

The Republic of Palau

**Project for Enhancement of Integrated Management of
Coastal Ecosystem in Palau for Strengthening their
Resilience to Climate Change**

Project Completion Report

February 2025

**Japan International Cooperation Agency
(JICA)**

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Project Completion Report

Project Title : Project for Enhancement of Integrated Management of Coastal Ecosystem in Palau for Strengthening their Resilience to Climate Change

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I. Basic Information of the Project

1. Country:

Republic of Palau

2. Title of the Project:

Project for Enhancement of Integrated Management of Coastal Ecosystem in Palau for Strengthening their Resilience to Climate Change

3. Duration of the Project (Planned and Actual)

3 years (from February 2022 to February 2025)

4. Background (from Record of Discussions(R/D))

Small island states are extremely vulnerable to climate change. Sea level rise and more frequent visit of large-scale typhoons caused by climate change are serious threats for the survival of those nations and people. Therefore, healthy coastal ecosystems which protect the land and people from such natural disasters and coastal erosion are the lifeline of small island states.

However, coastal ecosystems in small island states have been degraded by various factors, such as over-exploitation of fishery resources and coral bleaching caused by seawater temperature rise. In Addition, since terrestrial and coastal areas are very close in small islands, soil run-off by deforestation and cultivation and

drainages immediately flow into and cause adverse impacts on coastal ecosystems. Therefore, implementation of integrated management of coastal ecosystems which takes into consideration connectivity between terrestrial and coastal areas is essential to strengthen the resilience of coastal ecosystems to adverse impacts by climate change.

Since degradation of coastal ecosystems have been caused by various pressures such as fisheries, tourism, soil run-off and drainage from terrestrial areas, a comprehensive approach should be applied to address such multiple drivers simultaneously. It is essential to develop an integrated managing system participated by stakeholders concerning their conservation and sustainable use, including government, local communities, researchers, private companies and relevant organizations.

In order to address unpredictable ecosystem changes, it is also necessary to take adaptive management approaches which identify and evaluate impacts of Anthropogenic activities on the ecosystem through monitoring indicators which represent each component of the ecosystem and take appropriate measures.

To ensure the integrated coastal ecosystem management effectively, this project was expected to establish the Coastal Ecosystem Management Committee (CEMC) participated by stakeholders across relevant sectors, and three working groups (ecosystem monitoring, conservation and sustainable use, and Communication, education and public awareness (CEPA) under the CEMC. Under the supervision of CEMC, PDCA cycle (developing and implementing an action plan for ecosystem conservation and management, evaluation of results of activities based on scientific information by monitoring and improving the plan and activities) could be operated functionally. PICRC was also expected to serve as the secretariat to carry out administrative works such as organizing CEMC and WG meetings and information sharing among committee members.

5. Overall Goal and Project Purpose (from Record of Discussions(R/D))

Overall goal:

Coastal ecosystem services are sustainably provided and the resilience of the ecosystem to negative impacts of climate change is strengthened through effective and proper integrated coastal ecosystem management in Palau.

Project Purpose:

Capacity for integrated coastal ecosystem management taking into consideration significance of connection between terrestrial and coastal area is enhanced.

6. Implementing Agency

Palau International Coral Reef Center (PICRC)

7. Abbreviation

APCRS	Asia Pacific Coral Reef Symposium
BBP	Bureau of Budget and Planning
BNM	Belau National Museum
BoA	Bureau of Agriculture
BoE	Bureau of Environment
BoF	Bureau of Fisheries
BoT	Bureau of Tourism
CBD	Convention on Biological Diversity
CEMC	Coastal Ecosystem Management Committee
CEO	Chief Executive Officer
CEPA	Communication, Education and Public Awareness
COVID	Coronavirus Disease
COP	Conference of the Parties
CRRF	Coral Reef Research Foundation
DAC	Development Assistance Committee
EPU	Environmental Planning Unit
EQPB	Environmental Quality Protection Board
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environmental Facility

PM Form 4 Project Completion Report

ICRI	International Coral Reef Initiative
ISME	International Society of Mangrove Ecosystem
JCB	Joint Coordination Body
JCC	Joint Coordination Committee
JICA	Japan International Cooperation Agency
MAFE	Ministry of Agriculture, Fisheries, and the Environment
MC	Micronesia Challenge
MNRET	Ministry of Natural Resources, Environment & Tourism
MoE	Ministry of Education
MoF	Ministry of Finance
MoHRCTD	Ministry of Human Resources, Culture, Tourism & Development
MoJ	Ministry of Justice
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NBSAP	National Biodiversity Strategy and Action Plan
NEMS	National Environment Management Strategy
NEPC	National Environment Protection Council
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NPO	Non-Profit Organization
OA	Ocean Account
OECD	Organization for Economic Co-operation and Development
OIA	United States Office of Insular Affairs
OOC	Our Ocean Conference
OPM	Office of Project Management
OSSS	Office of Strategic Support Services
PACMAN	Pacific region mangrove monitoring network
PALARIS	Palau Automated Land and Resource Information System
PAN	Protected Areas Network
PANO	PAN Office
PCC	Palau Community College
PCS	Palau Conservation Society

PM Form 4 Project Completion Report

PDCA	Plan-Do-Check-Act
PIEC	Pacific Islands Environment Conference
PICRC	Palau International Coral Reef Center
PNMS	Palau National Marine Sanctuary
POA	Palau Ocean Academy
PVA	Palau Visitors Authority
SATREPS	Science and Technology Research Partnership for Sustainable Development
SDG	Sustainable Development Goal
SEEA	System of Environmental Economic Accounting
SOE	State of the Environment Report
SPREP	South Pacific Regional Environmental Programme
TNC	The Nature Conservancy
UN	United Nation
USDA	United States Department of Agriculture

II. Results of the Project

1. Results of the Project

1-1 Input by the Japanese side (Planned and Actual)

(1) Total Expenditure from Japanese Side

Planned: 260 million yen (at the beginning of the project, it was 240 million yen, but additional budget is allocated from the donation, so the total amount of planned budget became 260 million yen)

Actual: 257 million yen (From project budget: 214 million yen, From donation: 43 million yen)

