

Kiribati

Ex-Post Evaluation of Japanese ODA Grant Aid Project
“The Project for Improvement of Fisheries-related Roads in South Tarawa”

External Evaluator: Keisuke Nishikawa
Ernst & Young Sustainability Co., Ltd.

0. Summary

This project, which facilitated smooth travel and transportation on the only arterial road in South Tarawa, was consistent with the development policy of Kiribati and also with the assistance policy of Japan. With regard to the project effects, substantial improvements were observed in terms of transportation efficiency, safety and comfort of road travel in addition to travel speed and time, achieving highly positive project effectiveness and impacts. The efficiency of the project was also high as the output, cost and the schedule were all implemented as planned. However, the output would have been more desirable, judged from the results, if some parts of the road had been completed with elaborate drainage measures and surface treatment. Also, while there were few issues in the organisational structure for operation and maintenance, budget shortages resulted in shortfalls when purchasing road materials, which meant the technical skills of the road workers were not improved accordingly. Consequently, several damaged spots were identified. Therefore, financial and technical aspects must be improved and the sustainability of the project is low.

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

1. Project Description



Project Locations



Road Section Improved in the Project

1.1 Background

South Tarawa, a political and economic centre of Kiribati, with more than half the

nation's population, had approximately 75% of households engaged in some form of fisheries-related activity in 2005, and the fisheries industry remains an important source of income. Particularly on outer islands, fisheries are managed with a view to shipping products to South Tarawa. Apart from being an important source of income, marine products constitute an important supply of animal protein and fisheries are intrinsically linked to the economy and lives of the local people.

In South Tarawa, vehicles constitute the common means of transporting both the catch and fishermen and the roads in South Tarawa play a crucial role, not only in the daily lives of the islanders and the economic activities on the island in general but also in the transportation of marine products and fishermen.

However, the roads on Tarawa are facing a number of problems, including (1) the increased traffic volume in recent years due to the population increase, (2) the growing size of vehicles, including trailers used to carry containers, due to increased imports, (3) the concentration of traffic on existing roads due to the difficulty of constructing new parallel roads, in turn, caused by the long and narrow shape of the island, (4) the severe deterioration of the roads due to aging as many roads were originally constructed in the 1960s and 1970s and (5) the lack of drainage ditches and safety facilities such as sidewalks and bus stops. These problems are now disrupting safe and smooth traffic flow.

Under these circumstances, the Government of Kiribati decided that the improvement of roads should be a key policy objective, formulated a plan to improve the roads in South Tarawa over a total length of 60 km and requested the Government of Japan to provide grant aid assistance in June 2005 to improve urban roads among those identified for improvement in South Tarawa.

1.2 Project Outline

The objective of the Project is to revitalize distribution and transportation activities in South Tarawa by improving the road conditions in Betio, Bairiki and Bikenibeu districts and providing maintenance equipment.

Grant Limit / Actual Grant Amount	1,285 million yen / 1,255 million yen
Exchange of Notes Date	24 January, 2007
Executing Agency	Ministry of Public Works and Utilities
Project Completion Date	15 February, 2008
Main Contractor	Dai Nippon Construction
Main Consultant	Construction Project Consultants, Inc.

Basic Design Study	July, 2006 – January, 2007
Related Projects	<p>[Grant Aid] Construction of the Batio-Bairiki Causeway and Fisheries Channel (1986)</p> <p>[Projects by Other Organisations] <Taiwan> Project for Purchasing Heavy Equipment and Heavy Vehicles (2004) Project for Development of Feeder Roads in Betio, South Tarawa and Buota and Roads in Outer Islands (2005)</p>

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa, Ernst & Young Sustainability Co., Ltd.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted in the following timeline.

Period of the Study: October 2011 – October 2012

Period of the Field Study: 3 – 21 May, 2012

2.3 Constraints during the Evaluation Study

As it was difficult to obtain highly-reliable and consistent data to capture annual changes, a quantitative evaluation using traffic-related data such as traffic volume, vehicle registrations and the number of minibus passengers could not be conducted sufficiently.

3. Results of the Evaluation (Overall Rating: B¹)

3.1 Relevance (Rating: ③²)

3.1.1 Relevance with the Development Plan of Kiribati

The “10th National Development Strategies (2004-2007)”, a development policy in place when planning this project, primarily emphasized the development, improvement and expansion of social infrastructure to ‘strengthen the basis for a self-reliant economy and economic development’ and included six main strategic areas such as ‘economic development’. In the strategy, it was stated that the development of the

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ③: High, ②: Fair, ①: Low

fisheries industry and the improvement of infrastructure for that purpose would be crucial for economic development. The theme of the subsequently formulated “Kiribati Development Plan 2008-2011” was ‘Enhancing economic growth for sustainable development’ with six Key Policy Areas (KPAs). One of the KPAs was ‘Economic Development’ and a strategy to develop and improve economic infrastructure was specified as part of the initiative. Also in the latest development policy “Kiribati Development Plan 2012-2015” approved by the Cabinet on 25 April, 2012, Infrastructure is listed as one of the KPAs under the same development theme as the previous plan. Road improvements are another strategy encompassed in this KPA, and the importance of properly maintained infrastructure facilities is also clearly stated in the plan.

