Tuvalu

FY2016 Ex-Post Evaluation of Technical Cooperation Project (SATREPS[1])

"The Project for Eco-Technological Management of Tuvalu against Sea Level Rise"

External Evaluator: Nobuyuki Kobayashi, OPMAC Corporation

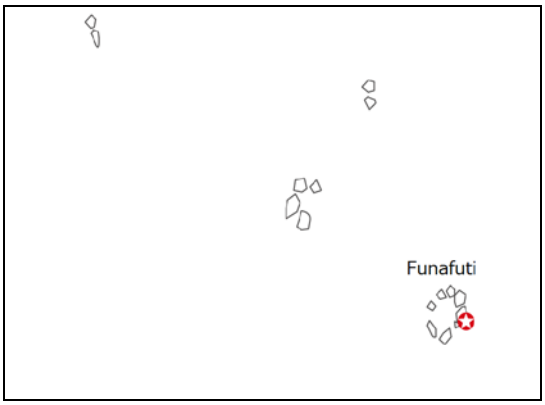
0. Summary

This project aimed at policy-making for coastal protection based on joint research by Japan and Tuvalu and the development of human resources and schemes for the continuous monitoring of coastal topography and the coral reef ecosystem. It was expected that the eco-technological methods based on the research would be adopted in Tuvalu as coastal protection measures. Since the project intention was to pick up research results for coastal protection reflecting the natural process of island formation, the research content of the project was consistent with the development policy of Tuvalu. However, the coastal protection measures developed by the project required a longer period for the incidence of effects and the time scale did not match the urgency of the development needs in Tuvalu. For these reasons, the relevance of the project is fair. The project produced sufficient research results up to project completion and coastal protection measures were prepared. On the other hand, however, sustainable monitoring schemes at the executing agencies were not established through the project. At the time of the ex-post evaluation, out of the proposed measures for coastal protection, open-cut of the Causeway had been adopted in the regional development strategy of Funafuti but not as a coastal protection measure. There, the executing agencies did not conduct research and monitoring activities and subsequent studies were not found in neighboring countries. Thus, the effectiveness and impact of the project are fair. The project period was within the plan but the project cost exceeded the plan. Therefore, the efficiency of the project is fair. The cost overrun was mainly due to an increase in the amount of equipment provided, an increase in the expense of experts dispatched, and the cost associated with the employment of an expert for design and construction supervision. At the time of the ex-post evaluation, the jurisdiction of the executing agencies did not include research and monitoring with the project and an organizational setting for the implementation of subsequent research had not been established. At the time of the ex-post evaluation, no budget had been allocated to relevant research and monitoring. Given these problems in the organizational and financial aspects, the sustainability of the project effects is low.

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

[1] SATREPS stands for "Science and Technology Research Partnership for Sustainable Development".

1. Project Description



Project Location

Alapi Beach in Fongafale Island

1.1 Background

Tuvalu consists of lowland atolls and is one of the countries likely to be affected most severely by future rises in sea level and cyclones caused by abnormal weather. Since the atolls are formed from coral and foraminifera, there is concern that recent population growth will bear an environmental burden on the ecosystem. Due to the unique feature of the islands, coastal protection measures that ignore ecological mechanisms risk jeopardizing the long-term island preservation mechanism in the country. Therefore, at the time of the ex-ante evaluation in 2009, the country needed to implement coastal proception measures based on an understanding of the island formation and preservation mechanism, to prepare for rises in sea level in the future, and to enhance adaptation to climate change. With this background, the project conducted joint research with the Tuvalu government, analyzed the causes of coastal erosion, and aimed at policy formation based on coastal conservation measures from a long-term perspective. While the project conducted research with a long-term perspective, technical cooperation projects aiming at immediate results (the Study for Assessment of the Ecosystem, Costal Erosion and Protection/Rehabilitation of Damaged Areas in Tuvalu and the Project on Pilot Gravel Beach Nourishment against Coastal Disaster on Fongafale Island, Tuvalu) were implemented in parallel. Tuvalu's adaptation to climate change was supported from both long and short-term perspectives.

The project was approved as a project in the Science and Technology Research Partnership for Sustainable Development (SATREPS) program and implemented in collaboration with the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA). The program aims were to cope with global development issues (such as environment, energy, disaster prevention, and the control of infectious diseases), to conduct joint research

with developing countries, and to improve the capacity of developing countries[2]. In the SATREPS program, JST established a committee of academics for the evaluation of academic importance and the committee decided to implement projects. Even after the adoption of the projects, JST and academics have continuously provided guidance to the projects.

1.2 Project Outline

At the time of the ex-ante evaluation, the SATREPS scheme was not obliged to prepare a Project Design Matrix (PDM). At the time of the detailed planning survey, only the Narrative Summary part of the PDM was agreed by the executing agency. Furthermore, the mid-term review partially revised the Narrative Summary and set up indicators. The executing agencies adopted the indicators. This ex-post evaluation is based on the Narrative Summary and the indicators in the mid-term review.

Overall Goal		Countermeasure plan against sea level rise by promoting sand production-transportation-sedimentation process considering the effect of human activities and anthropogenic construction is adopted as coastal management policy of Tuvalu Government.
Project Purpose		1. A sand production-transportation-sedimentation model which takes into consideration effects of human activities and global warming is developed and eco-engineering technology adapted to the Tuvaluan situations to create and/or restore sandy beach is proposed. 2. Monitoring arrangements which sustain coastal topography and coral reef ecosystems are made by developing staff capacity.
Output(s)	Output 1-1	A habitat-sedimentation balance map is made and the coastal characteristics and formation process of the sandy beach are clarified.
	Output 1-2	The effects of human activities and sea level rise on coastal sand production-transportation-sedimentation are evaluated.
	Output 1-3	Eco-engineering technology to enhance sand production-transportation-sedimentation is proposed.
	Output 2-1	Technical and administrative capacity of the research staff and government officials engaged in the joint research is developed.
	Output 2-2	Understanding on land formation and awareness of local communities toward coastal environment and ecosystem conservation is raised.
Total cost (Japanese Side)		266 million yen
Period of Cooperation		April 2009 – March 2014

[2] JICA (2014) "Terminal Evaluation Report on the Project for Eco-Technological Management of Tuvalu against Sea Level Rise"

Implementing Agency	Ministry of Natural Resources and Environment[3]
Other Relevant Agencies / Organizations	Pacific Islands Applied Geoscience Commission (SOPAC), University of South Pacific (USP)
Supporting Agency/Organization(s) in Japan	University of Tokyo, Oceanic Planning Corporation, National Institute for Land and Infrastructure Management, Ibaraki University, Tokyo Denki University, University of the Ryukyus
Related Projects	- JICA "*The Study for Assessment of Ecosystem, Costal Erosion and Protection/Rehabilitation of Damaged Area in Tuvalu*" (2009-2011) - JICA "*Project on Pilot Gravel Beach Nourishment against Coastal Disaster on Fongafale Island, Tuvalu*" (2012-2017)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Terminal Evaluation

At the time of the terminal evaluation, Project Purpose 1 had been achieved and it was expected that Project Purpose 2 would be achieved by the end of the project. For Project Purpose 2, the preparation of monitoring plans (including internal procedures) had not been achieved but it was expected that it would be achieved within the project period.