(2) Expert

Planned: 2 long-term experts (Chief Advisor/ Coastal ecosystem management and Project Coordinator/ CEPA) and a few short-term experts (Mangrove ecosystem, Soil run-off and Sedimentation, and others will be dispatched as necessary)

Actual: 6 people(2 long-term experts and 4 short-term experts)

Long-term 1: Chief advisor/ Coastal ecosystem management

Long-term 2: Project coordinator / CEPA

Short-term 1: Mangrove ecosystem monitoring

Short-term 2: Soil run-off and sedimentation monitoring

Short-term 3: Coastal community development

Short-term 4: GIS analysis

(3) Number of Participants in the Trainings in Japan

Planned: Not determined number of participants

Actual: 7 people in 2 trainings

- Counterpart training

Location: Iriomote island, Okinawa, Japan

Number of trainees: 5

Training topic: Mangrove monitoring

- Group and region focus training (Coastal and Marine Ecosystem Conservation Management for Global Biodiversity Goals) Location: Okinawa, Japan

Number of trainees: 2

Training topic: Coastal management

(4) Equipment

Planned: Vehicle, boat, and other equipment necessary for coastal ecosystem monitoring

Actual:

- Vehicle (Toyota Tacoma)
- Boat (33ft boat with Suzuki twin engine)
- Trailer for the boat (33ft Double Axle Boat Trailer)

(5) Cost of operation

Planned: Not defined

Actual: 39 million Japanese Yen

Examples of operational cost: travel expense, training implementation, equipment for mangrove and sedimentation monitoring, and pilot activity (ecotour), office supplies, and labor for the assistant staff and other workers.

1-2 Input by the PICRC side (Planned and Actual)

(1) Assignment of Counterparts

Planned: Project Director (PICRC), Project Manager (PICRC), Mangrove monitoring (PICRC, MAFE), Soil-runoff and Sedimentation (PICRC, EQPB, PCC), CEPA (PICRC, PCC)

Actual: Project Director (CEO of PICRC), Project manager (Director of Research Dept., PICRC), Mangrove monitoring (Research Dept., PICRC and MAFE, BoE, and PAN Office), Soil run-off and Sedimentation (Research Dept., PICRC, EQPB, and PCC), CEPA (Outreach Dept., PICRC and Science Dept., PCC)

(2) Provision of Project space and other necessary equipment

Planned: Office space with necessary equipment

Actual: Office space, internet, meeting rooms and laboratory, boat and vehicles belong to PICRC, equipment such as AAQ and weather station.

(3) Other inputs

Planned: Local operation cost

Actual: Local operation cost such as cleaning of project office. The strategic partners such as MAFE, EQPB, Airai and Ngiwal state used their own vehicles to come to the project sites. Airai and Ngiwal state let us use their state PAN office boats.

1-3 Activities (Planned and Actual)

- **Output 1: Integrated coastal ecosystem management system among multiple stakeholders, including marine and terrestrial areas, is established.**

Based on a series of discussion and agreement between PICRC and JICA during the basic planning survey for the project development, a Coastal Ecosystem Management Committee (CEMC) was originally planned to be established as an output of this component. In order to ensure the integrated coastal ecosystem management effectively, both parties agreed on the Minister of MAFE as the chair and PICRC as the secretariat of CEMC, and participated by relevant national government agencies (MAFE, MoE, PICRC, EQPB and PCC), state governments and NGOs (TNC and PSC), and also agreed to set up working groups to effectively implement the activities and develop products under each Output of the Project.

When the project started operation in February 2022, MAFE already started a 6-year project of Integrating biodiversity safeguards and conservation into development funded by GEF in 2018 (that was called GEF6 project). This GEF6 project aimed to address the negative impacts of unsustainable sector-led development practices on biodiversity-rich landscapes and mainstream biodiversity conservation into integrated land and seascape governance, planning and management in Palau. The GEF6 project developed Joint Coordination Body (JCB), a framework of 10 state governments in Babeldaob Island as a target stakeholder and supporting subcommittee that consisted of related government agencies and organizations to provide technical advice for the JCB. The GEF6 aim showed a quite similar direction of this coastal project and MAFE supported the GEF6 project until July 2024 that overlapped about 2 and half years of the coastal project. To maximize the limited capacity and resources of the leading agency and prevent duplication of the structure with the existing framework, the GEF6-JCB has been identified as a target framework to provide results and outputs of the coastal project for enhancing management of coastal ecosystems instead of creating a new Coastal Ecosystem Management Committee (CEMC). The coastal project team supported the GEF6-JCB framework through technical group and technical

subgroups as a part of the JCB's subcommittees to provide project results and outputs. Technical subgroup 1 was targeted to enhance management system and structure besides the subgroup 2 and 3 were targeted to enhance mangrove and sediment management respectively. The subgroup 4 was targeted to enhance education and awareness.

Project team and GEF6 secretariat in the Office of Strategic Support Services (OSSS) of MAFE formulated a technical subgroup 1 and discussed the direction of integrated management of coastal ecosystems and provided coastal project results into the master planning process of state governments of JCB to enhance their capacity on integrated management and highlight leadership of MAFE.

A concept of the first action plan for emphasizing mangrove and sedimentation monitoring and sustainable resource use and awareness raising on mangroves in PAN sites was developed and approved by the JCB. It proposed that the PAN Office of the Bureau of Environment (BoE) of MAFE to be its implementing agency. However, BoE refused it, since PAN Office had to concentrate in the implementation of the PAN Strategic Plan (2022-2027) until 2027 and would have neither the personnel nor the time to implement the proposed action plan (ver.1).

Although the secretariat of GEF6-JCB was transferred from MAFE to MoF after the GEF6 ended in July 2024, the activities of JCB were not active during the transition period for the second last 2024 until transition of the governments due to the Presidential Election in November 2024.

On the other hand, four state governments, Ngardmau, Ngeremlengui, Ngatpang and Aimeliik in the western area of Babeldaob Island have been established "Dmakeiukl" as a framework that has worked jointly together to manage their land and marine resources since 2022. The framework has started to organize regular meetings with the assistance of The Nature Conservancy (TNC) on coordination and funding support from U.S. Office of Insular Affairs (OIA) and The Pacific BioScapes Programme funded by European Union (EU) and Pacific Regional Environment Programme (SPREP) to discuss their common issues including sedimentation and mangrove monitoring at the Ngermeduu Bay in Babeldaob Island.

