Republic of Namibia

FY2015 Ex-Post Evaluation of Japanese ODA Loan

"Rundu-Elundu Road Upgrading Project"

External Evaluator: Nobuyuki Kobayashi, OPMAC Corporation

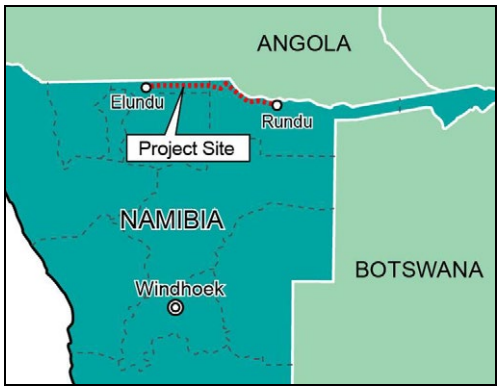
0. Summary

This project carried out asphalt pavement[1] in northern Namibia between Rundu (Kavango Region) and Elundu (Ohangwena Region). By facilitating smooth road traffic in the north part of Namibia, it aimed at improving the livelihood and living conditions of residents as well as Namibia's transportation logistics with its neighboring countries. The objectives of Namibia's development policy at the time of appraisal and ex-post evaluation included the economic growth and reduction of income gaps by infrastructure development which was consistent with the fact that many poor households resided in the project area. Since the scope of this project was consistent with the development policy and development needs, its relevance is high. The project cost was higher than planned. The project period was also longer than planned due to a delay in the loan agreement effectuation and procurement, and a raw material supply shortage. Thus, efficiency is fair. While the asphalt pavement shortened the travel time as planned, traffic volume for the first year after the project completion had reached just about 70% of the target. Promotion of trade with the neighboring countries was a condition for anticipated project impacts, but increased trade with neighboring countries was not evident. Nevertheless, as a result of shorter travel time, residents visited markets and hospitals more frequently and the recruitment of staff in hospitals and schools became easier. The overall evidence showed that this project significantly contributed to the improvement of the livelihood and living standards of the residents. Effectiveness and impact of the project are therefore considered high. For the long term, an insufficient capacity of private sector road maintenance contractors will be an issue. Although the maintenance budget is increasing, the amount has not reached the appropriate level. In terms of the project operation and maintenance, some minor problems were found in the institutional and financial aspects of this project. Sustainability of the project's effects, therefore, is fair.

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

[1] The pavement type of the improved road is Cape Seal. For the readability of the ex-evaluation report, a general term "asphalt pavement" is used.

1. Project Description



Project Location

The road improved by this project

1.1 Background

Due to Namibia's vast domain[2], the road sector is the most important means of transport and essential to logistics and access to public services. In the early-2000s, Main Road 110 and District Roads 3405 and 3407, which went across the northern part of Namibia, were essential community roads for residents. The section between Rundu and Elundu, however, was unpaved and restricted residents' economic activities and access to public services. In terms of income, health, and education, northern Namibia's development lagged behind the other parts of the country. Development of the road network in the north became a pressing task for reducing regional disparities.

In addition, the section from Rundu to the Angolan border was regarded as an extension road of the Trans-Caprivi Highway (an international corridor that connects neighboring landlocked countries with Namibia). The unpaved section between Rundu and the Angolan border, however, had not only prevented smooth logistics within Namibia but had also prevented trade promotion among neighboring countries. The road transport of northern Namibia, for example, has played a vital role in the reconstruction of Angola since the civil war in Angola ended in 2002. Due to Angola's insufficient port capacity the country needed to import capital goods and materials by land.

Since the 1990s, the Namibia government had prepared a project to improve the section between Rundu and Elundu. Due to the lack of funds, however, progress had not been smooth. Upon a request from the Namibian government, the Japan International Cooperation Agency (JICA) started a feasibility study in 2005. Based on the feasibility study, this project conducted asphalt pavement on the section between Rundu and Elundu.

[2] The territory of Namibia is approximately 824,000 m^2, 2.2 times that of Japan.

1.2 Project Outline

The objective of this project is to facilitate efficient road transport in the northern part of Namibia by asphalt pavement of the unpaved section between Rundu in the Kavango Region[3] and Elundu in the Ohangwena Region, thereby contributing to the improvement of the livelihood and living standards of residents and to more efficient logistics with neighbouring countries.

Loan Approved Amount/ Disbursed Amount	10,091 million yen / 9,912 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	August 2006 / August 2006	
Terms and Conditions	Interest Rate	0.9%
	Repayment Period (Grace Period)	15 years (5 years)
	Conditions for Procurement:	General untied (General untied for consulting services)
Borrower / Executing Agency(ies)	The Government of the Republic of Namibia / Roads Authority	
Final Disbursement Date	December 2013	
Main Contractor (Over 1 billion yen)	China Henan International Cooperation Group Co. Ltd. (People's Republic of China), Raubex (Pty) Ltd. (South Africa)	
Main Consultant (Over 100 million yen)	VKE Namibia Consulting Engineers (Pty) Ltd. (Namibia)	
Feasibility Studies, etc.	JICA (2006) "Special Assistance for Project Formation (SAPROF) for Rundu-Elundu Road Upgrading Project"	
Related Projects	None	

2. Outline of the Evaluation Study

2.1 External Evaluator

Nobuyuki Kobayashi, OPMAC Corporation

[3] The project outline quotes Kavango Region from JICA's documents for appraisal. The former Kavango Region was split into the Kavango East Region and the Kavango West Region in 2013.

2.2 Duration of Evaluation Study

Duration of the Study: August 2015 – August 2016

Duration of the Field Study: November 15, 2015 – November 28, 2015, and March 7, 2016 – March 12, 2016

2.3 Constraints during the Evaluation Study

There are a limited number of traffic count stations in the section upgraded by this project, and therefore year-around traffic data are limited. For this reason, Annual Average Daily Traffic (AADT) both in the baseline data for 2005 and the actual data for 2014 uses data estimated by the executing agency. The data for traffic volume is estimated, based on a data which is not annually recorded, and is from the past: and is taken from the adjacent sections. The analysis of traffic volumes faced constraints due to the lack of evaluation information.