While no sector strategies for road and fisheries are formulated in Kiribati, according to the Ministry of Public Works and Utilities (MPWU) and the Ministry of Fisheries & Marine Resources Development (MFMRD), infrastructure facilities such as roads have been playing a crucial role toward economic growth, poverty reduction, trade promotion and industrial development.

Based on the above, it can be concluded that this project, which supported the development of road infrastructure to achieve economic growth, has been consistent with the development policy and measures of Kiribati both during the planning and ex-post evaluation.

3.1.2 Relevance with the Development Needs of Kiribati

The fisheries sector of Kiribati is closely linked to the life of the nation’s economy and its people. The proportion of the households engaged in some form of fishing activities in South Tarawa was 57% in 2006, and it was said that every I-Kiribati consumed 50 – 78 kg³ of fish every year. Vehicles were used to transport these catches and also fishermen, but issues such as increased traffic volume, larger vehicles, the lack of alternative roads, road damage due to aging, and the lack of road safety equipment and drainage in South Tarawa have been highlighted as impediments to smooth and safe traffic flows. In particular, roads in the commercial and port area of Betio and the administrative district of Bairiki were crucial for the socioeconomic activities of the country.

At the time of ex-post evaluation, the same level (58%) of households in South Tarawa was engaged in fisheries-related activities in lagoons and reefs (2010 Census), and a general increase in the consumption level was observed in the 2011 MFMRD

³ According to FAO’s data in 2009, the amount of marine product consumption by I-Kiribati is 72.4kg per person, the third largest in the world. (Source: Ministry of Agriculture, Forestry and Fisheries of Japan, http://www.maff.go.jp/j/syouan/tikusui/gyokai/g_kenko/tokucyo/index.html)

Survey, revealing the average resident in Betio consumed 83.7kg of marine products a year, reflecting the importance of the fisheries sector. With regard to the significance of roads, as the general public normally purchases fish on their local roads, it is very important for the fisheries sector, not only for transportation but also as a trading venue. Based on interviews with medical institutions, educational institutions, Ports Authority, Central Pacific Producers and minibus operators as well as the executing agency and related government ministries, it also emerged that the importance of project roads represented by South Tarawa Road was constantly high.

3.1.3 Relevance with Japan's ODA Policy

Based on the five priority policy targets (Economic growth, Sustainable development, Good governance, Security, People to people communication and exchange) Japan expressed at the Fourth Pacific Islands Leaders' Meeting (May 2006), Japan stipulated a policy to provide assistance to Kiribati, one of the Less Developed Countries (LDCs), strategically and in line with the development strategy of the Kiribati government. Among all targets, the focuses were placed on economic growth, sustainable development and good governance, and the scope of 'economic growth' encompassed cooperation in infrastructure and fisheries sector development. Also, in light of the scattered locations of the islands and the distance from overseas markets, Japan had a clear policy to provide assistance to develop marine resources in a vast economic zone for the country's economic development.

Based on the above, this project relates both to the development of infrastructure and the fisheries sector, and contributes to the sustenance and development of Kiribati's economy and society, demonstrating high consistency with Japan's aid policy.

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

3.2 Effectiveness⁴ (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

At the time of project planning, the expected effects of this project were the faster travel speed and consequent reduction in travel time. In this section, changes in the number of traffic accidents and offenses, as well as the traffic volume will also be briefly examined, in addition to the indicators expected as project effects.

3.2.1.1 Changes in Travel Speed

⁴ The evaluation result of the project impacts is incorporated into the Effectiveness rating.

When this project was planned, the speed on open roads was 25km/h and it was expected that this speed would increase to the legal limit of 40km/h after the project implementation. In this ex-post evaluation study, the speed was measured in the section in Betio, which had been improved in this project. The result showed that travelling at 40km/h was possible without problem, apart from intersections and speed bumps. Just for reference, the speed over the entire 6.5km section of South Tarawa Road in Betio, from Dai Nippon Primary School to MTC Intersection, was recorded several times, revealing an average speed of 30.9km/h. As stated later, several areas of the road were heavily damaged, which slowed traffic down, but in all other sections of the road, 40km/h was possible. Therefore, the effect of the project can be said to have been achieved in this regard.

