons, Training in a third country (Kenya) 3 persons
Equipment	Provision of equipment 7 types	Provision of equipment Approximately 79 million yen, 36 types
Local Cost	20 million yen	36 million yen (182% of the plan)
Japanese Side Total Project Cost	300 million yen	484 million yen (161% of the plan)
Inputs of the South Sudanese Side	C/P: 10 persons	C/P: 27 persons in total

Source: material provided by JICA

* MM stands for man month.

3.3.1.1 Elements of Inputs

(1) Dispatch of Experts

Compared to the plan of short-term experts 6 persons (total 51 MM), the actual dispatch increased vastly to 16 short-term experts in 10 fields and one long-long term expert (90.1 MM in total, which is 177% of the plan). This was because of the addition of an output. The team added experts and restructured experts' fields. As a result, the number of experts and dispatched days increased significantly compared to the plan.

Table 11 Change of Experts' Fields

Plan	Actual
1. Chief Advisor/ Maintenance and Management Plan, 2. Road and Pavement Design/ Drainage System I, 3. Road and Pavement Design/ Drainage system II, 4. Construction Supervision / Quality Control, 5. Procurement / Equipment & Operation /Management, 6. Formulation of manual/ Capacity development / Coordinator	1. Team Leader/ Maintenance and Management Plan, 2. Road & Pavement Design/ Improvement of Drainage System, 3. Road Maintenance/ Road Inventory, 4. Construction Management/ Quality Control, 5. Procurement / Equipment & Operation /Management, 6. Road Management, 7. Topographic Survey, 8. Road Inspection, 9. Preparation of Manual/ Training & Development/ Coordinator, 10. Hydrology

Source: material provided by JICA

(2) Trainees Received

The project provided training in Japan three times and training in a third country once in Kenya.⁹ The date and the total number of participants are shown in the table below. Since the target number of times and the number of days at the planning time are unknown, it is impossible to compare the plan and the actual.

Table 12 Actual Training (unit: persons)

Affiliation	Training in Japan			Training in a Third Country
	February 2012	October 2012	October 2013	November 2012
MoRB	3	3	3	2
MoPI	2	2	2	1
Total	5	5	5	3

Source: material provided by JICA

(3) Provision of Equipment

At the time of planning, construction equipment for road repair was envisioned. In selecting the equipment, small equipment with high fuel efficiency and low spare parts costs was considered because of the financial resources of MoPI, which oversees road repair works. In reality, the project team reviewed the equipment that MoPI already had and re-examined the selection according to the need for a road maintenance and management cycle. For example, MoPI already had large machines such as roller graders and backhoes. However, since they had no transport vehicles, these machines were driven on the road. Considering the engine load and road damage, the machine should have been transported. The trailer was added for that purpose. Equipment to make concrete pipes for culverts used for building road drainage facilities was also added.

Table 13 Plan and Actual Equipment Provision

Plan a total of 7 types	Actual a total of 36 types
1. Small grader: 1 unit 2. Small backhoe: 2 units 3. Small compactor: 1 unit 4. Truck crane: 2 units 5. 4-ton dump truck: 1 unit 6. Asphalt cutter: 2 units 7. Surveying equipment: 2 sets and other costs for pilot projects.	[Minor road maintenance management by manual construction] 1. Conveyer belt, 2. Dump truck, 3. Truck crane, 4. Light truck, 5. Plate compactor, 6. Rammer, 7. Water jet, 8. Asphalt sprayer, 9. Concrete cutter, 10. Air compressor, 11. Hand breaker, 12. Scoop, Pick, 13. Wheelbarrow, 14. Vibrator load roller, 15. Hydraulic excavator tire type [Equipment for road maintenance machine maintenance] 1. Container workshop, 2. Tools, 3. Generator, 4. Water pump [Construction of road drainage system] 1. Pipe casting framework, 2. Concrete Vibrator, 3. Gantry crane and hanger, 4. Water tank and water distribution pipes, [Traffic control facility repair] 1. Barricade casting framework, 2. Line marker and line remover [Transportation] 1. Trailer head, 2. Floor [Evaluation] 1. VIMS, etc. Total: 36 types

Source: material provided by JICA

⁹ A three-day training course aimed at learning about overloading regulations and practices in neighboring Kenya

3.3.1.2 Project Cost

Regarding the project cost, as opposed to the planned amount of 300 million yen, the actual amount was 484 million yen, which is 161% of the plan. However, in this project, one output was added through formal procedures. Considering the additional output, although it is a rough estimate, the planned amount is 399 million yen.¹⁰ The actual amount of 484 million yen exceeded this amount by 85 million yen, which was 21% higher than planned. Therefore, the actual project cost exceeded the plan, but it can be said that the increase was in line with the output that was added through formal procedures; thus, the project cost was generally efficient.