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance to the Development Plan of Namibia

At the time of appraisal, the long-term national development strategy was *Namibia Vision 2030* which aimed at both economic growth and correction of income inequality. The medium-term national development plan, *the Second National Development Plan (2001/02 - 2005/06)*, is based on "sustainable and equitable improvement of living standards among the entire Namibia national." The main objective of the plan was economic growth and poverty reduction by development of economic and social infrastructure and the development of roads was regarded as a pillar of economic and social development in Namibia and economic integration among the member countries of the Southern African Development Community (SADC). The objective of the transportation sector was the development of infrastructure to satisfy traffic demand and to accelerate regional development, and the plan mentioned the development of new corridors for the revitalization of existing corridors. In 2000, the Namibian government prepared a sector plan (*National Transport Development Plan)* that mentioned developing international corridors in the future. The Trans-Caprivi Angola Link was one of the plans mentioned and included a part of the road section upgraded by this project (the Rundu - Nkurenkuru section). *The Namibia Medium to Long Term Roads Master Plan* regarded the establishment of an inter-regional road network for the reduction of regional disparity as a policy direction of the road sector development over a 10 to 15 year period.

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[5] ③: High, ② Fair, ① Low

At the time of ex-post evaluation, the *Namibia Vision 2030* still remained a long-term national development strategy. The medium-term development plan *the Fourth National Development Plan (2012/13 - 2016/17)* intended to achieve the goals of the long-term development strategy. Economic growth and reduction of income disparity continued to be the principles of the medium-term development plans. The plan set three priorities, one of which was to enable an environment for economic growth including the improvement of civil infrastructure. On road infrastructure, the plan raised concerns that an increase of traffic in the corridors might shorten the life of the existing road network and negatively affect maintenance costs. The plan also mentioned an appropriate balance of investment and maintenance costs. The Ministry of Works and Transport in Namibia established the sector plan *Namibia Transport Sector Plan 2013-17* which did not specify the corridors to be developed. Since new corridors were not specified, the importance of international corridors for road development selected in the *National Transport Development Plan* (a sector plan at the time of appraisal) was presumably maintained at the time of ex-post evaluation. The *Medium to Long Term Roads Master Plan Revision (2012)* set a priority on the development of rural roads. The master plan pointed out that delays in rural road development were causes of health risk in rural areas, low level of primary education, and fewer employment opportunities.

The Namibian government development policy continued to aim at economic growth and a reduction of income gaps and developing road infrastructure in the northern region where many poor people resided was considered consistent with the development policy. Regarding Namibian road sector policy, corridor development had been a priority at the time of appraisal. On the other hand, at the time of ex-post evaluation, the increased traffic in the corridors shifted concern to the balance between road construction and road maintenance. This policy change did not mean that new investment in the road sector was no longer important. The sector plan had been aiming at improving access in rural areas such as the section upgraded by this project which was located in a rural area in the northernmost part of Namibia. Given that the target section played an essential role making connecting feeder roads functional, the upgraded section is consistent with the priorities set in the sector plan. It was concluded that the implementation of this project was considered to be consistent with the development policies of Namibia.

3.1.2 Relevance to the Development Needs of Namibia

At the time of appraisal, many poor people resided in the former Kavango Region and the Ohangwena Region, an area along the section upgraded by this project. The household survey in FY 1993/94 (Central Statistics Office (1996), *Living Condition in Namibia*)

showed that the population below the relative poverty line (food expense accounted for more than 60% of household spending) accounted for 70.6% in the former Kavango Region and 42.3% in the Ohangwena Region, both of which were higher than the national average (37.8%) in Namibia. Among the seven regions in the northern area, the poverty rate in all regions except the Oshana Region was higher than the national average. In particular, that of the former Kavango Region was the highest in the country. In addition, the road had not been paved in the area and this hindered improvement of public transportation. It was pointed out that schools and hospitals faced difficulties recruiting teachers and health workers due to poor road conditions. In terms of economic aspect, road construction was expected to promote trade with Angola. The upgraded section connected Angola with the northeastern part of Namibia, furthermore, with Zambia, Botswana, and Zimbabwe through the Trans-Caprivi Corridor. Since the road section was unpaved at the time of appraisal, a trip between Rundu and Oshakati (capital of the Oshana Region) took a southern bypass route through Grootfontein. The route had room for improvement in terms of travel time and costs (see Figure 1).

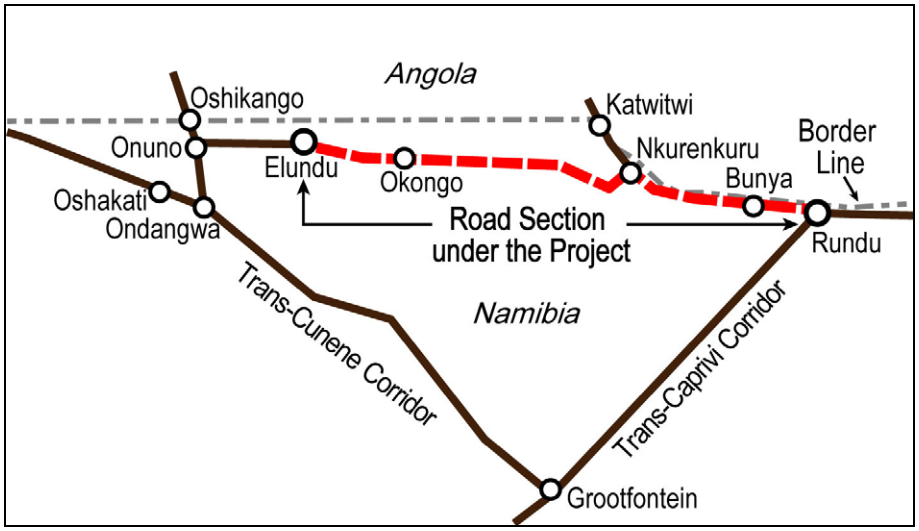


Figure 1: Road Section under this Project

At the time of ex-post evaluation, the former Kavango Region and Ohangwena Region had a higher poverty rate according to the FY2009/10 household survey (Namibia Statistics Agency (2012), *National Household Income and Expenditure Survey 2009/10*). Households below the upper poverty line (monthly consumption is below 377.96 Namibian dollars/person, which is considered a level necessary to satisfy basic needs) accounted for 43.4% in the former Kavango Region and 23.7% in the Ohangwena Region. Both regions were higher than the national average of 19.5% in Namibia. The former Kavango Region had the highest poverty rate in the country. The regions where the poverty rate remains greater

than 30 percent are mostly in the northern area. Regarding trade with Angola, exports from Namibia to Angola increased by more than triple from 2005 to 2014 (2005: 1,372.9 million Namibian dollars, 2014: 4,723.2 million Namibian dollars), and exports from Angola to Namibia increased from 25.1 million Namibian dollars in 2005 to 137.8 million Namibian dollars in 2014. In terms of trade amount by country, exports to Angola represent the fifth largest trading partner for Namibia. As ports in Angola did not have enough capacity, goods were re-exported to Angola after custom clearance via the Walvis Bay port in Namibia.