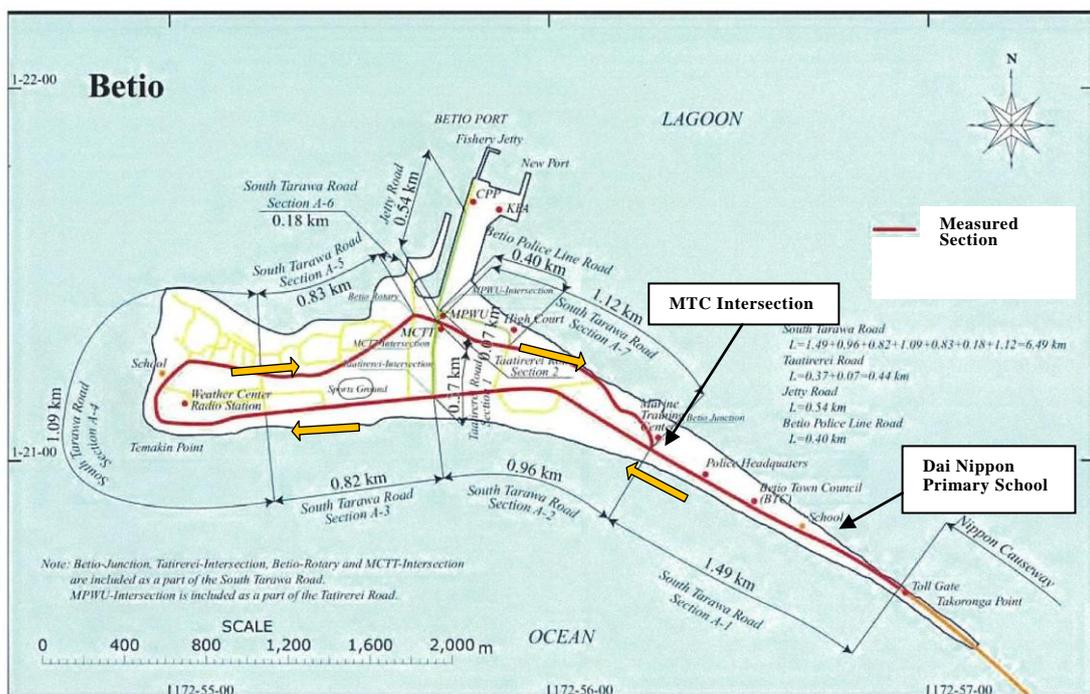


Figure 1: Improved Road in Betio and the Section where the Speed was Measured

3.2.1.2 Shorter Travel Time

Most of the road sections improved in this project were in Betio and Bairiki districts, linked by the 'Nippon Causeway', constructed with Japanese assistance.

A simplified beneficiary survey⁵, conducted to capture the travel time of a 6.6km section between the centres of Betio and Bairiki revealed a reduction in the average time required from 21 minutes before the project to 13 minutes after its

⁵ The simplified beneficiary survey was conducted during the field survey of the external evaluator in May 2012 by interviewing 20 people at schools, hospitals, shops and roadside stalls in Betio and Bairiki. These individuals were asked about the travel time, comfort, road safety, etc.

implementation.

A section between Betio and Bairiki includes the Nippon Causeway (3.3km), excluded from upgrading in this project and the conditions of which have remained unchanged. Therefore, the shorter travel time can be attributed to the improvement in Betio and Bairiki. The actual travel time was measured during the field visit using a sedan car, and the result was just over 10 minutes. Considering the fact that many respondents were users of minibuses requiring more time, the average travel time provided by the respondents was considered adequate.

3.2.1.3 Change in the Number of Traffic Accidents and Offenses

At the time of planning, it was expected that road safety would be enhanced and total accidents would decrease as there would be no vehicles running on hard shoulders after the implementation of this project.

After the project, few vehicles actually ran on the hard shoulders and pedestrian safety improved. It has also become safer for drivers, since hazards on the road surface, such as potholes, substantially decreased. In the simplified beneficiary survey, 70% of respondents answered that the roads had become ‘much safer’ and the remaining 30% said ‘safer’, citing the expansion of the effective road width and the installation of footpaths as the main factors.

However, no quantitative changes were observed in the number of traffic accidents and offenses in Bairiki and Betio, the districts improved in this project, with these figures fluctuating since the completion of the project in 2008, as shown in Table 1. Changes in total accidents and offenses before and after the project are also unclear as the police did not record such data prior to 2007, while the actual number of fatal accidents is 0-2 cases per year and the number of injuries is also 0-3 cases per year, reflecting the small absolute population size.

Thus, while the accident data do not clearly demonstrate changes in road safety, the results of the simplified beneficiary survey can be deemed as indicating a general improvement in safety.

Table 1: Number of Traffic Accidents and Offenses in Betio and Bairiki

	Betio				Bairiki			
	2008	2009	2010	2011	2008	2009	2010	2011
Death	1		2		1		1	2
Injury	1	2	1			2	3	1
Reckless Driving	9	8	6	2	6	5	11	3
Drink Driving	46	25	30	71	12	9	12	14
Careless Driving	94	73	64	62	47	82	56	40
Total	151	108	103	135	66	98	83	60

Source: Data provided by the Kiribati Police

3.2.1.4 Change in Traffic Volume

As the MPWU has not conducted any traffic censuses recently, the traffic volume data were obtained using the tariff collection data at the Nippon Causeway toll booth located at the eastern end of Betio (Tolls are collected only when entering Betio, which means that the actual volume is twice as large). The results are shown in Table 2.

Table 2: Traffic Volume at the Nippon Causeway Toll Booth

(Unit: Number of Vehicles)

	2008	2010
Motorbike	54,962	123,211
Saloon	357,627	200,319
Minibus	31,584	45,306
Truck	240,377	211,337
Total	684,820	580,173

Source: Data provided by MPWU

Note: The actual traffic volume exceeds these figures as some vehicles, e.g. government-owned, are exempt from toll payment. The data in the table above are the results of aggregating all the raw data available, but only 2008 and 2010 had such figures. Also, these figures are not necessarily correct due to an issue in the collection system.