1.3.2 Achievement Status of the Overall Goal at the Terminal Evaluation

The terminal evaluation did not explicitly mention the prospect of achievement of the Overall Goal. At the time of the terminal evaluation, it was pointed out that eco-technological methods had not been adopted as coastal protection policy and that progress toward the achievement of the Overall Goal was not visible.

1.3.3 Recommendations from the Terminal Evaluation

Ten recommendations were made in the terminal evaluation. These recommendations are related to either the dissemination of research results or the continuation of research activities. The recommendations are as follows:

1. Preparation of monitoring plans (including internal procedures) for the continuation of research activities
2. Approval of the monitoring plans by the Tuvalu government
3. Utilization of the Final Report that summarizes research results and makes policy recommendations
4. Utilization of aquaculture tanks for foraminifera and auxiliary facilities

[3] At the time of the ex-post evaluation, the executing agencies were, the Environmental Department of the Ministry of Foreign Affairs, Trade, Tourism, Environment and Labour; the Fisheries Department; and the Department of Lands and Survey of the Ministry of Natural Resources.

5. Awareness campaigns at communities and schools for environmental conservation using materials prepared by the project
6. Promotion of the project results inside and outside Tuvalu for a better understanding of island formation and preservation
7. Continuation of collaboration on monitoring activities between Japanese researchers and their counterparts in Tuvalu
8. Collaboration with research institutions, donor agencies and regional organizations concerning the implementation and continuation of research activities
9. Pilot implementation of eco-technological methods for coastal protection
10. Formal appointment of a government official to carry out an awareness campaign based on the results of the project

2. Outline of the Evaluation Study

2.1 External Evaluator

Nobuyuki Kobayashi, OPMAC Corporation

2.2 Duration of Evaluation Study

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

Duration of the Study: September 2016 – January 2018

Duration of the Field Study: February 6, 2017 – February 22, 2017,
April 24, 2017 – May 5, 2017

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

3.1 Relevance (Rating: ②[5])

3.1.1 Consistency with the Development Plan of Tuvalu

The national development strategy at the time of the ex-ante evaluation was *the National Strategy for Sustainable Development 2005-2015 (Te Kakeega II)*. In this strategy, the goal of the environment sector was to "Establish national climate change adaptation and mitigation policies". "Impacts associated with climate change and rises in sea level, specifically the salt-water inundation of pulaka pits, coastal erosion and flooding" were recognized as development issues. The Tuvalu government formulated *the National Adaptation Program of Action (NAPA)* in 2007 as a policy for adaptation to climate change and the program was in its implementation phase at the time of the ex-ante evaluation. *NAPA* picked up the development needs of major fields including coastal protection. In *NAPA*, coastal protection focused on the enhancement of resilience against climate change in coastal

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[5] ③: High, ②: Fair, ①: Low

and residential areas and projects to cope with coastal erosion were proposed.

At the time of the terminal evaluation, both *Te Kakeega II* and *NAPA* were ongoing. Adaptation to climate change remained important at both national policy and sector policy level throughout the project period. During the project period, the Tuvalu government formulated *the National Strategic Action Plan for Climate Change and Disaster Risk Management 2012-2016 (NSAP).* The plan embedded projects for coastal protection and foraminiferal sand in its program for climate change and referred to coastal protection activities reflecting the natural process of island formation.

At both the times of the ex-ante evaluation and project completion, the development strategy supported the formulation and implementation of policies for adaptation to climate change and focused on coastal protection as a part of the policies for adoption. The development strategy also referred to coastal protection which reflected the natural process of island formation. This project aimed to pick up research results that could be utilized for coastal protection without hampering the natural process of island formation. Thus, the research content of the project was consistent with the development plan.

3.1.2 Consistency with the Development Needs of Tuvalu

Since the most areas of Tuvalu are lowland atolls with a height of 1-3 m above sea level, overtopping waves and spring water[6] during high tides have caused damage to inhabitants. There are several factors behind the disasters. First, rises in sea level due to global warming can be pointed out. As of the time of the ex-ante evaluation, sea level had been rising in Tuvalu over the past 20 years and the trend was expected to continue. *The IPCC*[7] *Fourth Assessment Report* compared actual data of the global average sea level from 1980 to 1999 with a forecast of the global average sea level from 2090 to 2099. The rise in sea level was estimated to be 0.18m to 0.38m at minimum and 0.26m - 0.59m at maximum. In addition, there were artificial factors in Fongafale Island where this project was implemented. As aforementioned, atolls in Tuvalu are formed by coral and foraminifera. A population increase in Fongafale Island caused water pollution and there was the concern that the natural process of sand production might be hampered due to the degradation of the ecosystem.

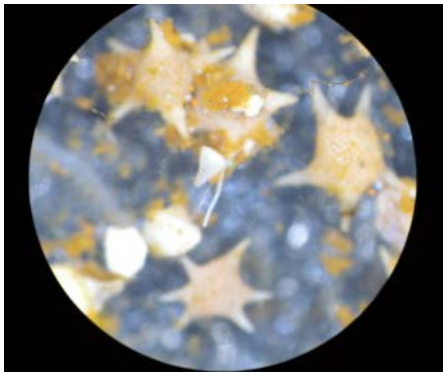


Photo 1:Ta Microscopic Image of Foraminifera

In the background of the development needs in Tuvalu is the fact that the lowland

[6] Hide tides are one of the factors that cause spring water as sea water enters underneath coral reefs.
[7] Intergovernmental Panel on Climate Change (IPCC)

geographical conditions make the country prone to damage caused by high tides. This geographical condition remained the same from the ex-ante evaluation to project completion. The depression caused a high tide in March 2014 and damaged a part of the revetment. Moreover, rises in sea level were expected to continue in the long run even at project completion. In *the IPCC Fifth Assessment Report*, which was published in 2014, the expectation of rises in sea level up to the year 2100 had increased by 20cm from the similar scenario laid out in the 4th report[8]. The population of Fongafale Island continuously grew and the population of Funafuti[9] increased by nearly 40% between 2002 and 2012 (see Table 1).

The reason for the population growth was more employment opportunities and better life convenience in Funafuti. A degradation of water quality has occurred due to population growth and in 2010 a water quality inspection found that the sea water on the lagoon side of Fongafale Island contained Escherichia coli at 27 times the environmental standard of Japan[10]. The substantial amount of Escherichia coli suggested that the water quality near the island needed to be improved through the treatment of domestic wastewater.