At the time of both appraisal and ex-post evaluation, the project area was one of the poorest areas in the country. Monthly expenditure does not reach USD 30 in poor households. At the time of appraisal, underdeveloped roads prevented the improvement of resident's livelihood as well as better living conditions in education and health care. Angola was a major trading partner for Namibia and trade with Angola showed significant growth in the past ten years. The upgraded section was an international route to connect Angola with the northeast of Namibia, Zambia, Botswana, and Zimbabwe. Development needs existed at the time of ex-post evaluation from the viewpoint of regional logistics.

3.1.3 Relevance to Japan's ODA Policy

In Namibia, wealth inequality was considered a major development issue. Thus, the Japan's ODA policy for Namibia emphasized assistance for poverty reduction (Ministry of Foreign Affairs in Japan, ODA Data Book 2005). In addition, the priority of assistance included infrastructure development in the northern area where poor people resided. JICA's policy for overseas economic cooperation emphasized the importance of its assistance for the southern part of Africa which played a vital role in the economy of Sub-Saharan Africa. Development of economic and social infrastructure to benefit a wider area beyond national borders was one of the prioritized areas in ODA.

This project was an infrastructure development project in the northern area where many poor people resided and was expected to contribute to the improvement of public service through smooth transport and eventually to the reduction of regional disparity. As aforementioned, the upgraded section connected two corridors and the improved regional logistics (an expected effect of this project) will benefit a wide area. In consideration of the above argument, expected project effects were consistent with the direction of Japan's aid policy.

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

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The scope of this project was completed almost as planned (see Table 1). Although minor road alignment changes were made at the design phase, the route was constructed as planned. Auxiliary works for traffic safety (such as road markings, crash barriers, and reflectors) were carried out on the upgraded section. On civil works, procurement has been carried out in two packages, one for the first section and another for the second section. The TORs of the consulting service were also carried out as planned. Contrary to the original plan, however, the consulting services were provided solely by Namibian national consultants. Work volume increased significantly due to the extension of the construction period, which was affected by the insufficient supply capacity of raw materials in Namibia.

Table 1: The Project Outputs (Plan and Actual)

Plan	Actual
(1) Civil Works Type: Asphalt pavement Length: 370km (First phase 132 km and second phase 238 km) Width: 11.4m (one lane on each side, roadway 3.7m x 2 lanes + shoulder 2m x both sides) Design Speed: 120km/h	(1) Civil Works Type: Asphalt pavement Length: 370km (First phase 134 km and second phase 236 km) Width: 10.8m (one lane on each side, roadway 3.4m x 2 lanes + shoulder 2m x both sides) Design Speed: 120km/h Others: approach roads to public facilities (gravel roads 10.3km)
(2) Consulting Services[6] TORs: detail design, assistance for tendering, construction supervision, preparation of environmental management plan, assistance for environmental monitoring, and preparation and implementation of HIV/AIDS prevention program Work Volume: International 69 M/M and National 122 M/M	(2) Consulting Services TORs: detail design, assistance for tendering, construction supervision, preparation of environmental management plan, assistance for environmental monitoring, and preparation and implementation of HIV/AIDS prevention program Work Volume : National 500 M/M

Note: The documentations during the project implementation did not include any details for the change in the road width and, therefore, the reason for the change could not be identified. The actual width was based on technical standards of highways in Namibia and both design speed and speed limit remained intact.
Source: documents provided by JICA and the executing agency

[6] Consulting service covered the second section only. For the first section, a construction supervision consultant had been employed and the detailed design had been completed by the time of appraisal. For this reason, the consulting service for the first section was not included in the scope of this project.

Upgraded Section near Rundu

Upgraded Section near Elundu

3.2.2 Project Inputs

3.2.2.1 Project Cost

While the project cost was planned to be 13,455 million Japanese yen, the actual project cost was 18,243 million Japanese yen. However, the actual project cost did not include some of the cost items (clearance of land mines and unexploded bombs and administrative expenses). For a precise comparison, after excluding the aforementioned costs from the planned project cost, the cost was 12,846 million Japanese yen which calculates to 142% for the actual cost against the originally planned costs. The actual project cost was higher than planned.

There were two reasons for the cost overrun: 1. The planned project cost was based on an estimation in 2004 and did not reflect price increases of raw material during the 2004-2006 period and 2. As the commencement of construction was delayed and the construction phase was prolonged, price increases of raw materials accelerated during the period.

3.2.2.2 Project Period

While the planned project period was 53 months (August 2006 - December 2010), the actual project period was 80 months (August 2006 - March 2013). The above-mentioned period was based on the definition of project completion at appraisal time, which regarded the end of the warranty period as project completion. However, two factors should be noted: 1. The warranty period was extended from six months in the appraisal to one year in the actual project implementation and 2. After the completion of construction, only routine maintenance was carried out and no civil work was implemented. Given the above factors, a judgement based on construction completion is appropriate for a fair comparison. By using construction completion as project completion, the planned project period would be 46 months (August 2006 - May 2010) and the actual project period

would be 68 months (August 2006 - March 2012), equivalent to 148 percent of the planned project period. The actual project period was longer than planned.

As this project was the first ODA-loan project in Namibia, the Ministry of Justice in Namibia required a longer period for the approval of the loan agreement. Due to the approval process, effectuation of the loan agreement was delayed from December 2006 (original schedule at the time of appraisal) to March 2007. In addition, procurement procedures also required more time than expected. Furthermore, the insufficient supply capacity of raw materials in the project area did not allow construction work to be completed within the original schedule. Both the first and the second sections required a construction period that was almost twice as much as assumed at the appraisal.