According to the Nippon Causeway toll collection data of 29 July, 2006, obtained during the basic design study of this project, 1,975 vehicles went through the booth (one-way) in 24 hours, which can be simply translated into an estimated annual volume of 600,000 – 800,000 vehicles⁶. While the reliability of the data is low, approximately 600,000 vehicles (1.2 million both ways) run between Betio and Bairiki, and the project road has been underpinning traffic demand in both districts.

3.2.2 Qualitative Effects

The following qualitative effects were expected at the time of project planning:

- (1) Travelling costs will fall due to reduced abrasion and tire damage and lower fuel costs.
- (2) The transportation efficiency of goods such as fishing gear and marine products will be improved between the western part (Betio) and the eastern part of South Tarawa.

With regard to (1), no truck or bus owners had sufficient data on the maintenance

⁶ The annual volume is estimated by the evaluator.

cost of their vehicles, but they commented that they saw the benefits of road improvement in terms of reduced tire abrasion, less frequent replacement of vehicle parts, and less burdens on the suspension and chassis of their vehicles. In other words, despite a lack of quantitative data, it can be assumed that the improvement of road surfaces has helped reduce the costs of vehicle maintenance and fuel due to the increased speed of travel.

As for the second qualitative effects, a shorter travel time between Betio and Bairiki was achieved as shown in “3.2.1.2 Shorter Travel Time” and all the respondents in the simplified beneficiary survey commented that traffic flow had become smoother. Also, there were some forwarders operating their lorries only between Betio and Bairiki due to the good road conditions, but no further east than Bairiki, due to the poor road conditions, which could damage their vehicles. Therefore, the efficiency of transportation between Betio and other districts can be seen only between Betio and Bairiki in terms of the improvement of road surfaces and the reduction in the time required. Improvements to road sections from the east of Bairiki to the eastern end of South Tarawa are planned in detail by the World Bank (WB), Asian Development Bank (ADB) and so on, and it is anticipated that construction will commence in late 2012 or early 2013. Once the road conditions of this section are improved, the transportation efficiency of goods and marine products between Betio and the eastern area is expected to be even higher.

Other qualitative effects of road improvement include improved travel comfort on the roads. In the simplified beneficiary survey, 75% of respondents replied that the comfort had ‘Improved a lot’ while 25% stated ‘Improved’, representing a high level of satisfaction among road users. In particular, the improved road sections in Betio and Bairiki were key in ensuring stable operations and facilitating the travel of minibuses, the only public transport in South Tarawa. However, as the road conditions east of Bairiki remain poor, the effects of this project have not fully reached those districts. When the project to be assisted by the WB and ADB, etc. is completed several years later, travel comfort on the roads should be felt throughout South Tarawa.

3.3 Impact

3.3.1 Intended Impacts

Indirect effects of this project expected at the time of planning were:

- Transportation of marine products will become more efficient allowing freshness to be retained
- Value will be maintained as dust and water will not be splashed on fish sold on

the roadside

- Two areas – a commercial area in the west (Betio) and a fisheries area in the east – will be connected

The following was the situation observed based on the stated indirect effects.

Betio has a port where cargoes and frozen/fresh fish are handled, and it was observed that the project road had been contributing in terms of stable transportation as a means of transporting goods and marine products from here to other districts of South Tarawa. In the simplified beneficiary survey, many positive comments were heard, stating that not only the fisheries industry but also the transportation services in general had improved. Also, the Central Pacific Producers (CPP), a government-owned seafood company, transports frozen fish to various locations in South Tarawa. Presumably, the efficiency of transporting frozen fish to their destinations has improved based on the reductions in time achieved.

The interview survey with the roadside fish sellers in Betio and Bairiki revealed that although the price of fish remained unchanged, the freshness was better retained as the fish were not heavily rocked while in transit. However, the method of preservation also remained unchanged, namely keeping the fish in cold boxes and selling them along the road, meaning the road improvement seems to have had little impact on efforts of roadside sellers to preserve freshness. Furthermore, in terms of preventing any decline in the value of fish sold on the roadside, no real impact of dust and water were seen even before the project, apart from some fresh fish sold on tables along the road. Positive effects were instead noticed in terms of the slight improvement in the selling environment, as the sellers could now avoid splashes of water during the rainy season.

With regard to the third indirect effect, the nature of the relationship between the industries in the west and east remained unclear. Under the current status where the road was developed only up to Bairiki, the ‘connection of the two areas’ was not really observed. Nevertheless, the eastern area has a fish farm near the airport as well as the largest hospital in Kiribati, and this project can be said to partially contribute to the stable transportation of marine products and other commodities.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

As the components of this project involved rehabilitating existing roads and few environmental effects were expected, it was not deemed necessary to undergo an approval and licensing procedure as specified under environmental law. In fact, the aggregate (coral aggregates) needed to construct the roads was obtained from a

dredged waterway and the area designated by the Ministry of Environment, and no major problems were identified during and after the construction. According to the executing agency, waste materials from the construction were taken to the designated landfills and the surplus soil (aggregate) was utilised for operation and maintenance purposes, leaving no major environmental impacts either during or after the project implementation.