Table 1: Population Trends in Tuvalu

	1991	2002	2012
Funafuti	3,839	4,492	6,194
Other areas	5,204	5,069	4,643
Total	9,043	9,561	10,837

Source: Tuvalu Central Statistics Division *2012 Population and Housing Census*

The project aimed at coastal protection with a long-term perspective and its outcome was the development of technology utilizing the natural process of island formation together with policy-making for coastal protection based on this technology. The research content of the project was highly advanced and there was no institution to conduct research as its mandate. For these reasons, relevant persons on the Tuvaluan side lacked hands-on experience of research. It was suggested at the time of the ex-ante evaluation that the relevant persons on the Tuvaluan side could not clearly understand the timing of the realization of research outcomes. It was pointed out in the terminal evaluation that the Tuvalu side misunderstood the project results and that their expectations did not match the planned outcomes. As the research results were picked up at the project implementation stage, the Tuvaluan side realized that the eco-technological coastal protection proposed by the project would require a

[8] Center for Regional Environmental Research, National Institute for Environmental Research (2015) *Reading Points in the IPCC Fifth Report*

[9] Funafuti consists of several islets and Fogafale Island has the largest population.

[10] Hajime Kayane (2014), the Final Report for the Project for Eco-Technological Management of Tuvalu against Sea Level Rise

long period of time. Since coastal protection is an urgent issue in the country, the Tuvaluan side pointed out in the terminal evaluation that the research activities were of lower priority than the coastal protection projects that generate immediate results.

At both the times of the ex-ante evaluation and project completion, there was the development need for coastal protection to reduce damage from high tides. The purpose of the project is generally in line with this development need. However, the coastal protection measures developed by the project required more time for the incidence of effects than that required by conventional coastal protection projects. The project was commenced while stakeholders in Tuvalu still did not fully recognize the timing of the realization of the research results. While this project produced coastal protection measures with a long-term perspective, the Tuvaluan side had urgent needs. This mismatch became evident during project implementation.

3.1.3 Consistency with Japan's ODA Policy

At the Japan-Tuvalu summit meeting in December 2007, the then Tuvalu Prime Minister, Mr. Ielemia, requested assistance for climate change. Under the initiative of the then Prime Minister of Japan, Mr. Fukuda, the formation of this project began. Japan proposed the Cool Earth Partnership in 2008 and the project was implemented as part of the partnership. For five years from 2008, the partnership would help developing countries reduce emissions and support the adaptation[11] of developing countries severely affected by climate change. In the ODA policy at the time of the ex-ante evaluation, Tuvalu was recognized as an island country vulnerable to climate change, and assistance for the country focused on climate change. Priority fields included "sustainable development" and countermeasures for climate change were considered part of this[12].

At the time of the ex-ante evaluation, the Japanese government planned to support developing countries in their adaptation to climate change and the project was a part of this effort. As the project conducted research for coastal protection in Tuvalu, the project goal was consistent with Japan's ODA policy.

3.1.4 Appropriateness of the Project Plan and Approach

At the time of the ex-ante evaluation, the Japanese side recognized the importance of securing staff to conduct research activities after project completion. It was understood that a budget for research and monitoring was an external condition from the Project Goal to the Overall Goal. To ensure the achievement of this external condition, it was planned that the project would involve research institutes from other countries in joint research, so that

[11] Ministry of Foreign Affairs of Japan (2009), *Japan's Official Development Assistance White Paper 2008*
[12] Ministry of Foreign Affairs of Japan (2009), *Japan's ODA Data by Country 2008*

research resources would be acquired from the outside after project completion. Furthermore, it was recognized that the arrangement of a monitoring scheme was a prerequisite for securing the budget. Tuvalu did not have a research institution and, thus, it was necessary to establish a scheme for future research in parallel with the joint research. However, no formal agreement had been made with research institutes of other countries at the time of the ex-ante evaluation. When the project was commenced, the achievement of the external condition was uncertain. The sustainability of project effects was unclear since there was no research institution on the Tuvalu side at the time of the ex-ante evaluation, Nevertheless, the project was adopted due to its academic importance and consistency with Japan's aid policy. This suggests a problem in the project plan.

Although a researcher from a research institute in another country joined the project, cooperation was based on an individual relationship with the researcher and no formal agreement had been made with the research institution by project completion. The project was not able to establish a scheme to continuously support the research capacity of Tuvalu through the uninterrupted activities of a foreign research institution.

As mentioned above, the project conducted research in the eco-technological field. However, the long-term perspective of the research activities and the urgent needs of the Tuvaluan side did not match at the time of the project completion. The Tuvaluan side did not have a strong incentive for monitoring activities leading to subsequent studies and was reluctant to acquire research resources from outside. While the project produced research results that could be used for policy planning for coastal protection, a sustainable monitoring scheme at the executing agencies had still not be arranged at project completion. As a result, the executing agencies were not conducting activities to follow-up research at the time of the ex-post evaluation.

At the time of the ex-ante evaluation, it was recognized that the resources for research would become an external condition and that a monitoring scheme would need to be arranged before project completion. However, the approach of the project did not match the development needs of Tuvalu. For this reason, there were difficulties in the establishment of a sustainable monitoring scheme and it was not possible to establish a cooperative relationship with a research institute in another country. As a result, it was difficult to implement the project in accordance with the original plan.

This project was partly irrelevant to the country’s development needs and had minor problems in the project plan and approach. Therefore, its relevance is fair.

3.2 Effectiveness and Impact[13] (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Project Output

At the time of project completion, the achievement of the Outputs of the project was as follows. Outputs 1-1, 1-2, and 1-3 are related to the Project Purpose 1 and the Outputs 2-1 and 2-2 are related to the Project Purpose 2.

Output 1-1: A habitat-sedimentation balance map is made and the coastal characteristics and formation process of the sandy beach are clarified.

Output 1-1 was achieved. A habitat map of foraminifera around Fongafale Island and Tengako Island was prepared. Furthermore, an estimation was made of the sand production by foraminifera and a model to predict the volume of sand drift was made.

Output 1-2: The effects of human activities and sea level rise on coastal sand production-transportation- sedimentation are evaluated.

Output 1-2 was achieved. Based on an assessment of the influence of water pollution on the foraminiferal habitat, an assessment of the influence of jetties and the Causeway on sand drift, together with an assessment of the influence of landfills and revetment on sedimentation, the influence of human activities on the production, transportation and sedimentation of sand was understood.

Output 1-3: Eco-engineering technology to enhance sand production-transportation-sedimentation is proposed.

Output 1-3 was achieved. The project produced research results such as aquaculture technology for foraminifera, technology for the treatment of water pollution, countermeasures for man-made structures and open-cut of the Causeway. These results were used in the proposal of an eco-technological method which contributes to coastal protection.