3.3.1.3 Project Period

The planned project period was from September 2011 to March 2014 (2 years and 7 months), while the actual implementation period was from October 2011 to March 2014 (2 years and 6 months: 97% of the plan). Thus, the actual period was within the plan.

In light of the above, although the project cost slightly exceeded the plan, the project period was within the plan. Therefore, the efficiency of the project is high.

¹⁰ There were three outputs in the original plan, but one was added and became four owing to changes in the project plan. Since detailed information on the cost of each outcome was not available, the total was estimated by supposing that the amount of all outputs was equal.

3.4 Sustainability (Rating: ②)

3.4.1 Policy and System

The development policy at the time of the ex-post evaluation, *South Sudan National Development Strategy 2018–2021*, holds the objective of “Consolidate Peace and Stabilize the Economy” and aiming at “people’s safety, stable price, and provision of basic services.” A goal of the economic cluster includes “development of basic economic infrastructure.” Regarding road development and maintenance and management, the following goals have been set to be achieved in three years.

- (1) expand the length of feeder roads rehabilitated or constructed from 750 km to 1,000 km
- (2) expand the length of major highway construction from 250 km to 500 km

Since road construction and rehabilitation is a priority issue in the national development plan, sustainability in policy and system is ensured even at the time of the ex-post evaluation.

3.4.2 Institutional/Organizational Aspect

Table 14 shows an outline of the roles of each organization. Government organizations and local government divisions have been divided and re-integrated. A bill on road maintenance and management was drafted under this project and approved by MoRB. However, it has not yet been approved owing to delays in deliberations in the Ministry of Justice and the Parliament. Accordingly, the MoRB policy formulated in 2012 has been the legal basis.

Table 14 Outline of Organizations Related to Road Maintenance

Organization	Jurisdiction	Role	Funding source
MoRB	International/interstate roads Circular and radial roads	Policy formulation and monitoring responsibility for road management	MoRB
SSRA	in part of Juba City	Planning, construction, and maintenance of highways	Construction funded by donors only
CE MoRB	Feeder roads: circular, collector, and local roads	Planning, construction, and maintenance of roads in the state	The state budget for construction and maintenance
Juba City	Urban roads 19 routes	Planning, construction, and maintenance of city roads, road cleaning	MoRB for construction, city budget for maintenance

Source: The Policy of the Ministry of Roads and Bridges in the Republic of South Sudan (November 2012)

At the time of the ex-post evaluation, the responsible section and personnel for the road maintenance and management cycle established by this project were allocated within the organizations of the MoRB and CE MoRB (Table 15). Thus, it can be said that the system has been established. However, according to the implementing agencies, owing to the low salaries of civil servants, there is an outflow of personnel to international organizations and NGOs, and the agencies do not have enough engineers. On the other hand, CE MoRB, the city hall, and

communities were working together on road construction and maintenance. It can be said that it is a means to improve efficiency by sharing resources such as budget, equipment, technology, and workers.

Table 15 Staffing to Each Organization Related to Road Maintenance and Management