Conversely, coordination with the roadside residents was not necessarily sufficient in all sections of the road. Some sections of the improved road saw drainage become problematic after rain was spotted and the puddles remained there for a long time. This has caused bog moss to grow, which impairs the living environment. Improvements to these sections are expected in the project to be assisted by the WB and ADB, etc., in which repairs are scheduled for some of the problematic sections identified after the implementation of this project.

3.3.2.2 Land Acquisition and Resettlement

No resettlements and/or land acquisitions were planned as all the sections of the project roads were to be repaired within the areas of existing roads. It was confirmed that the alignments of the existing roads remained the same. There was no expansion of existing roads, nor did any resettlements or land acquisitions take place.

While not all the indirect effects of this project have obviously emerged, some improvements have been observed and it is hoped that the improvement of the rest of South Tarawa Road will generate further positive effects and impacts. No environmentally negative impacts were observed apart from some drainage issues during and after the project implementation, and there were no resettlements or land acquisitions. Therefore, this project was considered as making a certain of contribution, even in terms of an indirect effect.

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

3.4 Efficiency (Rating: ③)

3.4.1 Project Outputs

This project was designed to rehabilitate the roads in Betio and Bairiki, and a section in front of the Tungaru Hospital in Bikenibeu. It was also intended to provide two concrete cutters needed for maintenance purposes.

Table 3 compares the planned and actual outputs, showing that all the road sections were improved as planned.

Table 3: Comparison of Planned and Actual Outputs (Road Repair)

District	Road Section	Length (km)	
		Plan	Actual
Betio	South Tarawa Road	6.491	6.491
	Jetty Road	0.535	0.535
	Taatirerei Road	0.436	0.436
	Police Line Road	0.398	0.398
Bairiki	South Tarawa Road	1.460	1.460
	Frontage Road	0.124	0.124
	Tabonikabaurea Road	0.270	0.270
	TAP Road	0.155	0.155
	Bairiki Wharf Road	0.482	0.482
Bikenibeu	South Tarawa Road	0.280	0.280
Total		10.631	10.631

Various documents and materials related to this project were referred to and interviews with the executing agency and the project consultant confirmed that road improvement had been implemented for the entire length of the road as planned, as shown in the table above. It was also confirmed that the two concrete cutters and the spare parts were provided as scheduled (Photo 1).

The Kiribati government was to implement the following components as part of the project:

- To secure a section of land necessary for construction materials, such as a stockyard
- To secure a disposal site for the waste and residual soil generated by the construction activities
- To relocate any buried public utilities crossing the road (telephone lines, electricity lines, etc.)
- To relocate any obstacles on the footpaths
- To install infiltration inlets



Photo 1: Two Concrete Cutters Provided in the Project

According to the information from the then-Project Director (Kiribati (MPWU) side), all the components above were implemented.

While the road was developed as planned, however, two locations where drainage was insufficient did not have any drainage facilities installed, as the existing road alignment and gradient were not scheduled for substantial change. As the land was flat, it is presumed that sloping work to secure sufficient drainage would be difficult, but the road surface was gradually damaged by rain after the completion of this project. The result shows the need to install drainage facilities at those locations. According to the executing agency, it was expected in the original plan that the rain water would flow through the land of roadside residents at those places, but the residents embanked the areas adjacent to the roads to block the rain water from flowing into their land, which eventually saw it retained at the edges of the road.

In Bairiki, all road sections apart from South Tarawa Road had their surfaces treated with SBST (Single Bitumen Surface Treatment) as planned. These surfaces were thin and heavily damaged, as the water was prone to drop from the trees above and was difficult to dry up. The traffic volume on Frontage Road was also considerable due to its central location in Bairiki. Judging from the results, it seems to have been more desirable to have these road sections finished with a more durable construction method, instead of SBST.

However, the locations where measures were considered insufficient only comprised approximately 5% of the entire sections improved under this project, which can be deemed low.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The project cost to be borne by Japan was set at 1,285 million yen and the actual project cost totaled 1,255 million yen, 97.7% of the original plan. The total project cost, including contributions of 2.68 million yen from Kiribati, was planned to be 1,288 million yen, but the overall project costs could not be compared as the actual disbursement record of the Kiribati government was not available. However, it is inferred that the planned amount was disbursed as a portion to be met by the Kiribati side and implemented as described above.

3.4.2.2 Project Period

The scheduled project period⁷ was 14 months, including a period of 4.5 months for detailed design and tendering processes. The actual period was 12 months (February, 2007 – February, 2008), shorter than the original plan.

⁷ The project period can be defined as a “Detailed Design + Construction” period.

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

3.5 Sustainability (Rating: ①)

3.5.1 Structural Aspects of Operation and Maintenance

The executing agency of this project was the MPWU (Ministry of Public Works and Utilities) and the unit in charge was CES (Civil Engineering Section), with 38 staff members responsible for the maintenance of roads, causeways and the airport runway. At the time of ex-post evaluation, the role of CES and its number of staff (number of positions) remained unchanged and the same structure was maintained. However, the executing agency felt that the number of staff was insufficient for the operation and maintenance required, hence part of the road maintenance work (relatively highly-skilled repair work) was delegated to a private sector company comprising ex-engineers of MPWU since May 2012.