The project team discussed with TNC to modify the concept of the first draft action plan (ver.1) and developed the second action plan (version 2), focusing on for its implementation in Ngermeduu Bay and its watershed area under the Dmakeiukl framework with political and technical guidance and assistance from BoE, PICRC and EQPB as a pilot action to the extension of the project outputs for further enhancement of coastal ecosystem management in Babeldaob and other outer Islands.

Minister of MAFE and Director of BoE agreed to support to the mangrove monitoring, management and related CEPA activities of the action plan (ver.2) if the funding is secured for its implementation during the meeting with them on December 19, 2024.

The action plan (ver.2) was accepted by the Dmakeiukl 2 states at their Leadership Meeting on January 23, 2025, and TNC would coordinate Dmakeiukl state PAN Coordinators and Rangers to prepare endorsement of the plan by the Dmakeiukl 4 states at the next Leadership Meeting during the second quarter of 2025. TNC also started preparation to secure another funding from OIA to implement the action plan in 2025.

Director of BoE and PAN Coordinator of PANO again confirmed their assistance for the action plan (ver.2) implementation during the last meeting between BoE and PICRC CEO and Chief Advisor of the project on February 4, 2025. They also accepted the Mangrove Monitoring Protocol and Conservation Plan at the meeting in line with the PAN Strategic Plan.

CEO and board members of EQPB also agreed to support the sediment monitoring and analysis of the action plan during the board member meeting on February 5, 2025. They were keen to accept the Monitoring Protocol and Guideline of the soil run-off and sedimentation at the board meeting and considered official process of the endorsement after the meeting.

Lastly, PICRC CEO agreed to follow up the action plan implementation and longer-term support for the national and state government challenges on coastal ecosystem management in Palau.

< Planned >

Activity: 1.1 Establish a technical group to support existing framework of coastal

ecosystem management (GEF6-JCB) consisting of stakeholders on marine coastal and terrestrial management as a multi-level stakeholder committee.

Activity 1.2 Set up technical sub-groups for necessary activities such as 1) policy development, 2) monitoring, conservation and sustainable management of mangrove ecosystem, 3) monitoring and management of soil run-off, and 4) CEPA participated by multiple agencies and organizations.

< Actual: Modification of the target stakeholders >

- A kick-off meeting was organized on June 7 in 2022 to involve all the stakeholders regarding the project to share the project design and activities.
- Through the discussion with GEF6 secretariat in the Office of Strategic Support Services (OSSS) of MAFE, Joint Coordination Body (JCB) of GEF6 was identified to share and discuss the results of the project activities and endorse the draft action plan from the Output 1, draft protocol and conservation plan from Output 2, and draft protocol and guideline from Output 3, and establish a system for integrated coastal ecosystem management as Output 1.
- Project team and GEF6 secretariat of MAFE formulated a technical subgroup 1 and discussed the direction of integrated management of coastal ecosystems and provided coastal project results into the master planning process of state governments of JCB to enhance their capacity on integrated management and highlight leadership of MAFE.

< Planned >

Activity 1.3 Collect relevant policies and information on coastal ecosystem management including coral reefs, mangrove ecosystem, and land use management as well as their activities that have been previously set and currently implemented and analyze them.

- Project team discussed with GEF6 secretariat of MAFE on sustainability of JCB framework and Office of Project Management (OPM) of Bureau of Budget and Planning (BBP) of Ministry of Finance handed over the JCB secretariat from MAFE after the GEF6 ended in July 2024. However, the subcommittee structure (i.e. technical subgroup) was still under consideration during the

transition period of the JCB secretariat.

< Planned >

Activity 1.4 Utilize results from output 2 & 3 for enhancing relevant policies, plans, and their implementation.

< Actual: Sharing project results with the JCB during the regular meeting >

- Project team attended regular (quarterly) meetings of JCB on August 11, December 1 in 2022 and March 2 in 2023 to provide results of baseline survey and monitoring of mangroves and sedimentation.
- Project team attended the 16th (Jun 8) and 17th (Sept 6) of regular (quarterly) meetings of JCB in 2023 to provide results of mangrove monitoring, sedimentation monitoring and CEPA plan for community awareness.
- At the 17th JCB regular meeting, project team joined the discussion on sustainability of JCB after the GEF6 project termination in 2024 and offered to support JCB to identify necessary actions for maintaining its framework.
- Project team attended the 18th of regular (quarterly) meetings of GEF6-JCB to share the project results of mangrove and sedimentation monitoring with the JCB members (December 15, 2023).
- Project team attended the 19th of regular (quarterly) meetings of GEF6-JCB to propose draft outlines of mangrove monitoring protocol, sedimentation monitoring protocol, mangrove ecosystem conservation plan, sediment guideline and action plan on mangrove MPA enhancement to JCB members (May 7, 2024).

< Planned >

Activity 1.5 Draft an Action Plan/Recommendation/Proposal for Enhancement of Integrated Coastal Ecosystem Management based on the information collected in 1-3 to 1-5 activities and discussions by technical group members, and approve it in the GEF6-JCB.

< Actual: Discussion with new GEF8 project to seek funding opportunity for Action plan>

- Project team discussed with a consultant team of Global Environment Facility (GEF) 8 in the Bureau of Budget and Planning (BBP) - Ministry of Finance (MoF) to seek a funding opportunity for implementing the proposed action plan (version 1) on mangrove conservation in MPAs and soil runoff reduction in Babeldaob Island (January 29, 2024).
- Project team attended GEF8 Inception workshop to share the outline of proposed action plan (ver.1), including its outcomes and outputs (January 30, 2024).
- Project team also attended GEF8 Validation Workshop to follow up their planning processes (May 14, 2024)
- Project team discussed with GEF8 team of MOF (Ms. Charlene Mersai, GEF Operational Focal Point for Palau) to seek a funding opportunity for the implementation of the proposed action plan (ver.1) (September 25, 2024).