3.2.3 Results of Calculations of Internal Rates of Return (Reference only)

While the Economic Internal Rate of Return (EIRR) was planned to be 15.37%, the actual rate was calculated at 12.69% (see Table 2 for the calculation's conditions). EIRR was lower than originally estimated at the time of appraisal for two reasons: 1. project cost increased in real terms based on local currency and 2. a decrease in the traffic volume partially offset higher unit values of the benefits. The Financial Internal Rate of Return (FIRR) could not be calculated because the section upgraded by this project was an open road.

Table 2: Conditions for EIRR Calculation at the Ex-post Evaluation

	Conditions
Cost	project cost (excluding tax) and maintenance cost (difference between maintenance cost of paved road and that of gravel road)
Benefits	reduction of vehicle operating cost (VOC), reduction of travel time, and reduction of traffic accident
Project Life	20 years after the completion of construction
Assumptions	● EIRR was based on the real price (2005 price) at the time of appraisal. For an appropriate comparison, the recalculation is based on the real price obtained by adjustment of the nominal price by the inflation rate (Consumer Price Index). ● Conversion factor from the financial price to the economic price is 0.73 (the same conversion factor at the time of appraisal). ● Traffic volume data from 2012 to 2014 was obtained from the executing agency. Volumes for the periods of 2010-2011 and 2015-2031 are estimated by using the traffic growth rate defined in the appraisal document (5 % per annum). ● Unit values for travel time and VOC saving are different in the planned target and the actual rate. The unit values were calculated in 1998 and adjusted to 2005 prices at the time of appraisal. Since unit labor cost, vehicle occupancy, fuel efficiency, unit fuel price changed after the time of appraisal, the unit values which the executing agency are currently using were employed and adjusted to 2005 prices at the time of ex-post evaluation. ● Incident rate of traffic accidents is the one used at the appraisal. The unit values are based on those the executing agency used at the time of ex-post evaluation. The unit values are adjusted to 2005 prices. ● Project cost increased by 56% in local currency and real terms (2005 price). Maintenance cost is also increased accordingly.

Both the project period and the project cost exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness[7] (Rating: ③)

3.3.1 Quantitative Effects (Operation and Effect Indicators)

Traffic volume is of primary importance for judging the effectiveness of road improvement projects in general. Given that this project intended to improve access in the northern part of Namibia by the construction of asphalt pavement, reduction of travel time was taken into consideration in the judgement of effectiveness on this project.

For traffic volume, AADT reached approximately 70% of the target for the year following the project completion set[8] during appraisal(see Table 3). Traffic volume falls below the target for three reasons: 1. The section closer to Rundu had recorded higher traffic growth before the commencement of this project and might have had a smaller room for traffic growth after the project completion, 2. An increase of cargo volume was expected during appraisal but it did not realize and trade via Katwitwi actually decreased, and 3. Baseline data for 2005 used some estimation and these data were presumably overestimated.

For reduction of travel time, the target set during appraisal was achieved (see Table 3). After this project upgraded a gravel road to an asphalt-paved road, the average speed of light vehicles (passenger cars, minibuses, and light trucks) increased from 70km/h in 2005 to 109km/h in 2014 and that of heavy vehicles (buses, medium and heavy trucks) increased from 55km/h in 2005 to 93km/h in 2014.

Reduction of VOC is considered to be another effect of this project, as a result of shorter travel distance and smoother road surface. As reduction of fuel cost was larger than expected at the time of appraisal, the reduction of VOC also exceeded the target set at that time (see Table 3).

[7] Sub-rating for Effectiveness is to be put with consideration of Impact. In line with the Project Outline, immediate effects on transport in the project area were evaluated in *Effectiveness* and the long-term effects on the local economy and the living conditions and livelihood of residents were evaluated in *Impact*.

[8] The targets of the indicators were set for two years after the project completion at the time of appraisal but the available data for the ex-post evaluation included only one year after the project completion (2014). For a precise comparison, the targets set at the appraisal are adjusted to those for the corresponding year (the next year of the project completion).

Table 3: Operation and Effect Indicators of this Project

	Baseline	Target	Actual	
	2005	2011	2013	2014
	Baseline Year	1 Year After Completion	Completion Year	1 Year After Completion
AADT (vehicle/day)	222	683	447	454
Travel Time (hours)	5.4	3.8	3.6	3.5
VOC Saving(thousand Namibian Dollars)	0	48,169	77,042	78,249

Source: documents provided by JICA and the executing agency, calculation by the external evaluator
Note: The targets of the indicators were set for two years after the project completion at the time of appraisal but the available data for the ex-post evaluation included only one year after the project completion (2014). For a precise comparison, the targets set at appraisal are adjusted to those for the corresponding year (the next year of the project completion). Estimated data by the executing agency were used for AADT for 2005, 2013, and 2014 because year-round data are limited. The estimated data are based on non-year-round data, traffic volume in the past, and that of the adjacent sections. Unit values for VOC saving are different in the planned target and the actual amount. VOC saving for 2013 and 2014 are based on 2005 prices and calculated by the external evaluator for a precise comparison with the 2005 baseline and target for 2011.

3.3.2 Qualitative Effects

(1) Positive Effects on Transportation for Drivers

Interviews with combi bus drivers[9] showed that a bus route had been changed. Prior to the project implementation, it was difficult for vehicles other than pick-up trucks and four-wheel drive cars to use the section upgraded by this project. Before the project, the bus service between Rundu and Oshakati was operated via Grootfontein and it took approximately seven hours including getting on/off time of passengers. At the time of ex-post evaluation, the bus service was directly operated from Rundu to Oshakati. The travel distance was shortened by approximately 120km and travel time was reduced by about 2 hours. The drivers had the opinion that vibration was small and acceptable during the travel and their opinion was consistent with the data for road surface conditions (see "3.5.4 Current Status of Operation and Maintenance").

(2) Positive Effects on Transportation for Residents

A questionnaire survey on residents living along the upgraded section was carried out during the ex-post evaluation[10]. The survey results show improvements in qualitative aspects of transportation and also revealed that the residents felt unsafe in some areas when they used the road.