Organization	Staffing for road maintenance and management											
MoRB	<ul style="list-style-type: none"> A total of 26 engineers are assigned when work occurs, not for exclusive use because there are no regular budgetary measures. Road inspections and road repair work are outsourced owing to cost-effectiveness considerations. The number of engineers in the ministry is insufficient. Because of low salaries and frequent delays, human resources flow to the private sector and NGOs. 											
SSRA	<ul style="list-style-type: none"> The organization was established in 2011. It is operational only when a project is funded. There were road construction projects by some donors from 2014 to 2015, but there has been no project since then. At the time of the ex-post evaluation, there were three engineers, but they were seconded to MoRB because there was no project. Owing to the South Sudanese currency's depreciation, the real salary is too low, and staff employment is not progressing. 											
CE MoRB	<p>The roles and number of personnel of each department are as follows.</p> <table border="1"> <thead> <tr> <th>The responsible section within the ministry</th> <th>Role and the number of personnel *The number of personnel is shown in parentheses</th> </tr> </thead> <tbody> <tr> <td>Road and Bridge</td> <td>Inventory (3), axle load survey (9), updating manual (12)</td> </tr> <tr> <td>Road Maintenance</td> <td>Formulating road maintenance and management/ repair plan (3), traffic survey (4), implementation of road maintenance and management/repair (14), monitoring deterioration rank of the maintenance road (4)</td> </tr> <tr> <td>Road Construction</td> <td>Identifying and proposing the ROW problem (3)</td> </tr> <tr> <td>Mechanical Engineering</td> <td>Maintenance of machine and equipment (18), operation of machine (12)</td> </tr> </tbody> </table> <ul style="list-style-type: none"> There is a shortage of engineers in ministries as a whole due to low real salaries. 		The responsible section within the ministry	Role and the number of personnel *The number of personnel is shown in parentheses	Road and Bridge	Inventory (3), axle load survey (9), updating manual (12)	Road Maintenance	Formulating road maintenance and management/ repair plan (3), traffic survey (4), implementation of road maintenance and management/repair (14), monitoring deterioration rank of the maintenance road (4)	Road Construction	Identifying and proposing the ROW problem (3)	Mechanical Engineering	Maintenance of machine and equipment (18), operation of machine (12)
The responsible section within the ministry	Role and the number of personnel *The number of personnel is shown in parentheses											
Road and Bridge	Inventory (3), axle load survey (9), updating manual (12)											
Road Maintenance	Formulating road maintenance and management/ repair plan (3), traffic survey (4), implementation of road maintenance and management/repair (14), monitoring deterioration rank of the maintenance road (4)											
Road Construction	Identifying and proposing the ROW problem (3)											
Mechanical Engineering	Maintenance of machine and equipment (18), operation of machine (12)											
Juba City (reference)	<ul style="list-style-type: none"> At the time of the ex-post evaluation, the road department was being established within the city government. The city has purchased the equipment for leveling and digging and is recruiting engineers. CE MoRB is cooperating with the construction and maintenance of roads in the city. It dispatches engineers and operators of heavy equipment to cooperate in design, road repair, and construction. 											

Source: MoRB and CE MoRB's response to the questionnaire

3.4.3 Technical Aspect

At the time of the ex-post evaluation, the following is the status of MoRB and CE MoRB regarding technology updates related to road maintenance and management, and technology transfer to recruits.

(1) MoRB

Opportunities for road maintenance management were limited owing to security issues such as the danger of attacks and land mines, as well as budget shortages. However, according to MoRB, OJT and internships were used to maintain the technical level and transfer skills. Moreover, MoRB kept the internships introduced in this project, and has been providing opportunities for students. MoRB was affiliated with the University of Juba, which has the Faculty of Engineering, and, at the time of the ex-post evaluation, about 10 students from the university have been accepted. This system created opportunities for recruits to gain practical experience in domestic and donor projects in neighboring countries before joining the ministry.

(2) CE MoRB

According to CE MoRB, about once a month, they hold study sessions using the manuals and other materials created in the project to maintain the level of engineers and transfer technology to successors. In addition, as shown in the impact section, CE MoRB was engaged in road repair design and construction work in Juba City from 2017 to 2021. It can be said that they have been continuing the practice by using the technology strengthened in this project.

As mentioned above, although the practice opportunities are limited, it can be said that technical sustainability is expected to be ensured because of the efforts and creative measures to maintain the technical level and transfer.

3.4.4 Financial Aspect

According to the changes in the annual budget of the Government of South Sudan and the MoRB (Table 16), the budget amount has been fluctuating significantly from year to year. Therefore, it was difficult to proceed with road maintenance and management in a planned manner. As mentioned in the impact section, road maintenance, management, and repairs in and around Juba were promoted when the budget was allocated, but the implementation has been ad hoc. Therefore, there has been a significant challenge in the sustainability of the financial aspect.