< Actual: Discussion on Action plan with partner agencies and JICA Head Quarter >

- Project team had meetings with Dr. Noriaki Sakaguchi, Senior Advisor, Global Environment Department, JICA and partners (Bureau of Environment (Ms. Ilima Hirao Kloulchad, Director), PAN Office (Ms. Melvira Kyarii Kazuma, PAN Coordinator), Environmental Quality Protection Board (Mr. Michael Blesam, CEO), PCS (Ms. Lolita Gibbons-Decherong, Program Manager), TNC (Dr. Yimnang Golbuu, Coral Resilience Director), PCC (Ms. Vernice Yuzi, Associate Professor), GEF6 (Ms. Dolmii Remeliik, Project Manager)) to discuss project outputs and the concept of action plan (ver.1) (April 11 and 12, 2024).
- Project team had a meeting with TNC (Dr. Yimnang Golbuu, Coral Resilience Director) to discuss the concept of action plan (ver.1) (March 29, 2024).

< Actual: Discussion with MAFE, BoE and PANO to develop an action plan >

- Project team had a meeting with the GEF6 secretariat (Ms. Dolmii Remeliik) to discuss the implementation of proposed action plan (ver.1) and sustainability of JCB after the GEF6 project (February 5, 2024).
- Project team held a meeting with the Minister of MAFE to discuss the contents of the proposed action plan (ver.1) (February 6, 2024).
- JICA project team discussed with PICRC project team on the contents of

proposed action plan (ver.1) in March and revised the plan.

- Project team had meetings with PANO (Ms. Melvira Kyarii Kazuma, PAN Coordinator) to discuss the concept of action plan (ver.1) on mangrove MPA and soil runoff reduction. However, BoE refused it, since PAN Office had to concentrate in the implementation of the PAN Strategic Plan (2022-2027) until 2027 and would have neither the personnel nor the time to implement the proposed action plan (ver.1). (February 15, July 3, 16, 25, and August 5, 2024).

< Actual: Discussion with MoF to seek funding opportunity for action plan implementation >

- Project team had a meeting with a SEEA advisor of Ocean Account (OA) project (Mr. David Adema) in MoF on mangrove monitoring on possible funding to support implementation of action plan (ver.1). Although the OA project possibly provided fund for implementing a part of the plan, MoF could not be an agency for leading the whole action plan processes (August 23, 2024).

< Actual: Collaboration with Dmakeiukl framework to implement the action plan to utilize the project outputs >

- Project team had a meeting with TNC (Ms. Yvonne Ueda, Conservation Manager) to discuss the project outputs and identified Dmakeiukl framework (Babeldaob western 4 states: Aimeliik, Ngaradmau, Ngeremlengui and Ngatpang) as a possible target to utilize the project outputs while JCB framework (Babeldaob 10 states) was under the transition process since the GEF6 project ended. The project team and TNC agreed to develop a revised action plan (ver.2) for Dmakeiukl states and organize a co-host workshop to share the action plan (ver.2) with the Dmakeiukl state PAN Coordinators and Rangers (September 18, 2024).
- Project team organized a workshop for Dmakeiukl state PAN Coordinators and Rangers to share the project results on mangrove and sedimentation monitoring and the concept of revised action plan (ver.2) for Dmakeiukl to enhance integrated management of coastal ecosystems around Ngermeduu Bay (November 26, 2024).

< Actual: Discussion with Minister of MAFE and Dmakeiukl on Action Plan implementation>

- Project team, Dr, Noriaki Sakaguchi, Senior Advisor, Global Environment Department, JICA and Mr. Yosuke Kato, Project Coordinator, JICA Palau Office had a meeting with Minister Steven Victor of MAFE and Ms. Ilima Hirao Kloulchad, Director of BoE to discuss the action plan (ver.2) for Dmakeiukl. Minister and Director of BoE agreed to support the action plan when TNC secured the funding to implement the plan (December 19, 2024).
- Project team attended Dmakeiukl Leadership Meeting to submit the action plan (ver.2). Although two states were absent at the meeting, other 2 states of Dmakeiukl adapted the action plan and agreed to discuss its endorsement at the next leadership meeting during the second quarter of 2025. TNC also agreed to start preparation for seeking fund from the OIA to implement the plan (January 23, 2025).
- Project team had discussion with Director of BoE and PAN Coordinator of PANO on supporting action plan (ver.2) for Dmakeiukl states and agreed their assistance for Dmakeiukl states on mangrove monitoring and management. They also mentioned organizing the workplan of the state PAN Coordinators and Rangers to fit the action plan activities (February 3, 2025).
- Project team attended the Board meeting of EQPB and discuss the action plan (ver.2) implementation. Board members and CEO of EQPB mentioned strong support for the action plan implementation and future collaboration for more integrated management of coastal ecosystems (February 5, 2025).

● **Output 2: Mangrove ecosystem monitoring and management mechanism is properly developed.**

Project team conducted a baseline survey and pilot monitoring of mangrove ecosystem with BoE to develop a mangrove monitoring protocol at the project sites in Airal and Ngiwal states.

Besides pilot monitoring, BoE has been working with USDA-Forest Service to conduct nationwide mangrove monitoring as a part of the programs for Pacific region mangrove monitoring network (PACMAN), mainly for an assessment of

blue carbon estimation, and proposed the project to cooperate together for mangrove monitoring for each side's perspective. Therefore, the project team worked closely with BoE and USDA-Forest Service, while the project team mainly focused focus on a monitoring protocol for the state government management activities conducted by the state PAN Coordinators and Rangers in the future.

Project team has also worked on development of the conservation plan of mangrove ecosystems to recommend for BoE and the state governments.

< Planned >

Activity 2.1 Set up mangrove ecosystem monitoring unit under the Ecosystem Monitoring Technical Sub-group established in activity 1-2 to conduct planning, implementation, and analyzing baseline survey and monitoring on mangrove ecosystem.