On the number of road closure days due to heavy rain, 94% of respondents had the opinion, “Decreased” (see Table 4). Similarly, 94% of the respondents replied that road dust caused by vehicle traffic was “Decreased”. For the entire respondents, more than 60% of the respondents replied that they “Rarely” or “Never” felt unsafe when they used the upgraded

[9] The external evaluators interviewed five combi bus drivers in Rundu during the site visit.
[10] Samples were 50 people in three locations of the Kavango West Region (17 people or so in 3 places) and 50 people in three locations of the Ohangwena Region (17 people or so in 3 places) . In total, 100 people were selected by nonrandom selection. Respondents consisted of 55 male and 45 female.

road. In the Kavango West Region where the upgraded section was adjacent to local communities, more than a half of the respondents felt unsafe “Often” or “Sometimes” (see Table 5). Interviews with staff of the executing agency and residents found several problems including; drivers violating speed limits, children playing on the road, and people falling asleep on the road at night. While the road pavement changed the traffic environment (such as an increase in traffic volume and higher vehicle speed), behavior of the drivers and residents remained unchanged and still used the road inappropriately.

Table 4: Road Closure Days and Road Dust

		Increased	Somewhat Increased	No Change	Somewhat Decreased	Decreased	Total
Road Closure Days	# of respondents	0	0	2	4	94	100
	%	0.0	0.0	2.0	4.0	94.0	100.0
Road dust	# of respondents	1	0	0	5	94	100
	%	1.0	0.0	0.0	5.0	94.0	100.0

Source: Questionnaire survey

Table 5: Feeling Unsafe for the Road Usage

		Often	Sometimes	Rarely	Never	N/A	Total
Ohangwena Region	# of respondents	2	6	12	30	0	50
	%	4.0	12.0	24.0	60.0	0.0	100.0
Kavango West Region	# of respondents	9	18	15	7	1	50
	%	18.0	36.0	30.0	14.0	2.0	100.0
Total	# of respondents	11	24	27	37	1	100
	%	11.0	24.0	27.0	37.0	1.0	100.0

Source: Questionnaire survey

3.4 Impacts

3.4.1 Intended Impacts

(1) Contribution to Trade between Namibia and Angola

For promotion of trade with the neighboring country, project effects were not clear. As mentioned above ("3.1.2 Relevance to the Development Needs of Namibia"), exports from Namibia to Angola increased significantly from 2005 to 2014 and exports were mostly via Oshikango. The trade value via Katwitwi was much smaller than via Oshikango and decreased (see Table 6). At the time of appraisal, exports via Katwitwi were expected to be doubled on a tonnage basis “before” and “after” the project implementation. Since the change in trade value and that of volume were not the same, an exact comparison was not possible . Nevertheless, an increase in the trade volume, which was expected at the time of appraisal, did not presumably occur. According to the executing agency, the main reason for the sluggish growth of trade via Katwitwi were the unpaved and deteriorating roads in the Angola side.

Table 6: Export and Import via Oshikango and Katwitwi

Unit: million Namibian dollars

	Oshikango			Katwitwi		
	Export	**Import**	**Total**	**Export**	**Import**	**Total**
(A) 2005	709.2	165.3	874.5	470.3	0.1	470.4
(B) 2014	4,110.8	150.9	4,261.7	261.2	3.5	264.7
((B)-(A))/(A) % Change	480%	-9%	387%	-44%	3,400%	-44%

Source: Namibia Statistics Agency

(2) Contribution to Living Conditions and Livelihood

As a result of shorter travel time after the road opening, residents went out more frequently and the frequency of visiting markets and hospitals also increased. In the questionnaire survey of the residents, more than 90% of the respondents answered "Increased" or "Somewhat Increased" for the frequency of out-of-town trips after the road opening. Similarly, more than 80% of the respondents answered "Increased" or "Somewhat Increased" for visits to both markets and hospitals (see Table 7). Similar results were extracted from the survey data classified by gender. In both men and women, 80 to 90% of the respondents chose "Increased" or "Somewhat Increased" for the frequency of out-of-town trips and visits to markets and hospitals. Both men and women recognized that the improvement of the road resulted in a more convenient daily life.

Table 7: Frequency of Out-of-Town Trip

		Increased	**Somewhat Increased**	**No Change**	**Somewhat Decreased**	**Decreased**	**Total**
Out of Town	Male (# of respondents)	36	16	3	0	0	55
	%	65.5	29.1	5.5	0.0	0.0	100.0
	Female (# of respondents)	21	18	6	0	0	45
	%	46.7	40.0	13.3	0.0	0.0	100.0
	Total (# of respondents)	57	34	9	0	0	100
	%	57.0	34.0	9.0	0.0	0.0	100.0
Visit to Market	Male (# of respondents)	20	29	5	0	1	55
	%	36.4	52.7	9.1	0.0	1.8	100.0
	Female (# of respondents)	14	23	7	0	1	45
	%	31.1	51.1	15.6	0.0	2.2	100.0
	Total (# of respondents)	34	52	12	0	2	100
	%	34.0	52.0	12.0	0.0	2.0	100.0
Visit to Hospital/ Clinic	Male (# of respondents)	21	26	7	0	1	55
	%	38.2	47.3	12.7	0.0	1.8	100.0
	Female (# of respondents)	15	22	8	0	0	45
	%	33.3	48.9	17.8	0.0	0.0	100.0
	Total (# of respondents)	36	48	15	0	1	100
	%	36.0	48.0	15.0	0.0	1.0	100.0

Source: Questionnaire survey

Both employment opportunities and business opportunities showed some improvements after the road opening. It should be noted this result was not brought about solely by this project since employment opportunities and business opportunities were influenced by the economy. In the questionnaire survey of the residents, approximately 60% of the respondents said "Improved" or "Somewhat Improved" for employment opportunities and more than 80% replied "Improved" or "Somewhat Improved" for business opportunities (see Table 8). The survey data classified by gender showed similar results. For both men and women, approximately 60% of the respondents chose "Improved" or "Somewhat Improved" for employment opportunity. Similarly, the total of " Improved" and " Somewhat Improved" reached 80% among both males and females. Both men and women had the opinion that the improvement of the road brought a better means of livelihood.