Table 16 Changes in the Annual Budget

unit: million U.S. dollars

	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
South Sudan National	1,240	54,000	53,843	526	1,343	N/A
MoRB	N/A	207.9	28.9	3.4	681.0	262.3
of maintenance and management	99.9	7.3	2.1	0.2	83.1	83.1
CE MoRB	N/A	N/A	N/A	N/A	N/A	144.8

Source: Report on the Implementation Review Study on the Project for Construction of the Bridges in Juba (December 2021)

3.4.5 Social and Environmental Aspects

At the time of planning, as points to note in the activities of this project, a rapid increase in vehicle traffic and control of overloaded vehicles were indicated. As there was no continuous

traffic count survey, as the alternative, this evaluation refers to the results of the traffic count survey conducted in the preparatory survey for grant aid cooperation. The comparison of the traffic volume in Juba City during the project implementation (2013) and at the time of the ex-post evaluation (2021) shows that the traffic volume increased for all vehicle types, although it is unclear whether the increase or decrease was as expected. The increase in large-size trucks was particularly significant.

Table 17 Comparison of Traffic Volume

	Pedestrian	Bicycle	Motorcycle	Passenger car	Minibus	Bus	Light/small truck	Medium-sized truck	Large-sized truck
2013	11,794	646	19,428	13,318	1,918	311	3,626	125	42
2021	21,442	295	47,377	24,607	16,665	1,359	4,077	642	379
Increase ratio	182%	46%	244%	185%	869%	437%	112%	514%	902%

Source: Report on the Implementation Review Study on the Project for Construction of the Bridges in Juba (December 2021)

* Comparison of traffic volume at four sites on the south and east sides of Juba City

Overloaded vehicles have been a major cause of road damage, but laws and regulations to control them were not enacted even at the time of the ex-post evaluation. Thus, there were no domestic weight limits or penalties, which was one of the reasons that the problem of overloaded vehicles has not been addressed.¹¹ Crackdowns by the police and others are implemented irregularly, but it is said that their real purpose is to collect fines.

Although it was not anticipated at the time of planning, the culverts constructed in the OJT for this project were clogged with waste from illegal dumping, and the repaired roads were eroded by flooding. Although the implementing agencies have a countermeasure idea, it has not implemented an actual countermeasure.¹²

3.4.6 Preventative Measures to Risk

At the time of planning, it was pointed out that security deterioration due to political rallies and demonstrations might be a risk to the political and security situation.

Conflicts exceeding assumptions occurred, and the road maintenance and management cycle was disrupted. Even after the conflicts calmed down, there were risks of attacks by armed groups

¹¹ Each country in East Africa has a regulation (55.6 metric tons) for the loading capacity, but it is not applied to South Sudan. For example, trucks leaving Mombasa in Kenya operate according to this regulation, but once they enter South Sudan, transshipment is carried out ignoring the loading limit, and the number of trucks is reduced in order to cut the transportation costs. The reason why such overloading occurs is because the weight is not measured or enforced at borders and bridges, and it is possible to pass inspections by paying a bribe.

¹² MoRB and CE MoRB proposed the following countermeasures for illegal dumping problems: (1) Waste collection is the responsibility of the city government, but it should be done in cooperation with road maintenance and management; (2) Establish regulations; (3) Set collection points for waste; (4) Information dissemination to local leaders; and (5) Educational activities on garbage management, because Juba's population increase is caused by the people coming from areas where no garbage collection has been conducted.

and landmines and unexploded ordnance. Thus, road maintenance and management activities by the MoRB were implemented only in safe areas. Risk assessments have been handled by collecting information in cooperation with other departments of the ministry and contractors.

Road maintenance and management work include inspections and surveys, but harassment by the police and others still hinders smooth implementation. Especially, the activities related to Output 3, which are surveys on overloading and traffic volume, became difficult. In the background were the problems that the development of laws and regulations at the national level was not progressing, and that the fines collected by the police and others reportedly became their personal property. As a countermeasure, the implementing agencies prepare identification cards issued by the ministry and an official government document notifying implementation of the survey to demonstrate the legitimacy of the survey when the police stop them.