Output 2-1: Technical and administrative capacity of the research staff and government officials engaged in the joint research is developed.

Output 2-1 was partially achieved. Counterparts in the Fisheries Department acquired the capacity to monitor coral ecosystems while those in the Department of Lands and Survey obtained the capability to monitor coastal topography. However, periodic monitoring reports on coastal ecosystems (mainly coral reefs) and topographical changes (mainly the Alapi Beach) were not made as originally planned in the project. No counterpart was

[13] Sub-rating for Effectiveness is to be put with consideration of Impact.

assigned for public relations.

Output 2-2: Understanding on land formation and awareness of local communities toward coastal environment and ecosystem conservation is raised.

Output 2-2 was partially achieved. Counterparts and government officials organized briefing sessions for residents and awareness campaigns for residents were carried out during the project period using results of the research. Nevertheless, the terminal evaluation pointed out that residents did not initiate environmental conservation activities voluntarily thanks to these enlightenment activities. In the ex-post evaluation, it could not be confirmed through interviews with relevant parties that there had been a relationship between public awareness campaigns by the project and environmental conservation activities among residents[14].

3.2.1.2 Achievement of Project Purpose

(1) Achievement of Project Purpose 1

The project had two Project Purposes. Project Purpose 1 was policy-planning of coastal protection measures using eco-technological methods. It is concluded that the Project Purpose 1 was achieved.

The experts of the project had completed *the Final Report on the Eco-Technological Management of Tuvalu against Rises in Sea Level* (hereinafter "Final Report") by project completion and submitted it to the Tuvaluan side. In the Final Report, analysis was made on the influence of human activities on sand production, transportation and sedimentation and eco-technological methods developed by the project as well as beach nourishment and replanting of coastal vegetation were proposed. The Final Report is not only a list of coastal protection measures but also shows the positioning of individual measures based on a time scale for the incidence of effects and scientific/technological difficulties. The Final Report assessed the coastal protection measures from the viewpoint of public policy. For JICA's Study on the Assessment of the Ecosystem, Costal Erosion and Protection/Rehabilitation of Damaged Areas in Tuvalu, the project recommended a gravel beach instead of a vertical seawall, which may hamper sand sedimentation. JICA's Project on Pilot Gravel Beach Nourishment against Coastal Disaster on Fongafale Island adopted the recommendation.

In the project, research produced new eco-technological methods (e.g. aquaculture technology for foraminifera and technology for the control of water pollution) and made

[14] In the ex-post evaluation, officials of the Kauple (organization for resident autonomy) and stakeholders at a church which supported an awareness campaign, a women's group engaged in environmental conservation activities, and the Solid Waste Agency (6 people in total) were interviewed. For the arrangement of the interviews, project stakeholders suggested organizations involved in the awareness campaigns and those who recognized the activities of the project were identified at each organization.

policy proposals on coastal protection based on the research results. This suggests that Project Purpose 1 was achieved. The indicators for Project Purpose 1 and their achievement at the time of the project completion are shown in the following table.

Table 2: Achievement of Project Purpose 1

Project Purpose	Indicator	Actual
A sand production-transportation -sedimentation model which takes into consideration effects of human activities and global warming is developed and eco-engineering technology adapted to the Tuvaluan situations to create and/or restore sandy beach is proposed.	**Indicator (A)** Model to enhance sand transportation-sedimentation by reflecting coastal ecosystem conservation and human activities is developed.	Achieved. Coastal conservation measures were recommended using the eco-technological methods developed by the project (e.g. aquaculture technology for foraminifera, open-cut of the Causeway, removal of man-made structures, treatment of domestic wastewater) as well as beach nourishment and coastal vegetation.
	Indicator (B) An eco-technological plan to enhance sand production-transportation-sedimentation.	Achieved. Initial costs and maintenance costs and issues were examined for countermeasures against man-made structures (removal of jetties, reclamation of underwater borrow pits, sand bypass) and open-cut of the Causeway. During the project, a gravel beach which did not hinder recovery of the sandy beach was recommended in JICA “the Study for Assessment of Ecosystem, Costal Erosion and Protection/Rehabilitation of Damaged Area in Tuvalu". JICA “Project on Pilot Gravel Beach Nourishment against Coastal Disaster on Fongafale Island” adopted the recommendation.

(2) Achievement of Project Purpose 2

Project Purpose 2 of the project was institutional building to continuously monitor coastal topography and the coral reef ecosystem and the development of human resources for the monitoring scheme. It is concluded that Project Purpose 2 was partially achieved.

The Fisheries Department and the Department of Lands and Survey assigned staff for the monitoring activities for the research and the project carried out training. As a result, data collection continued during the period that experts were absent from Tuvalu. Nevertheless, the monitoring activities were limited to those related to the research of the project and were not incorporated into the routine work of the executing agencies. The executing agency terminated the monitoring activities at the time of the terminal evaluation because the expected research results could be obtained within the project period. For continuity of the research, the terminal evaluation recommended the preparation of monitoring plans (including internal procedures) for coastal reef ecosystems and coastal topography (mainly the Alapi Beach). However, the plans had not been prepared by the time of project completion and the monitoring activities were not resumed.

The counterparts acquired the skills necessary for monitoring through the training of the project. On the other hand, the scheme to continue the monitoring activities was not established. These suggest that Project Purpose 2 was partially achieved. The indicators for Project Purpose 2 and their achievement at the time of project completion are shown in the

following table.

Table 3: Achievement of Project Purpose 2

Project Purpose	Indicator	Actual
Monitoring arrangements which sustain coastal topography and coral reef ecosystems are made by developing staff capacity.	**Indicator (A)** Monitoring implementation system (staff assignment) will be internally regulated in related departments.	Unachieved. At the time of the terminal evaluation, the Fisheries Department and the Department of Lands and Survey were expected to prepare monitoring plans (including internal procedures) and to consider budget allocation based on the plan but no plan was prepared.
	Indicator (B) Monitoring staff are assigned at each related department.	Achieved. During project implementation, three persons were assigned at the Fisheries Department and the Department of Lands and Survey for monitoring and data collection for research.
	Indicator (C) Monitoring results are submitted to Japanese experts on a regular basis.	Partially Achieved. Monitoring of coral ecosystems and that of coastal topography were conducted during the research period but the monitoring activities were discontinued at the time of the terminal evaluation and had not been resumed by the project completion.

For Project Purpose 1, the project produced sufficient research results, and coastal protection measures were planned using the research results. For Project Purpose 2, the project contributed to the development of the monitoring capability of the counterpart but it did not establish monitoring schemes at the executing agencies. Thus, the project achieved at a limited level its project purpose.