< Actual: Mangrove pilot monitoring >

- Project team started pilot mangrove monitoring from (December 2022) with BoE, MAFE and state PAN rangers at the project sites of Airai and Ngiwal states, after selection of monitoring sites The sites were selected at upper stream, middle stream and downstream in each state to cover mangrove species as much as possible. The distribution of monitoring plots in each location was followed by the methodology of USDA Forest service.
- A pilot monitoring of Mangrove was conducted by the project team of JICA expert and PICRC staff with BoE, MAFE and state PAN rangers at the project sites in Airai and Ngiwal states (December 2022-July 2023 and May 2024-September 2024).

< Planned >

Activity 2.2 Examine the current condition including policy and its implementation on mangrove ecosystem monitoring and management in Palau.

< Actual: Discussion with relevant government agencies and organizations >

- Project team set up a mangrove sub-group, composed of PICRC, JICA,

BoE-MAFE, PCC and EQPB, to develop a mangrove monitoring protocol and conservation plan and organized the meeting with those partner organizations (July 25, 2023).

< Planned >

Activity 2.3 Implement baseline survey on mangrove ecosystem to identify the distribution, inventories, its services, and threats in order to develop monitoring system and develop a mangrove ecosystem conservation and management strategy.

< Actual: Baseline survey of mangrove monitoring >

- The baseline survey of mangrove monitoring was conducted from July to September 2022 to understand the present distribution of mangrove area in Babeldaob and Koror Islands. The survey was conducted by visual observation (mangrove species and its occupancy of the area) at 22 sites in 11 states (2 sites in each state). While common species are the same in entire Babeldaob Island, species composition slightly differs between northern part and southern part of Babeldaob Island.
- Satellite image analysis also performed to know the transition of state-basis mangrove area. The area increases in some states, while the area drastically decreases, such as Melekeok.

< Planned >

Activity 2.4 Identify sustainable mangrove ecosystem monitoring system in Palau and establish mangrove monitoring & evaluation mechanism.

< Actual: Coordination with BoE/USDA and PALARIS >

- Project team had a meeting with BoE (Ms. Leena Mesebeluu, Director) and BoE acknowledged the plan of mangrove training. BoE mentioned the need for carbon stock research on mangrove to estimate the economic value and Dr. Richard Mackenzie continued to conduct his carbon stock monitoring project under the BoE (November 7, 2023).
- USDA Forest Service (led by Dr. Richard MacKenzie of Pacific Southwest

Research Station) focused on carbon stock estimation of mangroves, while the project team focused on mangrove ecosystem monitoring, using same monitoring plots and data, such as species, diameter), to save manpower of the survey and time.

- Project team also collaborated with Dr. Richard MacKenzie (Pacific Southwest Research Station, USDA Forest Service) working on carbon stock estimation of mangroves around Palau for MAFE with BoE research team.
- Project team had a meeting with PALARIS (Dr. David Idip, Senior GIS Analyst and Ms. Ophelia Ongalibang, GIS Analyst) for sharing data that obtained each side on GIS mapping (May 17, 2024).

< Planned >

Activity 2.5 Establish mangrove ecosystem monitoring protocol.

< Actual: Discussion on mangrove monitoring protocol >

- Project team organized the mangrove sub-group meeting (November 29, 2023 and April 12, 2024) with the partner organizations (BoE, PCC and EQPB) to discuss the indicators and methodologies of mangrove monitoring protocol.

< Planned >

Activity 2.6 Provide a series of training for mangrove ecosystem monitoring to relevant stakeholders.

< Actual: Mangrove monitoring training / field test for state PAN Coordinators and Rangers>

- A training on Mangrove Ecosystem Conservation was conducted supported by the International Society of Mangrove Ecosystem (ISME) in Iriomote Island and JICA Okinawa International Center in Okinawa, Japan, inviting three (3) staff members from PICRC and two (2) people from BoE, MAFE and Airai State Government for their capacity building (October 14 to 27, 2023).
- Project team attended an online meeting on NOAA mangrove training workshop that was planned to conduct in June 2024) (February 15, 2024) to exchange the information of mangrove monitoring protocol, which the project team was

preparing.

- Project team attended a meeting on capacity building of PAN coordinator organized by TNC to share the plan of training for PAN coordinators and rangers (February 20, 2024) for further cooperation on training using monitoring protocol which was prepared by the project.
- Project team conducted a field test of simplified mangrove monitoring methodology designed for State PAN Coordinators and Rangers (December 9-10, 2024)

< Planned >

Activity 2.7 Implement mangrove ecosystem monitoring according to the protocol, analyze and evaluate the data, and report the result to the GEF6-JCB.

< Actual: mangrove monitoring and reporting to GEF6-JCB >

- A pilot monitoring of mangrove was conducted by the project team of PICRC staff (Victor Nestor, Elsei Tellei and Greta Sartori) with BoE (Skyler Ruben and Omekrael Sadang) and state PAN rangers (Victor Tyson Philip, Willa Wong) at the project sites in Airai and Ngiwal states.
- Project team attended the 19th of regular (quarterly) meetings of GEF6-JCB to propose draft outlines of mangrove monitoring protocol, sedimentation monitoring protocol, mangrove ecosystem conservation plan, sediment guideline and action plan on mangrove MPA enhancement to JCB members (May 7, 2024).

< Planned >

Activity 2.9 Draft the National Mangrove Ecosystem Conservation Strategy/Plan through the activities 2-1 to 2-8.

< Actual: Develop a draft Mangrove Conservation Plan >

- Project team had a meeting with BoE (Ms. Ilima Hirao Kloulchad, Director) to discuss mangrove monitoring protocol, the concept of conservation plan and training for state PAN rangers. The drafts of mangrove monitoring protocol and the concept of mangrove conservation plan have still been pending and under

consideration at the BoE for their approval. (September 20, 2024).

- Project team had a meeting with Dr. Richard Mackenzie (USFS/BoE) and Mr. David Adema (MoF) on mangrove workshop to discuss mangrove monitoring indicators for PAN coordinators and rangers (August 20, 2024).
- Project team attended an online meeting on NOAA mangrove workshop to discuss indicators and methodologies for mangrove monitoring protocol (August 21, 2024).
- Project team attended NOAA Mangrove Workshop to discuss indicators and methodologies of mangrove monitoring protocol (September 3-5, 2024).
- Project team attended a follow-up meeting of NOAA Mangrove Workshop with BoE/USDA (Dr. Richard Mackenzie) and MoF (Mr. David Adema) to finalize the draft indicator lists of mangrove monitoring protocol to be utilized by Ocean Account Data Base (October 8, 2024). These indicators are also used in the mangrove ecosystem monitoring protocol.