While CES lacks a systematic road maintenance plan, annual work plans are usually prepared, based on which the budget is secured every year. However, in the sections of South Tarawa Road excluded from this project, maintenance activities are reactive as the road is old, has problems with drainage, and requires a series of emergency repairs.

With regard to road maintenance equipment, the site office in Betio was responsible for repairs, showing that the repair work had not been delegated to PVU (Plant and Vehicle Unit), though this was considered at the time of project planning. Some of the repairs of larger equipment have been outsourced to the private sector since 2012. It is assumed that there are no issues from the structural aspect relating to repair work as all the equipment provided in this project and the subsequent follow-up cooperation remain in working order.

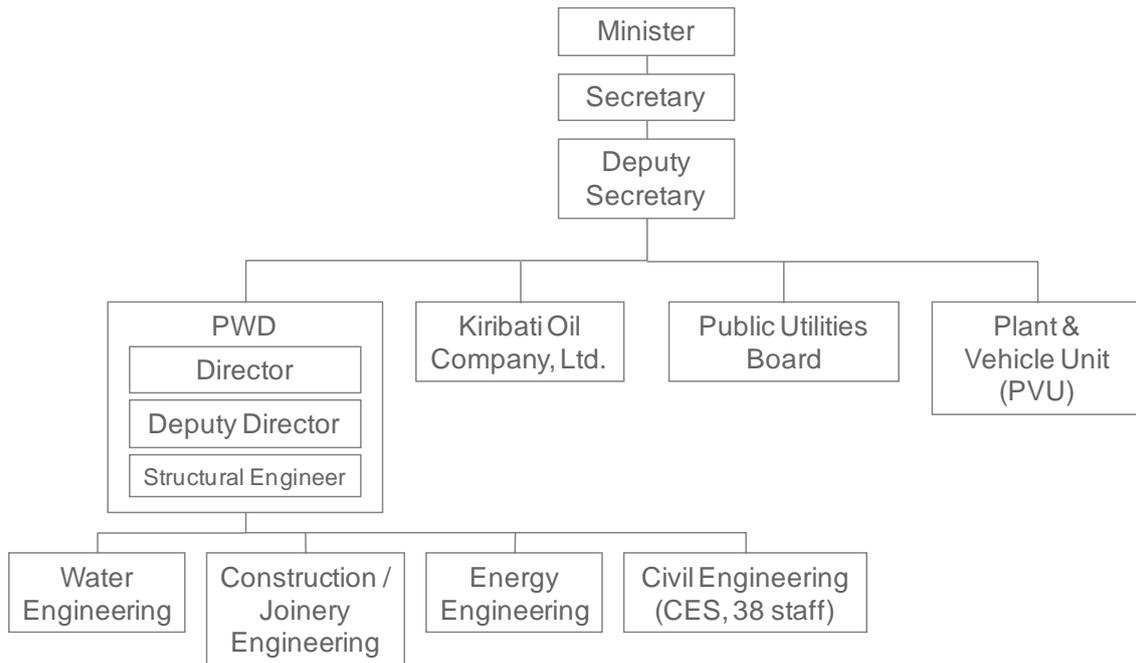


Figure 2: Organisational Chart of the Ministry of Public Works and Utilities

3.5.2 Technical Aspects of Operation and Maintenance

At the time of project planning, it was judged that the staff of CES had achieved a sufficient technical level necessary to maintain the project road as they had acquired experience and technical skills through a number of foreign aid projects. At the time of ex-post evaluation, the executing agency recognises that there are no technical issues as the staff has a certain level of fundamental knowledge on road maintenance as well as several civil engineering degree holders as new staff members after 2008.

However, the reality is that those technical skills and knowledge are neither sufficiently utilised in actual on-site maintenance work nor backed by ample practical experience. One of the main reasons for the difficulties in applying this knowledge in an actual setting is not only the lack of technical accumulation but also the lack of a budget for material procurement and the difficulties they face in obtaining such materials. No effective measures seem to have been taken to solve these problems.

According to the executing agency, there are no systematic training courses in place to raise the technical skills of their engineering staff, which means that everything relies on the technical skills improved through the limited accumulation of on-site experience.

3.5.3 Financial Aspects of Operation and Maintenance

The CES budget has remained at around 600,000 Australian dollars on average throughout the 2000s, and the budget for 2006, when the basic design study of this

project was conducted, was 666,000 Australian dollars. This budget includes the costs of improving not only roads but also seawalls and airport runways. The “Local Purchases” includes the employment cost of temporary staff for road maintenance.

Table 4: Budget of CES

(Unit: Australian Dollars)

Item	2006	2007	2008	2009	2010	2011
Salaries etc.	262,806	279,384	287,439	295,081	282,685	311,256
Transport & Travel	68,450	46,813	42,205	60,589	45,000	40,000
Local Purchases	66,190	76,208	60,000	65,000	60,000	40,500
Overseas Purchases	168,460	161,830	150,118	87,000	75,000	43,000
Local Services	35,345	18,790	30,000	49,000	30,000	15,000
Hire of Plant & Equipment	58,392	22,161	58,600	58,600	29,800	29,800
Telecommunications / Electricity and Gas	6,250	10,710	8,500	32,000	20,000	20,000
Other	-	-	-	2,000	1,000	1,000
Total	665,893	615,896	637,862	649,270	543,485	500,556
Budget of MPWU	2,825,841	2,727,204	2,748,732	2,811,910	2,483,843	2,473,272
Proportion of CES Budget (%)	23.6	22.6	23.2	23.1	21.9	20.2

Source: Budget for Each Year (Ministry of Finance and Economic Development)

Between 2006 and 2011, the overall budget has been declining in general. As the relatively large amounts of “Overseas Purchases” for 2006 – 2008 are due to purchases of heavy equipment, this figure decreased substantially in 2009.