3.4.7 Current Status of the Operation and Maintenance System

The equipment provided by this project is managed by CE MoRB. Out of the 20 main types of equipment, six were in good condition, and the remaining 14 were left unrepaired and stored in warehouses and parking lots because spare parts were unavailable owing to a lack of budget. According to CE MoRB, the equipment is repaired in order of priority; thus, if the budget becomes available, spare parts can be obtained, and the equipment items are to be repaired. Because cooperation to repair works with the city government budget was increasing at the time of the ex-post evaluation, there are chances that the priority may rise.



Machines and equipment provided by the project that are unrepaired owing to a lack of spare parts



A river filled with waste dumped illegally

As mentioned above, sustainability is expected in policy/systems, technical aspects, and preventive measures to risk, but financial sustainability is a major concern. Some minor issues have been observed regarding the institutional/organizational, environmental, and current status of the operation and maintenance system, and prospects for improvement or solution are poor. Therefore, the sustainability of the project effects is moderately low.

4. Conclusion, Lessons Learned, and Recommendations

4.1 Conclusion

The project aimed to enhance the road maintenance and management capacity of MTRB and MoPI through the establishment of a cycle of road maintenance and management (inspection, plan, and maintenance/repair). In South Sudan's national development policy, from the time of project planning to the completion of the project, improving the quality of road infrastructure was a consistent issue. South Sudan was affected by a long-time conflict, and proper road maintenance and management had not been conducted for many years. Because the population had been concentrating in the capital, and cargo transportation had been increasing, the need for road development and maintenance was expected to increase further. Regarding the project plan and approach, since it was a project in a conflict-affected country, the project plan was adjusted flexibly according to the knowledge level and proficiency of the C/P of MTRB and MoPI and emphasized establishing their ownership of nation-building. The project is coherent with the assistance policy of the Japanese government at the time of planning because basic livelihood assistance including the transportation section was one of the policy's priority areas for establishing peace. Moreover, the project was expected to yield benefits to neighboring countries and contribute to peacebuilding. In the projects by JICA and the Japan Self-Defense Forces dispatched to UNMISS, C/Ps participated in inventory and road repairs, which could increase opportunities for practical OJT, which was limited owing to a lack of budget. With other donors, information was exchanged and harmonized with similar projects. Therefore, the project's relevance and coherence are high.

As for effectiveness, the environment for establishing a road maintenance and management cycle within MTRB/MoPI was established, and a series of outputs was put into practice. Thus, the road maintenance and management capacity was strengthened, and it can be said that the Project Purpose was largely achieved. Owing to the major conflicts in December 2013, just before the project completion and July 2016, and the lockdown due to COVID-19 from the beginning of 2020, the activities of the implementing agencies related to road maintenance and management were suspended each time. From the time of the project completion to the ex-post evaluation, the road maintenance and management cycle have been fragmented. Thus, the continuity of the Project Purpose was at a limited level. After the two conflicts, the restoration of stability was delayed. There was a danger of attacks, unexploded ordnance, and landmines on the roads. In addition, the government's financial situation did not improve. Up to the time of the ex-post evaluation, the state of road development in South Sudan had not progressed, making it difficult to achieve the Overall Goal of appropriate and sustainable road maintenance and management. The roads and culverts constructed and repaired in the OJT of the project benefitted people's lives. However, maintenance and management had not been implemented appropriately, which worsened the state of the roads and culverts, and the benefit became limited. Some measures in

preventing deterioration of the roads and culverts and cleaning them were necessary with the cooperation of the city government and communities. As mentioned above, the impact of this project is limited. Therefore, effectiveness and impact are moderately low.

Although the project cost significantly exceeded the plan, the additional cost was commensurate with the increase in output, and the project period was within the plan. Thus, the project's efficiency is high.

Sustainability is expected in policy/systems, technical aspects, and preventive measures to risk, but financial sustainability is a significant concern. Some issues have been observed regarding the institutional/organizational, environmental, and the current status of the operation and maintenance system. Prospects for improvement or solution in such aspects are poor.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

(1) The maintenance and management of roads in Juba City is centrally the responsibility of CE MoRB. However, the cooperation of Juba City and its residents is essential for routine maintenance and management. CE MoRB, in cooperation with Juba City and involving residents, should formulate strategies for road maintenance such as cleaning campaigns, reduction of illegal dumping, and consideration of strengthening waste collection. Such strategies should be incorporated in an annual plan and should promote cooperation from relevant stakeholders.