< Pilot Activity>

Project team worked on development of mangrove ecotour at the pilot site in Ngiwal state to highlight economic value of mangrove ecosystem for the communities to enhance sustainable resource use and management. The project provided the state PAN rangers and operators with several training programs for ecotour operation and supported to develop infrastructure at the ecotour site. The Ngiwal state government also allocated their budget for securing the facilities and trails for the ecotour sites. The management and operational procedure of the ecotour was discussed with the Ngiwal state government for launching their business tour. The tour was officially launched on January 14th, 2025.

< Planned >

Activity 2.8 Identify and implement possible community-based mangrove ecosystem management project by providing sustainable and effective use of mangrove ecosystem as a pilot activity.

< Actual: Development of Implementation Plan on promotion of mangrove

ecotourism>

- An implementation plan of pilot activity on promotion of mangrove ecotourism was developed and agreed between PICRC and Ngiwal state government (September 2023).
- A ceremony of MOU signing of pilot activity was conducted at the Ngiwal State Government (September 1, 2023).

< Actual: Training for ecotour operators >

- A two-week training on mangrove ecotour operators for the Ngiwal State was conducted (November 5-28, 2023).
- A follow-up training for PAN Rangers in Ngiwal was conducted to enhance the capacity of kayak-guiding (July 29, 2024).

< Actual: Test and demonstration tour for local and international tourists>

- Media tour was conducted to introduce ecotour development project in Ngiwal state for local newspaper companies, radio broadcast and president office by the Embassy of Japan and JICA Palau Office (February 1, 2024).
- Mangrove test tour was conducted for community people with support of PICRC (Ms. Caryn Lkong Koshiba, CEO and Mr. Victor Nestor, Researcher) and JICA project (Mr. Yoichi Harada, Mr. Tadashi Kimura, Ms. Kanako Itagaki, Mr. Nolan Rebluud) to enhance boat guiding (May 23, 2024).
- A Test tour for Ngiwal State PAN ranger (Ms. Alicia Eledui) was conducted as a part of Ocean Explore event by PICRC (June 17, 2024).
- Okinawa teachers training group visited Ngiwal state and the ranger of Ngiwal state showed the ecotour site and their environmental activity to the group x (July 30, 2024).

< Actual: Preparation for operation and management of business tour >

- Project team (Mr. Yoichi Harada, Ms. Kanako Itagaki, Mr. Tadashi Kimura, Mr. Nolan Rebluud) had meetings with Ngiwal State (Ms. Willa Wong, PAN Coordinator) to discuss ecotour development and preparation until official launch (April 24 and May 16, July 2, 24, August 16, September 23, November 11 and 18, 2024). Necessary cooperation, such as technical training, was also

discussed.

- Project team (Mr. Yoichi Harada, Ms. Kanako Itagaki, Mr. Tadashi Kimura) had an online meeting with Sojitz Corporation (Mr. Masahiro Asaeda, Mr. Seiji Motomura), PVA (Ms. Onodera Mika, JICA expert) and Palau International Airport Corporation (Mr. Manabu Yoshida, President/CEO) on collaboration with the Ngiwal Ecotour (September 3, 2024). However, the Ngiwal state intended to manage ecotour by themselves for a while. Ngiwal state expressed their plan to cooperate with tour company, after management by the state was realized hard.
- Project team (Mr. Yoichi Harada, Ms. Kanako Itagaki, Mr. Tadashi Kimura) had a meeting with JICA Palau Office (Mr. Yosuke Kato, Ms. Aiko Itou, Ms. Asuka Kumagai) on ecotour business operation for Ngiwal State (September 12, 2024). It was concluded that cooperation with Japanese tour agency might be possible. However, it was not proper to introduce some company to Ngiwal state, while Ngiwal state intended to manage ecotour by themselves for a while.
- Project team had a meeting with Palau Ocean Academy (POA) (Ms. Yuko Inoue, POA Manager and Mr. Kenzaburo Akira, ST World General Manager and Mr. Yuta Murai, POA Guide) meeting in Ngiwal (September 23, 2024). The tour agency was interested in developing tours in Babeldaob. The project team explained the intention of Ngiwal state that they want to manage the tour by themselves for a while.

< Actual: Collaboration with PVA on ecotour promotion >

- Project team had meeting with PVA (Ms. Mika Onodera, JICA expert) on Alii Pass and ecotour development in Ngiwal (June 18 and July 24, 2024).
- PVA conducted “Fam Tour”, a promotion tour event to introduce state ecotours, for Ngiwal state (August 22 and 29, 2024). About 10 persons from several tour agencies, including Japanese firms, participated and expressed their interest in the operation of the tour.
- Official launch of Ngiwal ecotour was conducted with Project team, JICA Palau Office, Ngiwal State government and community members (January 14, 2025).

- **Output 3: Monitoring system on soil run-off and sedimentation impact on coastal ecosystems and guideline for their prevention are developed.**

Project team conducted baseline survey and pilot monitoring of soil run-off and sedimentation at the project sites in Airal and Ngiwal states to develop monitoring protocol and guideline for sediment management. The draft monitoring protocol was discussed with EQPB to finalize.

After the development of monitoring protocol, a series of training on the monitoring of soil run-off and sedimentation, including setting up the equipment, data collection and analysis, was conducted for EQPB, PICRC and PALARIS.

Project also developed a draft guideline of soil run-off and sedimentation prevention based on the results of soil run-off and sedimentation monitoring and had discussions with EQPB to finalize the guideline.

< Planned >

Activity 3.1 Set up soil run-off monitoring unit under technical group established in activity 1-2 to conduct baseline survey, develop monitoring protocol, and implement monitoring on soil run-off in terrestrial areas.

Activity 3.3 Identify effective monitoring parameters and methods to measure soil run-off from terrestrial areas and sedimentation on coastal ecosystems quantitatively and develop the monitoring protocol.