Table 8: Improvement of Livelihood after Opening of the Road

		Improved	Somewhat Improved	No Change	Somewhat Worsened	Worsened	Total
Employment Opportunity	Male (# of respondents)	8	26	18	0	3	55
	%	14.5	47.3	32.7	0.0	5.5	100.0
	Female (# of respondents)	7	18	20	0	0	45
	%	15.6	40.0	44.4	0.0	0.0	100.0
	Total (# of respondents)	15	44	38	0	3	100
	%	15.0	44.0	38.0	0.0	3.0	100.0
Business Opportunity	Male (# of respondents)	24	22	8	0	1	55
	%	43.6	40.0	14.5	0.0	1.8	100.0
	Female (# of respondents)	16	21	8	0	0	45
	%	35.6	46.7	17.8	0.0	0.0	100.0
	Total (# of respondents)	40	43	16	0	1	100
	%	40.0	43.0	16.0	0.0	1.0	100.0

Source: Questionnaire survey

(3) Contribution to Improvement of Public Service

Prior to the project implementation, hospitals and schools faced difficulties to ensure a sufficient number of staff because of the remoteness of the area and difficult access. The questionnaire survey suggested that the number of staff engaged in public service increased after the road opening. Nearly 80% of the respondents replied that the number of doctors and nurses "Increased" or "Somewhat Increased" (see Table 9). Among the survey respondents, those with children attending school in the same household (64 respondents, including one invalid answer) were asked about the number of teachers after the road opening.

Approximately 90% of those with children had the opinion that the number of teachers in a region "Increased" or "Somewhat Increased."

Table 9: Increases of Health Workers and Teachers

		Increased	Somewhat Increased	No Change	Somewhat Decreased	Decreased	N/A	Total
Doctors/Nurses	# of respondents	38	39	22	1	0	0	100
	%	38.0	39.0	22.0	1.0	0.0	0.0	100.0
Teachers	# of respondents	42	14	5	1	0	1	63
	%	66.7	22.2	7.9	1.6	0.0	1.6	100.0

Source: Questionnaire survey

Interviews with health workers and teachers[11] confirmed that the increase in the number of staff resulted in an improvement in public services. For education, all of the interviewed schools hired more certified teachers to replace temporary teachers. Prior to the project implementation, few people wanted to work in the remote area with difficult access. There were some improvement in teaching materials (prior to the project implementation, teachers could not have a lesson when they went to other towns due to difficulties in obtaining and carrying teaching materials) and in school meals (prior to the project implementation, road traffic was often closed and school meals could not be served).

For health care, the increase of outpatients did not allow many hospitals to improve the quality of medical care. Quality improvement was observed in emergency care. The hospitals in Nkurenkuru and Okongo had referral hospitals and emergency patients requiring a higher level of medical care were carried to the referral hospitals. The travel time to the referral hospitals was reduced from 3-4 hours (prior to project implementation) to 1.5 -2 hours (after project implementation). A decrease in vibration also enabled a safer transportation of patients.

(4) Contribution to Agriculture

Interview with local residents revealed that the main crop of the project area was maize. For agriculture, several positive effects were identified after the road opening including; less damage in transported products, an increase in the number of brokers, and an increase of agricultural income. According to data from the survey respondents, 57 people were engaged in agriculture at the time of ex-post evaluation. The questionnaire survey showed that

[11] At the site visit, interviews were conducted at hospitals/clinics (2 locations in the Kavango West Region and 2 locations at the Ohangwena Region) and schools (2 locations in the Kavango West Region and 1 location at the Ohangwena Region).

slightly less than 80% of the farmers considered that the visits of brokers for agricultural products "Increased" or "Somewhat Increased." Improvement of access made sales of agricultural products easier (see Table 10). For damage on crops in transport, more than 80% of the farmers replied "Decreased" or "Somewhat Decreased." The reduction of vibration also contributed to smaller economic loss in transport. After the road was opened, respondent answers that shipment cost "Increased" or "Somewhat Increased" surpassed 50%. However, the increase in shipment cost was presumably due to an increase of the unit cost of fuel in local currency terms. The main cause was considered an irrelevant factor regarding the improvement of the road. Although factors other than this project should be taken into account, agricultural income "Increased" or "Somewhat Increased" for nearly 70% of the farmers. In the interviews with farmers during the site visit, there was an opinion that shipping products to nearby towns by trucks improved demand and supply, and sales price of agricultural products became higher. Smoother road traffic contributed to the improvement in the terms of sales.

Table 10: Effects on the Agricultural Sector

		Increased	Somewhat Increased	No Change	Somewhat Decreased	Decreased	N/A	Total
Brokers	# of respondents	17	27	9	4	0	0	57
	%	29.8	47.4	15.8	7.0	0.0	0.0	100.0
Damage in Transport	# of respondents	0	0	3	13	36	5	57
	%	0.0	0.0	5.3	22.8	63.2	8.8	100.0
Shipment Cost	# of respondents	8	21	10	10	4	4	57
	%	14.0	36.8	17.5	17.5	7.0	7.0	100.0
Agricultural Income	# of respondents	9	30	14	3	0	1	57
	%	15.8	52.6	24.6	5.3	0.0	1.8	100.0

Source: Questionnaire survey

3.4.2 Other Impacts

(1) Impacts on the Natural Environment

For the project implementation, an Independent Environmental Control Officer (IECO) who was responsible for environmental management was required. The construction supervision consultant hired an environmental consultant for IECO. IECO monitored the implementation of countermeasures in accordance with the environmental management plan and proposed recommendations. Countermeasures such as the management of borrow pits and disposal of waste oil and materials were implemented. Based on the environmental monitoring report and the information from IECO, the countermeasures were in line with with the environmental management plan and negative impact on the natural environment

was considered minor. Moreover, it was presumable that additional burden on natural environment was not substantial because the upgraded section had one lane on each side and utilized the alignment of the existing road.

(2) Land Acquisition, Resettlement, and Prevention of HIV/AIDS

Based on the project completion report, the executing agency's answers to a questionnaire, and interviews with the construction supervision consultants, land acquisition was conducted in accordance with Namibian law and resettlement was not required. Compensations were paid for the 326ha of acquired land. There were few residents along the upgraded section since the two-lane road followed the alignment of the existing road. For this reason, resettlement was not required. Negative impact of land acquisition was considered insignificant for residents.