While the salaries show signs of growth, many other budget items have recorded declines, leading to insufficient maintenance of infrastructure facilities such as roads. In particular, the insufficient allocation of Local / Overseas Purchases and Local Services has been a key factor explaining the difficulties in actual repair work, while the executing agency themselves have recognised the lack of budget as the cause of maintenance issues in a number of respects. However, given the difficulty in securing the budget, no effective solutions have been found, despite acknowledgement of the importance of maintenance. The overall budget for MPWU has also been declining recently.

The Nippon Causeway remains the only toll road in Kiribati, and the tolls collected here are all transferred to the Nippon Causeway Fund Account, used exclusively to maintain the causeway. Therefore, all the costs of maintaining the road sections covered in this project are allocated from the general CES budget. However, the maintenance cost specialised for the project road remained unclear as the budget had not been divided by road sections. Also, the maintenance cost for machinery such as concrete cutters was also unclear, as it was not separated from the overall budget.

3.5.4 Current Status of Operation and Maintenance

3.5.4.1 Conditions of Road Surfaces

Table 5 shows the main damage and problems affecting all the road sections improved in this project, as identified by actual observations of the ex-post evaluation.

Table 5: Damage to the Project Road Identified in the Ex-Post Evaluation

Road Section	Damages
[Betio]	
South Tarawa Road	Generally in good condition. Heavy damage at MCTT Intersection and in front of Moel Supermarket. Prone to puddles at the intersection with Police Line Road.
Jetty Road	Pavement at the northern end of the Road broken away due to the passage of heavy vehicles.
Taatirerei Road	Sand piled up and pavement broken away at a section of poor drainage.
Police Line Road	Some potholes and poor drainage spots.
[Bairiki]	
South Tarawa Road	Generally in good condition. Some fallen gutter lids. Sand and rubbish identified and piled on the road edges. Some potholes and drainage problems seen near bus stops.
Frontage Road	Deteriorating in general and a number of potholes identified. Drainage problem on one side of the road.
Tabonikabaurea Road	Surface conditions under the tree deteriorating, and a number of potholes observed.
TAP Road	Sections with poor drainage had potholes over a relatively large area.
Bairiki Wharf Road	Generally good, but some potholes identified near the Government building.
[Bikenibeu]	
South Tarawa Road	Heavily damaged at the entrance to the hospital and in front of the bus stop. Sand also piled up on the roadsides.

Note: The sections apart from the problematic spots shown above are generally in good condition.

The initial decline in these road surfaces was due to the heavy rain in South Tarawa from the end of 2009 till the beginning of 2010. The average annual precipitation of Kiribati is around 2,000mm and the annual rainfall in 2008 was only 927mm. It was 2,565mm in 2009 and 2,025 in 2010, hence relatively low in these years as well. However, the month of December in 2009 recorded 555mm in just one month, with another 486mm recorded in January 2010 at the Betio Observation Station. This was equivalent to half a year's rainfall in just two months, causing the rainwater to remain on the road for an extended period.

Given that only four years have passed since the project was completed, the damage can be considered heavy at some points. This damage has been exacerbated by the multiple factors such as:

- Surface damage due to stagnant water seen on poorly drained roads (Taaitirei Road and the intersection of South Tarawa and Police Line Roads)
- Insufficient cleaning of hard shoulders, gutters and infiltration inlets
- Slow passage of heavy vehicles (e.g. at MCTT Intersection)
- Further damage while damaged spots remain unrepaired

Besides these factors, there are very significant burdens on the road surface given the lack of regulations defining the weight limit of vehicles in Kiribati.

With regard to the drainage problem, insufficient road gradient and a lack of gutters are the main factors. The embankment erected by roadside residents to block the water flowing from the road into their own land has aggravated the poor drainage. It was deemed desirable to explore the potential for drainage via gutters in more detail, given the difficulty in expanding the existing road width.

As stated above, a road development project supported by the WB and ADB, etc. will be commencing soon. In this project, some repairs to the spots and sections damaged after JICA's project was completed, namely, seven spots in Betio and two spots in Bairiki, have been proposed in its planning stage.

3.5.4.2 Maintenance Work

Maintenance work on the road is undertaken by the CES workers. The method of maintenance observed during the field survey in the non-project sections (heavily damaged) simply involved throwing coral stones or sand mixed with some cement into the potholes from the truck. Consequently, those materials disappear after the rain, and the road reverts to its original condition. The road in general, including the project road, is sometimes also repaired with cement and/or bitumen, but they also tend to break off, since the height of the repaired spots only comes up to the same level as the existing road and to exactly the same size as the damaged spots. Therefore, repair work is always carried out somewhere (regardless of whether a project or non-project road) as many spots must be repaired, instead of systematically implementing routine maintenance work.