(2) A mechanism to secure stable funds for road maintenance and management should be considered. An option is to introduce overload vehicle control and use fines from violators as the funding source. As the project provided equipment and skills to make concrete blocks and culverts for CE MoRB, and there is a high demand for such products, obtaining funds through sales of such products is another option. At the time of the ex-post evaluation, parliamentary deliberations resumed; thus, it would be desirable to formulate a concrete proposal on such mechanism in time for deliberation of road-related laws.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

(1) For sustainable road maintenance and management, it is necessary to gain cooperation from local governments and communities.

The roads and culverts constructed and repaired by the project's OJT were not necessarily adequately maintained and managed. The leading cause was that the culverts were clogged with

waste dumped illegally, and the repaired dirt roads were scraped away by flooding during the rainy season. According to interviews with the city government and CE MoRB, they were aware that daily cleaning of the culverts was residents' responsibility, and dumping of waste was prohibited. However, information dissemination to the residents was not sufficient. In formulating the project plan, cooperation and partnership with the city government on information dissemination and promotion to encourage residents to clean the culverts should have been incorporated.

Concrete countermeasures proposed in the interviews with implementing agencies, city government, and the leaders of the communities included formulation of regulations for waste management and information dissemination to residents, awareness-raising activities on illegal dumping, strengthening of waste collection and setting waste collection points, and cleaning culverts and roads by the community.

There are six counties in Central Equatoria state, and each has unique features in geography and rainfall.¹³ MoPI's engineers suggested involving county road administrators in the project's OJT. Although it is difficult for MoPI to repair all the roads in counties, if engineers at the county level learn the sandbag method introduced in the project, they can use the local soil and organize local labor for minor road repairs by themselves.

(2) Collaboration may not be possible owing to restrictions in each organization. It is desirable to consider flexible responses according to local customs as much as possible.

Coordination was made between the project and the Japan Self-Defense Forces that were dispatched to UNMISS. Moreover, MoPI participated in the Self-Defense Forces' road construction. It can be said that efforts were made to yield effects within a limited budget by using all-Japan collaboration. Since the activities of the Self-Defense Forces were non-permanent, there were institutional restrictions such as preclusion of asphalt pavement. While roads were paved one after another in Juba, it was desirable to pave the roads. In the end, a compromise measure was done with alternative soil mixed with crushed bricks and marram, which was then pressed to serve as a substitute for asphalt pavement. MoPI staff and local people also provided labor for the construction. According to local customs, water and lunch are supposed to be provided. However, as the Self-Defense Forces regulations do not allow it, the project side had covered the cost (outside the budget and paid for by the company that the experts belong to). It is customary for the organizers of the construction to provide water and lunch, which is a way of showing gratitude to the workers. It is also conceivable that such custom is related to trust in the organizers.

¹³ For example, Kajo Keji county is a lowland area that requires culverts, and Yei and Lanya counties are areas where road wear is severe owing to heavy rainfall.

5. Non-Score Criteria

5.1. Performance

5.1.1 Objective Perspective

Efforts to develop human resources from almost scratch in conflict-affected countries

In South Sudan, where conflict has continued for many years, it became clear after the project started that some C/Ps did not have sufficient educational opportunities and that some lacked basic knowledge of roads. Since it would be challenging to have C/Ps accumulate knowledge under such circumstances, the project team volunteered to provide lessons outside project hours to supplement basic knowledge on such matters as road design, surveying, and others. At the beginning of the supplementary lessons, participants had difficulties in classroom study or were not punctual. The experts tried to encourage CP participation by providing tea and sweets. The lessons were provided on an ad-hoc basis when an expert in a given field was in South Sudan. Gradually, about ten motivated C/Ps began to participate in the lessons continuously. Among such C/Ps, the project, by using training sessions in Japan and an emerging country (Kenya), managed to develop core human resources for road maintenance and management.

End