As it was concerned that influx of construction workers might spread HIV/AIDS, the construction management consultant conducted awareness-raising activities for HIV/AIDS[12]. The review of the activities in mid-2011 proposed to step up awareness activities for construction workers. Based on this recommendation, 60 people (construction workers, etc.) participated in a training session in November 2011.

(3) Traffic Accidents

On traffic accidents, a slim margin between the design speed and the actual travel speed created a travel environment prone to traffic accidents. Road markers to show travel distance were not installed at the section upgraded by this project, so locations of accidents were reported only in a wide range. Thus, the available data did not show the exact locations of accidents and it was difficult to count the number of accidents in the upgraded section.

This project has largely achieved its objectives. Therefore effectiveness and impact of the project are high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

Roads Authority (RA) is the executing agency of this project and engaged in maintenance of the road after the project completion. RA is in charge of planning, construction, maintenance of trunk roads, main roads, and district roads and supervised an entire life cycle of roads. The number of employees is 563 staff at the time of ex-post evaluation, of which

[12] It was difficult to carry out a precise analysis on how this project had affected the incidence rate of HIV/AIDS because factors other than the project implementation needed to be taken into account.

approximately 50 employees are technical specialists. The Rundu district office (4 persons) of RA is responsible for the maintenance of the upgraded section in the Kavango West Region and the Kavango East Region. The Oshakati district office (7 persons) is responsible for the maintenance of the upgraded section in the Ohangwena Region.

At the time of ex-post evaluation, maintenance work is outsourced to contractors and district offices conducted road inspection, tendering, contract management, and quality control of construction works. Each district office prepares an annual inspection report for the assigned area and the report is used as a basis for a maintenance plan.

The executing agency formulated *the Medium and Long Term Roads Master Plan Revision* (2012) and the master plan showed the optimum level of maintenance budget in consideration of the cost burden of the whole society. Nevertheless, government officials pointed out that the private sector did not have enough capacity for the appropriate level of maintenance works which the master plan suggested. The organizational structure has been changed to outsourced maintenance works since 1999. While practical training such as these for operating construction machinery and for quality control of construction works for road maintenance is necessary for the private sector, the private sector is reluctant to undertake procurement of construction machinery and personnel training. Thus, this causes a shortage of maintenance capacity.

Regarding institutional aspects, although responsibility for maintenance is clearly defined, a shortage of capacity in the private sector which carries out maintenance works is considered an issue in the long run. The executing agency is assessing the plan to introduce multi-year maintenance contracts in order to stimulate private sector investment in maintenance capacity based on longer prospects for future operations.

3.5.2 Technical Aspects of Operation and Maintenance

RA requires new recruits to hold an educational degree in relevant fields, and confirmed whether they have technical knowledge necessary to conduct responsible duties prior to recruitment. Managers engaged in maintenance are required to be professional engineers certified by the Engineering Council of Namibia. According to staff of the executing agency, training classes to update and refresh knowledge are conducted 2-3 times a year. The training at the executing agency includes contract management of maintenance work and inspection of paved roads. Internal documents such as technical specifications of roads and a maintenance manual were updated in 2014 and inspection procedures of paved roads were also developed. The maintenance manual focuses primarily on contract management. The

site visit found that manuals were provided in the district office engaged in maintenance.

On technical aspects, RA confirms technical capacities of new recruits and gives its staff opportunities to participate in training programs. Manuals required for maintenance were developed and are used in maintenance works at the district office of RA.

3.5.3 Financial Aspects of Operation and Maintenance

Budgets for routine and periodic maintenance costs are provided by the Road Fund Administration (RFA) and emergency maintenance from the government's budget. The major funding sources of the RFA are a fuel levy, vehicle licence fees, mass-distance charges, and cross-border charges. Funds from aid agencies are also used for rehabilitation.

While the maintenance budget for FY 2002/03 was 6,960 Namibian dollars/km (116 thousand yens/km), that for FY 2014/15 was 19,622 Namibian dollars/km (155 thousand yens/km)[13]. The budget for maintenance has been increasing and is expected to be approximately 1 billion Namibian dollars in FY 2016/17 (see Table 11). Although the maintenance budget is increasing, the amount is still insufficient. As aforementioned, *the Medium and Long Term Roads Master Plan Revision* (2012) estimated maintenance budget requirement to minimize the social cost. The road master plan concluded that road surface deteriorated rapidly and this would substantially increase user costs when the budget did not reach 60% of the required amount. The budget allocation did not reach the level at the time of ex-post evaluation (see Table 12). Interviews with RFA staff shows that RA has set priorities for periodic maintenance taking into consideration the criteria such as road classifications and traffic volume in order to deal with insufficient budget. Given that road classification of the section upgraded by this project is in the highest criteria (a trunk road), its priority is considered relatively high.

Table 11: Maintenance Budget

Unit: million Namibian dollars

	2012/13		2013/14		2014/15	
	Allocation	**Expenditure**	**Allocation**	**Expenditure**	**Allocation**	**Expenditure**
Routine Maintenance*	354.8	376.2	374.5	355.2	458.5	433.3
Periodic Maintenance	437.3	451.2	556.8	535.3	451.5	430.8
Total	792.1	827.5	931.3	890.5	910.0	864.1

Source: documents provided by the executing agency
Note: Routine maintenance budget includes the emergency maintenance budget.

[13] For conversion from Namibian dollar to Japanese yen, the exchange rate at the time of appraisal (1 Namibian Dollar = 16.6 yen) was applied to FY 2002/03 and the exchange rate at the year-end of 2015 the application of the 2015 year-end (1 Namibian Dollar = 7.9 yen) was applied to FY 2014/15.

Table 12: Budget Requirement for Road Maintenance

Unit: million Namibian dollars

	2010/11	2011/12	2012/13	2013/14	2014/15
Budget Requirement (2011 price)*	1,378	1,378	1,378	1,378	1,378
CPI	-	6.60%	5.90%	5.90%	2.90%
Budget Requirement (Nominal Price)	1,378	1,469	1,556	1,647	1,695
Budget Requirement X 60%	827	881	933	988	1,017

Source: Budget requirement from MLTRMP (2012), CPI from Namibia Statistics Agency, and calculation by the external evaluator.
Note: Budget requirement is optimum funding requirement minus budget requirements for rehabilitation and upgrade.