< Actual: Discussion with soil run-off monitoring technical group >

- Project team organized the meeting of sedimentation sub-group with partner organizations (BoE, PCC and EQPB) to discuss on the contents of the monitoring protocol on soil run-off and sedimentation and guideline of the soil run-off and sedimentation prevention (April 28, July 25 and November 29, 2023).

< Planned >

Activity 3.2 Carry out a baseline survey on soil runoff from terrestrial areas and sedimentation on coastal ecosystems.

< Actual: Baseline survey of soil run-off and sedimentation >

- Baseline survey of soil run-off and sedimentation was reconducted at the project sites of Airai and Ngiwal states (December 2022).

< Planned >

Activity 3.4 Provide a series of training for monitoring on soil run-off and sedimentation and their impacts on coastal ecosystems to monitoring unit members.

< Actual: Training on soil run-off and sedimentation monitoring >

- Project team (Mr. Y. Okada and Mr. Y. Harada) conducted the first part of the training on soil run-off and sedimentation monitoring for EQPB and PICRC staff (November 19-21, 2024).
- The second part of the sedimentation monitoring training on data analysis was organized for EQPB, PICRC and PALARIS (December 12-13, 2024).

< Planned >

Activity 3.5 Implement monitoring on soil run-off and sedimentation on costal ecosystems, analyze and evaluate the data, and prepare report of the results for the GEF6-JCB.

< Actual: Pilot monitoring of soil run-off and sedimentation >

- The following pilot monitoring of soil run-off and sedimentation were conducted at the project site in Airai and Ngiwal with the state PAN rangers.

Deploy	Retrieve	Period	Airai	Ngiwal	Notes
Dec. 5 th 2022	Dec. 12 th 2022	7 days	○	—	Baseline Survey
Dec. 15 th 2022	Dec. 22 th 2022	7 days		○	Baseline Survey
Dec. 22 th 2022	Apr. 4 th 2023	103 days		○	
Apr. 4 th 2023	Apr. 27 th 2023	23 days		○	
Apr. 10 th 2023	Apr. 25 th 2023	15 days	○		
Apr. 27 th 2023	Jul. 6 th 2023	90 days		○	
Jul. 12 th 2023	Jul. 28 th 2023	16 days	○		
Jul. 28 th 2023	Oct. 3 rd 2023	67 days	○		
Oct. 3 rd 2023	Nov. 22 2023	50 days	○		
Oct. 9 th 2023	Nov. 20 th 2023	42 days		○	
Nov. 20 th 2023	Feb. 9 th 2024	82 days		○	
Nov. 22 th 2023	Feb. 7 th 2024	78 days	○		
Feb. 7 th 2024	Apr. 21 th 2024	74 days	○		
May 8 th 2024	Aug. 2 nd 2024	87 days		○	

- All the equipment of soil run-off and sedimentation monitoring was removed from the project site to wrap up all the field surveys (August 28, 2024).
- Project team (Mr. Yuki Okada, Mr. Tadashi Kimura and Dr. Noriaki Sakaguchi) had a meeting with Airai State Governor to share the results of sediment monitoring and the importance of soil run-off prevention for coastal ecosystems (April 19, 2024).
- Project team attended the 19th of regular (quarterly) meetings of GEF6-JCB to propose draft outlines of mangrove monitoring protocol, sedimentation monitoring protocol, mangrove ecosystem conservation plan, sediment guideline and action plan on mangrove MPA enhancement to JCB members (May 7, 2024).

< Planned >

Activity 3.6 Analyze the relation between soil run-off and sedimentation and land use activities based on the baseline survey.

Activity 3.7 Analyze the impacts of soil run-off and sedimentation on coastal ecosystems.

< Actual: Data analysis of soil run-off and sedimentation monitoring >

- Project team (Mr. Yuki Okada, Mr. Tadashi Kimura) had a meeting with PALARIS (Dr. David Idip, Senior GIS Analyst and Ms. Ophelia Ongalibang, GIS Analyst) on modeling and GIS analysis on soil-run-off and sedimentation (April 24, 2024).

< Planned >

Activity 3.9 Identify relevant policy and its implementation on land use that potentially 1) provide impacts of soil run-off and sedimentation on coastal ecosystems and 2) prevent them.

< Actual: information gathering on policies and regulations on sedimentation >

- Project team also organized sedimentation sub-group meetings with partners (EQPB) to collect relevant policies and regulations on sedimentation control (September 29 and October 5, 2023).

< Planned >

Activity 3.10 Based on the results from activities 3-2 to 3-9, produce a guideline describing necessary measures for preventing soil run-off, which is approved by GEF6-JCB and provided for agencies and organizations having jurisdiction over land use related policy, strategy, and actions.

< Actual: Development of soil run-off and sedimentation monitoring protocol and guideline for soil run-off and sedimentation prevention >

- Project team (Mr. Yuki Okada and Mr. Tadashi Kimura) had a meeting with EQPB (Mr. Michael Blesam, CEO) on the monitoring protocol and guideline (April 24, 2024).
- Project team (Mr. Y. Harada and Mr. T. Kimura) had a meeting with EQPB (Mr. Michael Blesam, CEO) on drafts of the monitoring protocol and guideline (December 17, 2024).

- **Output 4: Communication, Education and Public Awareness (CEPA) for the importance of coastal ecosystem is strengthened.**

JICA team worked with Outreach Department of PICRC to conduct several activities for environmental education on coastal ecosystem conservation and management for school students and local communities. Technical subgroup consists of PICRC Outreach Department, PCC, and JICA Project CEPA expert. During the CEPA activities, several materials for environmental education and awareness raising were developed by the project including posters, stickers and T-shirts. As one of the educational materials, the project produced a Mangrove Guidebook for PCC students reviewed by Belau National Museum (BNM) and PCC. The guidebook is also expected to be used as a reference book for state PAN Coordinators and Rangers on their mangrove monitoring and management activities.

The project supported to enhance exhibitions of PICRC Aquarium on mangrove ecosystem conservation such as posters and sign boards.

The project also worked to raise community awareness on coastal ecosystem conservation with the collaboration of Mangrove Awareness Campaign Coalition led by USDA Forest Service and related NGOs. A community interview and awareness raising activities for state governments were planned by the project and are scheduled to be implemented on July 26th, 2025, which is the World Mangrove Day.