It was seen that road maintenance workers had basic knowledge on how roads should be repaired, but because most of the materials supplied to them were as described above, all they can do in reality is conduct temporary emergency repairs.

One of the main factors explaining these insufficiencies in road maintenance works was, as stated, the budget shortfall, hampering the purchase of appropriate materials from overseas. The aggregate also contains salt as it is taken from the sea, weakening and reducing the lifetime of the repaired spots.

Spare parts and consumables are procured through a domestic supplier and no

problems were seen in this respect. The concrete cutter, provided under this project, was used only when relatively large repair works were conducted.

Some equipment such as a concrete mixer was provided in 2011 under Japan's Follow-up Cooperation scheme to facilitate the maintenance work. According to the executing agency, while the mixer was of the dimensions requested by the Ministry, it turned out to be too small to conduct sufficient road maintenance work, and had never been used for a year after the provision. In reaction to this situation, JICA explained again that the concrete mixer was to be used in conjunction with other machines for the maintenance of smaller roads, and requested the executing agency to use the mixer adequately.



Photo 2: Project Road with the Surface Broken Away (Taatirerei Road)



Photo 3: Road Maintenance Work (Non-Project Section)

Major problems have been observed in terms of technical and financial aspects, therefore sustainability of the project effect is low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project, which facilitated smooth travel and transportation on the only arterial road in South Tarawa, was consistent with the development policy of Kiribati and also with the assistance policy of Japan. With regard to the project effects, substantial improvements were observed in terms of transportation efficiency, safety and comfort of road travel in addition to travel speed and time, achieving highly positive project effectiveness and impacts. The efficiency of the project was also high as the output, cost and the schedule were all implemented as planned. However, the output would have been more desirable, judged from the results, if some parts of the road had been completed with elaborate drainage measures and surface treatment. Also, while there were few issues

in the organisational structure for operation and maintenance, budget shortages resulted in shortfalls when purchasing road materials, which meant the technical skills of the road workers were not improved accordingly. Consequently, several damaged spots were identified. Therefore, financial and technical aspects must be improved and the sustainability of the project is low.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

4.2.1.1 Collection of Basic Data

This ex-post evaluation study encountered considerable difficulty in collecting reliable data such as the traffic volume, vehicle registration, minibus passenger number, and so on. It is essential to keep fundamental data consistently so that the traffic conditions and the impact on the road can be determined. In addition, in the interests of preparing a road maintenance plan and implementing efficient maintenance work, regular recording and indexing of the surface conditions, at least of the arterial road of South Tarawa Road, will be important.

4.2.1.2 Development of a Preventive Maintenance Plan

While an annual action plan on road maintenance is prepared by CES, the actual maintenance work primarily concerns emergency repairs of damage to road sections excluded from this project. As the Kiribati Road Rehabilitation Project (KRRP) is to be implemented in 2013 with assistance from the WB and ADB, etc., the necessity for these emergency repairs will be substantially reduced. In parallel, therefore, the necessary budget must be secured to prepare a preventive maintenance plan for entire sections of South Tarawa Road, and maintenance activities conducted in accordance with the same. Only steady implementation can reduce the long-term maintenance cost and keep the road surface in good condition.

Another cause of damage, in addition to the problems of road structure and insufficient road maintenance, was the use of heavy vehicles. In this ex-post evaluation study, it has been revealed that Kiribati lacks any regulations or institutions to restrict overloaded vehicles. As the ground is not necessarily strong enough to support the road base, appropriate measures to limit the maximum load are thought to help prevent unexpected deterioration and extend the life of the road.

4.2.1.3 Stable Allocation of Maintenance Budget

Among the project roads, South Tarawa Road is an arterial road regarded as the

key road for the economy and society of Kiribati, meaning its intensive maintenance is significant. While the current key maintenance issue is the lack of budget, the maintenance of Nippon Causeway is financially covered by the tariff and has been effective to some extent. In light of the importance of South Tarawa Road, some form of budgeting framework will be important to prevent the deterioration of its road surface. For example, a road maintenance fund may be established, where part of the petrol tax from road users will be contributed for the purpose of maintenance.

4.2.2 Recommendations to JICA

The road section east of Bairiki will soon be improved with assistance from the WB and ADB, etc. As the damaged spots and sections in JICA's project area may also be improved under this project, it is important to monitor its progress and provide relevant information to them accordingly.

4.3 Lessons Learned

One of the characteristics of the sections in the project area heavily damaged upon completion of the project was the damage caused by water drops from trees on feeder roads, where the surface was treated with SBST. No such damage was seen on the DBST sections. On an atoll with flat land such as South Tarawa, it is difficult to include slopes when designing the road, which makes it prone to poor drainage.

Under these circumstances, in an atoll nation with weak ground and hot and humid weather, as well as the harsh impact of salt from the sea and heavy rain, it may be desirable to ensure roads are made strong enough with the DBST, to the extent possible, over their entire sections. Also, it is important for the executing agency and donors to collaborate with each other, more than in any other countries, to design drainage and determine other necessary facilities when improving the road.