3.5.4 Current Status of Operation and Maintenance

As explained above ("3.5.1 Intuitional Aspects of Operation and Maintenance"), maintenance works of the road are outsourced to contractors. The scope of maintenance works is as follows:

Routine maintenance: when needed. Maintenance works are weeding grass and bush, repair works for pot holes, cracking, and shoulder collapse, and cleaning of road surface and culverts.

Periodic maintenance: every eight years. Construction works to extend the life cycle of roads (such as resealing and rehabilitation by chemical additives).

Emergency maintenance: in the case of disaster. Repair works for damages caused by disasters.

Surface cracks
(after repair works, near Bunya)

Several years have passed since the completion of the section upgraded by this project, but periodic maintenance has not begun. During the site visit, serious rutting and pot holes were not found. Some cracks were found in the section near Bunya but repair works had already been implemented. At the time of ex-post evaluation, International Roughness Index (IRI)[14] of the upgraded section was 3.28mm/m on average and below 5mm/m, a threshold that vibration becomes serious, in most parts of the section (see Table 13). Damages on the upgraded section are insignificant and there is no serious issue with the current status of the infrastructure.

[14] IRI is an index for the smoothness of road surfaces and is measured by the unevenness of a road surface.

Table 13: IRI for the Road Section Upgraded by this Project

IRI	Rundu-Mbambi (Approx. 170km)	Mbambi-Elundu (Approx. 200km)
0.0-2.0mm/m	1%	3%
2.0-3.0mm/m	49%	63%
3.0-4.5mm/m	46%	32%
4.5-6.0mm/m	3%	2%
6.0 - mm/m	1%	0%

Source: Documents provided by the executing agency

Some minor problems have been observed in terms of institutional and financial aspects. Therefore sustainability of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project carried out asphalt pavement in northern Namibia between Rundu (Kavango Region) and Elundu (Ohangwena Region). By facilitating smoother road traffic in the north part of Namibia, it aimed at improving the livelihood and living conditions of residents as well as Namibia's transportation logistics with its neighboring countries. The objectives of Namibia's development policy at the time of appraisal and ex-post evaluation included the economic growth and reduction of income gaps by infrastructure development which was consistent with the fact that many poor households resided in the project area. Since the scope of this project was consistent with the development policy and development needs, its relevance is high. The project cost was higher than planned. The project period was also longer than planned due to a delay in the loan agreement effectuation and procurement, and a raw material supply shortage. Thus, efficiency is fair. While the asphalt pavement shortened the travel time as planned, traffic volume for the first year after the project completion had reached just about 70% of the target. Promotion of trade with the neighboring countries was a condition for anticipated project impacts, but increased trade with neighboring countries was not evident. Nevertheless, as a results of shorter travel time, residents visited markets and hospitals more frequently and the recruitment of staff in hospitals and schools became easier. The overall evidence showed that this project significantly contributed to the improvement of the livelihood and living standards of the residents. Effectiveness and impact of the project are therefore considered high. For the long term, an insufficient capacity of private sector road maintenance contractors will be an issue. Although the maintenance budget is increasing, the amount has not reached the appropriate level. In terms of the project's operation and maintenance, some minor problems were found in the institutional and financial aspects of this project. Sustainability of the project's effects, therefore, is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

In the traffic accident data obtained for the ex-post evaluation, there is no detailed information on the locations of blackspots (locations where accidents occurred). It is difficult to identify specific locations of blackspots and to take countermeasures such as road design change and installation of warning signs. The reporting format for traffic accidents used by policemen has a section to write down distance data based on road markers but road markers have not been installed in the road section upgraded by this project. For this reason, locations of accidents are reported with rough approximations. The executing agency had a policy to set up road markers nationwide at the time of ex-post evaluation. It is desirable to install road markers at the earliest timing possible.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Traffic Safety Education

The beneficiary survey showed that residents felt unsafe in the Kavango West Region where traffic volume is higher. The residents felt unsafer with the increased traffic because they use the improved road for travel within a community. Traffic environment changed notably in both traffic volume and vehicle speed. Nevertheless, road users did not change behaviors (e.g. drivers violate speed limit and children play on the road). For road pavement projects, it is desirable to include traffic safety education in consulting services and to implement traffic safety campaigns before the completion of the road. These activities are expected to help residents adapt to a new traffic environment.

Consideration of Road Infrastructure Development of Neighbouring Country

An increase in the export volumes at the nearby border post (a project effect expected during appraisal) did not realize since road infrastructure development had not progressed enough in Angola. At the time of appraisal, Angola was not an eligible country for Japanese ODA loan and road infrastructure development on the Angola side was not included in the project scope. Impact on international trade was conditioned by a risk associated with underdevelopment of road infrastructure in Angola but this risk was not considered. Road infrastructure development in a neighbouring country becomes an important factor influencing the positive impact of a road improvement projects in a border area. For this reason, it is desirable to study the road infrastructure and development plans of neighboring countries and to analyze their influence on a project's overall goal at the time of appraisal. Simultaneous road development in neighboring

countries should be considered if possible to implement a project covering multiple countries.

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1.Project Outputs	Civil Work: ・ Asphalt pavement Length: 370km Width: 11.4m (one lane on each side) Consluting Services: ・ International: 69 M/M ・ National: 122 M/M	Civil Work: ・ Asphalt pavement Length: as planned Width: 10.8m (one lane on each side) ・ Gravel road Length: 10.3km Consluting Services: ・ National: 500 M/M
2.Project Period	August 2006 – December 2010 (53 months)	August 2006 – March 2013 (80 months)
3.Project Cost Amount Paid in Foreign Currency Amount Paid in Local currency Total Japanese ODA Loan Portion Exchange Rate	 8,290 million yen 5,165 million yen (311 million Namibian dollars) 13,455 million yen 10,091 million yen 1 Namibian dollar = 16.6 yen (As of October 2005)	 10,274 million yen 7,969 million yen (638 million Namibian dollars) 18,243 million yen 9,912 million yen 1 Namibian dollar = 12.5 yen (Average between January 2006 and December 2013)