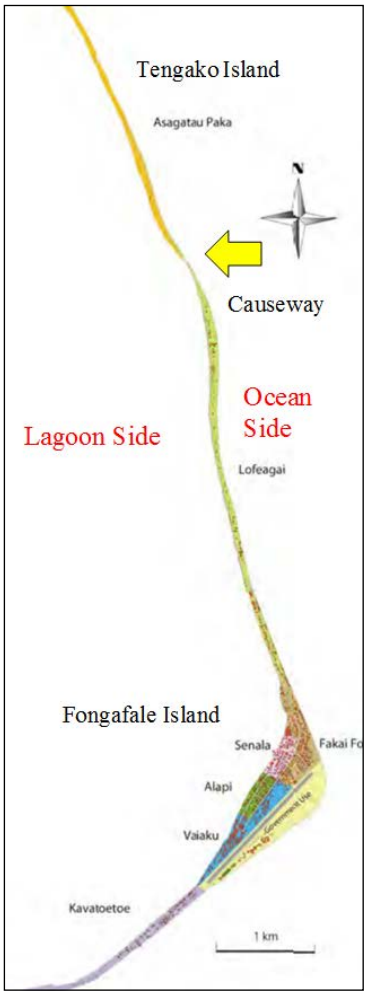


Figure 1: Location of Causeway

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

In the mid-term review (August 2011), the Overall Goal of the project was revised to coastal conservation measures in Tuvalu adopting eco-technological methods which had been picked up by this project. At the time of the ex-post evaluation, it was concluded that the Overall Goal had not been achieved.

At the time of the ex-ante evaluation, the Overall Goal was to restore and strengthen the resilience of sandy beaches but it was difficult to strengthen the resilience of the ecosystem within 3 to 5 years after project completion. Therefore, as an intermediate step

leading to strengthening of the resilience of the ecosystem, the Overall Goal was revised so that research results would be reflected in the coastal protection measures of the Tuvalu government. Since the Overall Goal is defined as a goal to be achieved within 3 - 5 years after project completion, this amendment is appropriate. Although no indicator was chosen for the Overall Goal over the project period, the terminal evaluation used the status of the implementation of eco-technological methods in coastal protection as evidence.

At the time of the ex-post evaluation, the regional development plan, the Funafuti Strategic Plan (2016-2020) referred to open-cut of the Causeway proposed by the project. A small channel between Tengako Island and Fongafale Island was landfilled and the Causeway was built. Open-cut of the Causeway will allow sand to flow from the ocean side to the lagoon side along with the ocean current and sandy beaches on the lagoon side will recover. Although open-cut of the Causeway is expected to contribute to coastal protection, the above regional development plan regarded the improvement of access to fishery resources for small-scale fishermen (more specifically, a shortening traveling time to fishing grounds, savings in fuel costs) as the project purpose of the open-cut. At the time of the ex-post evaluation, activities for future project implementation (such as design, environmental and social impact assessment, and budgeting) had not been conducted for open-cut of the Causeway.

After completion of the project, the Tuvalu government implemented a beach nourishment project, which was completed in 2016. No relevance between the project and the above beach nourishment project could be found through interviews with relevant officers on the Tuvalu side, experts of the project and the JICA “Project on Pilot Gravel Beach Nourishment against Coastal Disaster on Fongafale Island”. It was not confirmed that the research results and technical advice from the project were used in the formation of the beach nourishment project. UNDP's Tuvalu Coastal Adaptation Project, a project funded by the Green Climate Fund (GCF), is currently assessing beach nourishment.

The indicator for the Overall Goal and its achievement at the time of the ex-post evaluation are shown in the following table.

Table 4: Achievement of the Overall Goal

Overall Goal	Indicator	Actual
Countermeasure plan against sea level rise by promoting sand production-transportation-sedimentation process considering the effect of human activities and anthropogenic construction is adopted as coastal management policy of Tuvalu Government.	No indicator was selected during the project period.	The incidence of Impact is limited. Based on the extent to which the coastal protection measures of the Tuvalu government adopted the recommendations of the project, open-cut of the Causeway proposed in the Final Report had been incorporated into the development plan at the time of ex-post evaluation. However, open-cut of the Causeway was chosen as a measure to support small-scale fishery, not as a coastal protection measure.

3.2.2.2 Continuation of Research and Monitoring

One of the paths towards achievement of the Overall Goal is the continuation of research and monitoring by the Tuvalu government. The accumulation of research results and data through research and monitoring will contribute to policy planning in coastal protection in the future and will be an essential source of information for aid and research. The continuation of research and monitoring will also stimulate the interest of international cooperation agencies and research institutions.

At the time of the ex-post evaluation, out of the executing agencies, the Fisheries Department alone regarded research as its jurisdiction. However, research on coastal protection and conservation of the natural environment (such as protection of foraminiferal habitats) was not carried out because the department only conducted research and data collection from the viewpoint of fisheries resources management. The Fisheries Department had discontinued the operation of the experimental facility for aquaculture of foraminifera at project completion due to expensive operation costs. At the time of the ex-post evaluation, the executing agencies did not prepare monitoring plans for the continuation of the research and the monitoring schemes were not established.

Another path to the Overall Goal is subsequent research in Tuvalu or neighboring island countries by experts and other researchers who participated in the project. Research results from neighboring island countries which have similar natural and social conditions may be used in coastal protection measures in Tuvalu.

The interviews with experts in the ex-post evaluation found that experts in the project were conducting follow-up studies such as those on aquaculture foraminifera on coral gravel in Japan but follow-up studies were not ongoing in Tuvalu or in neighboring island countries. Interviews with relevant parties of the Tuvalu government and international cooperation agencies[15] did not confirm research activities relevant to the research results of the project.

The overall goal has not been achieved. Out of the eco-technological measures proposed by the project, open-cut of the Causeway was adopted in the regional development plan but it was not regarded as a measure for coastal protection. The executing agencies did not resume research and monitoring activities and follow-up studies in Tuvalu or in neighboring countries.

3.2.2.3 Other Positive and Negative Impacts

(1) Impact on the Natural Environment

The terminal evaluation did not point out a negative impact on the natural environment.

[15] Interviews with four officers in the Secretariat of the Pacific Community (SPC), the Secretariat of the Pacific Regional Environmental Programme (SPREP), and the United Nations Development Programme (UNDP)

The project built aquaculture tanks for foraminifera. A building was removed and equipment such as tanks had been stored in an existing government facility at the time of the ex-post evaluation because a cyclone destroyed the facility in 2015. At the time of the ex-post evaluation, other equipment was installed in existing government buildings. Therefore, the negative impact on the natural environment caused by the project is considered very minor.

(2) Resettlement and Land Acquisition

The project built a facility for the aquaculture of foraminifera. As the facility was set up on land owned by the Tuvalu government, resettlement of residents and land acquisition were not required.

(3) Obtaining Patents

Based on the research results of this project, two patents had been obtained by the time of the ex-post evaluation. The University of Tokyo and Oceanic Planning Corporation applied for and obtained a patent on technology for aquaculture of foraminifera in Japan. Experts and a counterpart on the Tuvaluan side were co-inventors of the patent, and the counterpart became the first patent holder in Tuvalu. In addition, Ibaraki University applied for and obtained a patent on wastewater treatment with sea water in Japan.

(4) Contribution to Activities for Environmental Awareness

Based on the research results of this project, picture books were made for environmental education and these were distributed in Tuvalu after project completion. The picture books were written in Tuvaluan and explained that the island consisted of coral and foraminifera and that the protection of their habitat was crucial. In the ex-post evaluation, it was found through an interview with a school official that the picture book was in a classroom at a school in Funafuti and children with an interest could read it.

JICA's *Project for Pilot Gravel Beach Nourishment against Coastal Disaster on Fongafale Island*, Tuvalu conducted awareness campaigns using the research results of the project (the island consists of foraminifera and protection of the foraminifera habitat contributes to coastal protection). At the time of the ex-post evaluation, residents regularly clean up the beach made by the gravel beach project.

According to counterparts, the habitat map of foraminifera was used as reference material for public explanation when the Fisheries Department established fish habitat protection areas.

(5) Utilization of New Skills in Daily Operation

The counterparts of the project utilize capabilities acquired in this project in daily operation. The counterparts of the Fisheries Department strengthened their abilities as research divers and were collecting samples for research on ciguatera poisoning at the time of the ex-post evaluation. Moreover, the counterparts in the Department of Lands and Survey had gained skills in using the latest survey instruments through the project and were surveying outer islets at the time of the ex-post evaluation.

Since this project has to some extent achieved the project purpose and overall goal, effectiveness and impact of the project are fair. For the Project Purpose, coastal protection measures were proposed by using the research activities of this project but the monitoring schemes were not established at the executing agencies. For the Overall Goal, the regional development plan adopted open-cut of the Causeway but the open-cut was not regarded as a coastal protection measure. The executing agencies did not conduct research and monitoring activities and a follow-up study was not found in neighboring countries.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

Table 5: Inputs for the Project

Inputs	Plan	Actual
(1) Experts	1 Long-Term (Project Coordination, no information on MM*) 5 Short-Term (Project Leader/Marine Ecology, Remote Sensing, Costal Engineering, Costal Erosion Assessment, and Marine Geology, no information on MM)	3 Long-Term (Project Coordination, 60MM) 17 Short-Term (7 Marine Geology/Ecology, 2 Remote Sensing, 4 Coastal Engineering,1 Foraminifera, 38 MM)
(2) Trainees received	No information on the number of trainees	3 persons
(3) Equipment	Ultrasonic current meter, Water quality testing equipment, Survey equipment, Ecological research equipment, etc.	Aquaculture tanks for foraminifera, Ultrasonic current meter, Water quality testing equipment, Survey equipment, etc.
(4) Local Cost Expenditure	10 million yen	15 million yen
Japanese Side Total Project Cost	Total 160 million yen	Total 266 million yen
Tuvaluan Side Total Project Cost	No information	Total 1 million yen (estimation, project operational cost)

Source: Internal documents, Terminal evaluation report
Note: * MM stands for man/months.

3.3.1.1 Elements of Inputs

For the input of the Japanese side, although three long-term experts were assigned, only one expert was stationed in Tuvalu except for transition periods. Thus, the actual assignment was largely in accordance with the original plan. The number of short-term experts was increased mainly due to the facts that (1) aquaculture tanks for foraminifera were operated in Tuvalu as well as in Japan and one short-term expert in Marine Ecology who designed the facilities was added and (2) the number of short-term experts in Marine Engineering was increased because research on water quality improvement was added. In addition, one of the dispatched experts was a foreign researcher who was responsible for teaching counterparts about the aquaculture of foraminifera. In the opinion of the executing agencies, the expertise of the dispatched experts matched research content. As experiments on the aquaculture of foraminifera was added to the project scope, aquaculture tanks for foraminifera were added to the equipment provided. At the time of the ex-ante evaluation, it was assumed that experiments on the aquaculture of foraminifera would take place in a small tank. However, actual use of the aquaculture technology to be developed would require introduction on a larger scale. The Aquaculture tanks were therefore constructed for larger scale aquaculture experiments.

For the inputs from the Tuvaluan side, 10 officers were assigned for counterparts during the project period. In addition, the Tuvaluan side provided some equipment (sinks, air conditioners), a project office, utility costs, a part of the project operational costs (transportation costs of equipment, cost of survey boats, etc.). However, the Japanese side bore the cost of electricity cost for the aquaculture tanks for foraminifera as this was too expensive for the Tuvaluan side.

3.3.1.2 Project Cost

The project cost was planned to be JPY 160 million. The actual project cost was JPY 266 million, which was significantly higher than planned (166% of the planned project cost). Major reasons for the increase in project cost were (1) the cost of the equipment provided substantially exceeded the plan (planned: JPY 30 million, actual: JPY 80 million), (2) the cost associated with the dispatch of experts became significant (approximately JPY63 million on a contract basis), and (3) personnel costs for experts were required (approximately JPY 39 million on a contract basis). For the increase in the cost of the equipment, as aforementioned, the construction of larger aquaculture tanks for foraminifera was included in the project scope and the amount of other equipment increased as well. The cost associated with the dispatch of experts increased because more short-term experts were assigned and this increased the number of trips to Tuvalu. The short-term experts made 90 trips in total. The personnel costs for experts were for the employment of an expert who

designed and supervised the construction of the aquaculture tanks for foraminifera.

3.3.1.3 Project Period

This project was implemented from April 2009 to March 2014, and the project period was as planned (100% of the planned period). At the beginning of the project period, the equipment provided required transformers due to a difference in voltage. However, this minor problem did not cause a significant delay in the project activities.

Although the project period was within the plan, the project cost exceeded the plan. Therefore, efficiency of the project is fair.

3.4 Sustainability (Rating: ①)

3.4.1 Related Policy and Institutional Aspects for the Sustainability of Project Effects

For the policy and institutional aspects, it is important that policies remained intact for the continuation of relevant research and the introduction of coastal protection measures based on the eco-technological methods proposed by the project.

The national development strategy at the time of the ex-post evaluation was *Te Kakeega III (2016-2020)*. *Te Kakeega III* set targets for 12 development issues and, given its serious impact on Tuvalu, climate change was regarded as the primary development issue. To protect Tuvalu from the impact of climate change, the national strategy recognized the necessity of various measures to enhance resilience to climate change. In the field of the natural environmental, the strategy assumed that human activities were adversely affecting naturally formed coastlines and proposed coastal protection measures that did not disturb the process. These measures were restrictions on construction activities, a ban on the collection of sand and stone, and the plantation and preservation of coastal vegetation.

At the time of the ex-post evaluation, *NAPA* was ongoing. The implementation of the program was divided into three phases and *Phase 2 (NAPA 2)* was underway at the time of the ex-post evaluation. As mentioned above, coastal protection was one of the priority areas of *NAPA* but the main focus of *NAPA 2* was disaster prevention and coastal fishery. For this reason, a project to implement coastal protection measures proposed by this project had not been carried out at the time of the ex-post evaluation. The succeeding plan of *NSAP* was under preparation at the time of ex-post evaluation.

Tuvalu ratified the Paris Agreement (December 2015) in COP 21 and, as a contracting party of the agreement, was responsible for the preparation of an adaptation plan and its implementation (Clause 9, Article 7). The agreement also referred to the effective action for climate change that developing countries among the contracting parties, especially island countries, needed to adopt to improve their capacity (Clause 1, Article 11).

Given the contents of the national development strategy, there is the condition that the policy contributes to the sustainability of the project effects.

3.4.2 Organizational Aspects for the Sustainability of Project Effects

For the organizational aspects, it is crucial that organization for research and monitoring is well-established for the implementation of a project's subsequent research.

At the time of the ex-ante evaluation, there was no research institute conducting scientific research in Tuvalu. Therefore, the implementation scheme centered on the Environment Department under the Ministry of Natural Resources and Environment. Moreover, researchers from SOPAC and USP were expected to participate in the project as sufficient research resources could not be obtained in Tuvalu. This cooperative relationship was intended to secure future research resources. In consideration of the research content, the Department of Environment, the Fisheries Department and the Department of Lands and Survey became the executing agencies of the project. During project implementation, the Department of Environment Bureau became a section under the Ministry of Foreign Affairs, Trade, Tourism, Environment, and Labor. On the hand, the Fisheries Department and the Department of Lands and Survey belonged to the Ministry of Natural Resources.

At the time of the ex-post evaluation, the Department of Environment remained under the Ministry of Foreign Affairs, Trade, Tourism, Environment and Labor while the Fisheries Department and the Department Lands and Survey stayed under the Ministry of Natural Resources. Due to the duties and the level of human resources of the executing agencies, no scheme to implement subsequent research of the project was established. The organization for the research and monitoring of each executing agency is shown in the following table.

Table 6: Organization for Research and Monitoring of the Executing Agencies

Executing Agencies	Current Situation
Department of Environment	Since research was not in the mandate of the department, there was no scheme to continuously conduct research as a daily operation. The Department of Environment did not collect environmental data regularly, and no monitoring that was relevant to the research of the project was conducted. At the time of the ex-post evaluation, there was one official in the department and no one was assigned for research and monitoring.
Fisheries Department	The department conducted research from the viewpoint of fishery resource management (current amount of fishery resources, ciguatera poisoning, etc.) but it did not conduct research for coastal protection and preservation of the natural environment. The Fisheries Department was responsible for monitoring but its purpose was to manage fisheries resources. Therefore, the Fisheries Department did not conduct research and monitoring to enable subsequent research of the project. Four staff was engaged in research and monitoring in the field of coastal fisheries.
Department of Lands and Survey	Since research was not in the jurisdiction of the department, there was no scheme to continuously conduct research as a daily operation. Surveying was the main task of the Department of Lands and Survey and topography data of Tuvalu was continually collected. At the time of the ex-post evaluation, two staff were assigned for surveying but data collection had nothing to do with the continuation of the research conducted by the project.

Source: Answers for the questionnaires to the executing agencies, Interviews with relevant officials

Table 7: Number of Employees of the Executing Agencies after Project Completion

Unit: person

	2014	2015	2016
Department of Environment	3	1	1
Research	0	0	0
Monitoring	0	0	0
Fisheries Department	No Data	43	43
Research*	4	4	4
Monitoring*	4	4	4
Department of Lands and Survey	6	8	8
Research	0	0	0
Monitoring**	2	2	2

Source: Answers to the questionnaires with the executing agencies
Note 1: * The same staff are assigned for both research and monitoring.
Note 2: **The number of staff who are in charge for land survey and mapping

Researchers at SOPAC and USP, those who were supposed to join the project at the time of the ex-ante evaluation, did not participate in the research of the project but a foreign researcher (belonging to SOPAC at the beginning and, then, transferred to USP) became an expert of the project. However, this cooperative relationship was based on an individual connection with the researcher. The project did not establish a scheme to have foreign research institutes continue their research in the country and to support the improvement of the research capacity in Tuvalu after project completion.

In Tuvalu, organization for research and monitoring was not established. Thus, there was a problem in the organizational aspects.

3.4.3 Technical Aspects for the Sustainability of Project Effects

For the technical aspects, it is important that counterparts can maintain their research and monitoring capabilities through training and daily operation and to use the equipment provided for subsequent research.

Counterparts collected research data during project implementation and obtained the capability required for monitoring during the project period. At the time of the ex-post evaluation, research and monitoring relevant to the project was not being conducted but the counterparts were using the capabilities necessary for monitoring in daily operation. In the site visit survey, various equipment provided by the project was examined. Based on the list of the equipment provided made at the terminal evaluation, out of 111 items provided to the Tuvaluan side, there were 98 items for the Fisheries Department and 13 items for the Department of Lands and Survey. Although research and monitoring relevant to the project was not being conducted, the equipment relevant to the daily operation of the executing agencies was being used at the time of the ex-post evaluation. The use of the equipment suggested that the counterparts to some extent maintained their capability for monitoring acquired during project implementation.

The Fisheries Department did not conduct monitoring relevant to the research of the project but scuba equipment and a microscope were used for sample collections in other research. According to officials from the Fisheries Department, water quality testing equipment is hardly used because in training they used a different type of equipment. For the equipment installed at the laboratory of the Fishery Department, a large amount of equipment had been provided and the laboratory was not organized well. For these reasons, the items on the list of equipment provided were not fully inspected. However, most items of expensive equipment (over JPY500,000) were found.


Photo 2: Microscope in Fisheries Department Laboratory

The Department of Lands and Survey used GPS, total station[16], and survey equipment (survey poles, tripods, etc.) for survey operation. After project completion, the GPS could not be used for a certain period because a battery for the equipment could not be obtained. Some of the inexpensive equipment (such as web cameras) was discarded due to depletion but other equipment was found.

Among the training activities of the executing agencies at the time of the ex-post evaluation, the activities which were likely to contribute to the continuation of project effects are shown in the following table.

Table 8: Training Activities of the Executing Agency

Executing Agency	Current Status
Department of Environment	International cooperation agencies provided training on marine spatial management (setting of nature reserves etc.).
Fisheries Department	On coastal fisheries, training on underwater visual censuses[17] was provided. In addition, knowledge on the collection and analysis of sample methods was shared through OJT in the Fisheries Department.
Department of Lands and Survey	Training is mainly on the use of equipment through OJT. International cooperation agencies provided training (use of GIS software, etc.).

Source: Answers from the questionnaires with the executing agencies, Interviews with relevant officials

Neither research nor monitoring relevant to the project was carried out at the time of the ex-post evaluation, although the counterpart was collecting data for the research of the Fisheries Department and the survey operations of the Department of Lands and Survey. The capabilities necessary for monitoring were maintained even at the time of the ex-post evaluation. It is concluded that the sustainability of the technical aspect had been secured to some extent.

[16] Survey equipment to measure several parameters such as distance and angle
[17] A research method on biota based on the number of species by visual observation

3.4.4 Financial Aspects for the Sustainability of Project Effects

For the financial aspects, it is important that budget for research and monitoring is allocated for the activities of subsequent research.

The recurrent budget of the executing agencies after project completion is shown in the following table. Although the recurrent budget of the Department of Environment showed a downward trend, the decrease was due to the organizational change when the function of the Department of Environment was partially transferred to the Climate Change Disaster Management Unit. For the Fisheries Department, the recurrent budget of the Coastal Fisheries Section, a section which was directly involved in the project, remained constant. The recurrent budget of the Department of Lands and Survey showed an upward trend and that for survey and mapping increased substantially in FY 2016.

Table 9: Recurrent Budget for the Executing Agencies after Project Completion

Unit: Australian Dollar

	2014	2015	2016
Department of Environment	154,696	146,927	81,163
Fisheries Department	711,028	711,916	749,704
To Coastal Fisheries Section	136,480	130,638	135,414
Department of Lands and Survey	202,868	210,532	291,797
To Survey and Mapping	60,329	50,300	78,278

Source: Government of Tuvalu (Minister for Finance and Economic Development)

The allocation of the recurrent budget implied that the financial situation of the executing agencies is stable. Nevertheless, research and monitoring relevant to the project were not conducted and there was no allocation of a budget for subsequent research. At the time of the terminal evaluation, the Fisheries Department and the Department of Lands and Survey were supposed to submit monitoring plans to the Department for Planning and Budget. Budget allocation was to be assessed. However, these plans had not been submitted by the time of the ex-post evaluation and, thus, no budget was allocated to monitoring relevant to the research of the project.

At the time of the terminal evaluation, the operation of the aquaculture tanks after project completion was under consideration for more effective use of the facility. However, operation was suspended after project completion because the executing agency could not bear the operating cost (mainly electricity costs) of the tanks. As a cyclone damaged the facility, the aquaculture tanks for foraminifera were removed and, at the time of the ex-post evaluation, the tanks and auxiliary items were stored in warehouses and containers. A new building was being built on the site of the demolished facility with the support of New Zealand.

Research and monitoring relevant to the project were not conducted and no budget was

allocated. Therefore, there is an issue with the financial aspects.

Major problems have been observed in terms of the organizational and financial aspects. Therefore, sustainability of the project effects is low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed at policy-making for coastal protection based on joint research by Japan and Tuvalu and the development of human resources and schemes for the continuous monitoring of coastal topography and the coral reef ecosystem. It was expected that the eco-technological methods based on the research would be adopted in Tuvalu as coastal protection measures. Since the project intention was to pick up research results for coastal protection reflecting the natural process of island formation, the research content of the project was consistent with the development policy of Tuvalu. However, the coastal protection measures developed by the project required a longer period for the incidence of effects and the time scale did not match the urgency of the development needs in Tuvalu. For these reasons, the relevance of the project is fair. The project produced sufficient research results up to project completion and coastal protection measures were prepared. On the other hand, however, sustainable monitoring schemes at the executing agencies were not established through the project. At the time of the ex-post evaluation, out of the proposed measures for coastal protection, open-cut of the Causeway had been adopted in the regional development strategy of Funafuti but not as a coastal protection measure. There, the executing agencies did not conduct research and monitoring activities and subsequent studies were not found in neighboring countries. Thus, the effectiveness and impact of the project are fair. The project period was within the plan but the project cost exceeded the plan. Therefore, the efficiency of the project is fair. The cost overrun was mainly due to an increase in the amount of equipment provided, an increase in the expense of experts dispatched, and the cost associated with the employment of an expert for design and construction supervision. At the time of the ex-post evaluation, the jurisdiction of the executing agencies did not include research and monitoring with the project and an organizational setting for the implementation of subsequent research had not been established. At the time of the ex-post evaluation, no budget had been allocated to relevant research and monitoring. Given these problems in the organizational and financial aspects, the sustainability of the project effects is low.

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

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Equipment provided was effectively utilized during the project period and research results were obtained within the project period. At the time of ex-post evaluation, however, most of the equipment provided to the laboratory of the Fishery Department had not been used as it was difficult to conduct activities relevant to the research of the project. It is difficult for the Tuvalu side to resume relevant research and from it to derive coastal protection measures. Nevertheless, the equipment provided is in good condition and remains usable. Regarding the completion of the new laboratory of the Fishery Department in 2017 as an opportunity, it is desirable that effective use of the equipment provided by the project is examined and that the results of assessment reported to JICA, to be reflected in research and monitoring activities after FY 2018.

4.2.2 Recommendations to JICA

As mentioned above, at the time of ex-post evaluation most of the equipment provided to the laboratory of the Fisheries Department was not in use. It is desirable that monitoring on the assessment for the use of the provided equipment by the Fisheries Department continues and, if possible, give advice on the use of the equipment provided to the department.

4.3 Lessons Learned

Selection of Research Institute as a Counterpart of the SATREPS Scheme

Although the project was joint research, the counterparts of the joint research were government agencies which do not have research in their mandate. While the project included in the Project Purpose the establishment of a sustainable monitoring scheme necessary for the continuation of research, this could not be established at the agencies despite the improvement of the monitoring capacity among the counterparts. In the project, it was difficult to simultaneously implement both the institutional building of a monitoring scheme and the joint research. Moreover, the selection committee of JST should assess the level of research capability of counterpart organizations as well as their mandate from the viewpoint of continuing research. For a project to use the SATREPS scheme, it is desirable that a counterpart organization with an appropriate level of research capability is selected and that confirmation is made that the organizational mandate will not hamper continuation of the research at the time of the detailed planning survey, and also that monitoring capacity will be strengthened through joint research.

Securing Research Resource in an Island Country

At the beginning of the project the Japanese side had considered securing research resources

to be problematic after project completion but no way to solve this issue had been found until the project completion. At the time of the ax-ante evaluation, it was planned that the project would involve research institutes from other countries in joint research to secure research resources in the future from outside of Tuvalu. However, the formal involvement of research institutes was not achieved. In an island country where research resources are scarce, it is desirable that the possibility of regional projects are assessed with a detailed planning survey including the involvement of research institutions in another country. It is also advisable that for enhancement of research resources, the results of such assessment are reflected in a specific and feasible project implementation plan after discussion with the executing agency, and follow up its progress during project implementation.

End