< Planned >

Activity 4.1 Education materials, such as reference books, training manuals, and videos used in schools, PICRC and PCC, are prepared.

< Actual: Development of education materials: Mangrove guidebook >

- Mangrove Guidebook for PCC and high school students is developed and published (December 2024).

< Planned >

Activity 4.2. Format of questionnaire is developed.

Activity 4.3. Questionnaire survey is conducted before and after Activity 4-4 and

< Actual : Questionnaire survey on CEPA activities >

- A preliminary questionnaire survey for the students at the elementary schools was conducted at the Education Carnival to evaluate current levels of their awareness on mangroves and impacts of soil run-off and sedimentation on coastal ecosystems (January 2023).

< Planned >

Activity 4.4. Raise awareness of coastal ecosystem to school age children through events and exhibition by utilizing PICRC and other organization's facility.

< Actual: Awareness event for school age children >

- An environment education program for school students was conducted at the Educational Carnival in PICRC to interpret mangrove ecosystem services and impacts of soil run-off and sedimentation on the coastal ecosystems for 510 students at elementary schools and a high school in Koror state and Babeldaob island (January 17 to 19, 2023)
- A field mangrove observation tour for Melekeok Elementary School to raise awareness on mangrove conservation was conducted (July 26, 2023: the World Mangrove Day).
- Project team supported PICRC Outreach Department to conduct a mangrove boat tour for Airai Elementary School to raise awareness on mangrove conservation (February 20, 2024).
- Project team supported PICRC Outreach Department to conduct a mangrove boat tour for elementary school students at Ngiwal ecotour site as a part of Intersession Camp program in PICRC (March 28, 2024). Ngiwal mangrove boat tour for science teachers was also conducted by the project team and PICRC Outreach Department (July 3, 2024)
- Project team supported PICRC Outreach Department to conduct educational events for grade 3 students of the Peleliu Elementary at PICRC (March 11 and 12, 2024)

< Planed >

Activity 4.5 Strengthen environmental education related to coastal ecosystems and their importance to climate change adaptation to young generation (high school to college age) and seek possibility to connect this to career opportunity to them.

< Actual: CEPA activities for school education on conservation of coastal ecosystems >

- Information on existing relevant education materials in Palau and foreign countries was collected directly or through the internet. Based on this information, the project team started discussions on creating new teaching materials (March 2022 - February 2023).
- An event for PCC and high school students on kayak tour at Ngiwal Ecotour site was conducted by the project team and PICRC Outreach Department (June 27, 2024).
- To celebrate the World Mangrove Day, an educational mangrove ecotour was conducted in Ngiwal for Melekeok elementary school and Airai elementary school by the project team and PICRC Outreach Department. In the afternoon the project team and Outreach Department took the students to the Mangrove Campaign launching event at Ngetmeduch marine leaning center (July 26, 2024)
- A mangrove educational activity was conducted in Kayangel by the project team and PICRC Outreach Department (August 30, 2024)
- Project team supported PICRC Outreach Department on mangrove educational activities at Art and Tides calendar awarding event in Ibobang (August 15, 2024), Ngardmau (August 16, 2024), Ngaraard (August 26, 2024), and Koror (October 9 and October 30, 2024).

< Planned >

Activity 4.6 Provide values of coastal ecosystem services visibly to communities based on the result of output 2&3 and relevant activities.

< Actual: CEPA activities for raising public and communities' awareness on coastal ecosystem conservation >

- Mangrove clean-up event in Koror was conducted on Earth Day by the project team and PICRC Outreach Department collaborating with Earth Day Committee (April 16, 2024).
- Mangrove poster was displayed on Earth Day Green Fair in Koror by the project team and PICRC Outreach Department (April 19, 2024).
- Mangrove clean-up event was conducted in Airai bay collaborating with the Airai community by the project team and PICRC Outreach Department (September 2024)
- The project team developed a detailed plan to raise community awareness on mangrove conservation and management, and soil run-off and sedimentation control in Airai and Ngiwal states (December 2024).

< Actual : Community activity on ecosystem services >

- A community interview and questionnaire survey were planned and scheduled to conduct in Airai state in July 2024. However, due to the difficulty of scheduling, it will be postponed to next year. Mangrove Campaign coalition agreed to use the plan and take the surveys.

< Planned >

Activity 4.7 Share Palau's experience on coastal ecosystem management at national conferences (e.g. Women Conference) and international conferences such as OOC, ICRI and APCRS.

< Actual: Sharing the Palau's experiences >

- Project team attended GEF-6 JCB meetings to share the project results with JCB members (August 11 and December 1, 2022, March 2 and September 6, 2023).
- Project team attended State PAN coordinator meeting to share the project results with State PAN Coordinators (March 30 in 2023).
- Project team attended Our Ocean Conference (OOC) shared the project results (April 12 to 13, 2022).
- Project team (6 PICRC researchers and 2 JICA experts) attended the 5th Asia Pacific Coral Reef Symposium (APCRS) to share the project results (June 19 to

23, 2023).

< Actual: Collaboration with Mangrove Campaign Initiative >

- Project team attended a regular meeting for mangrove campaign initiatives led by the BoE/USDA-Forest Service, MoF and NGOs from January to November 2024 to discuss awareness and educational events on mangrove conservation (January 29, February 26, March 4, April 1, May 20, May 28, June 11, June 24, July 4, September 5, October 28 and November 25, 2024). The mangrove campaign officially launched on July 26, World Mangrove Day. The campaign is targeting.

< Planned >

Activity 4.8 Share experience to neighboring countries and regions through WSs.

< Actual: National workshop for sharing project experience >

- Project team co-organized a workshop for Dmakeiukl state PAN Coordinators and Rangers for sharing the project results with the local state governments instead of organizing regional workshop for neighboring countries (November 26, 2024).
- Project team attended Dmakeiukl Leadership Meeting to share the action plan and discuss its implementation instead of organizing regional workshop for neighboring countries (January 23, 2025).

2. Achievements of the Project

2-1 Outputs and indicators

(Target values and actual values achieved at completion)

- **Output 1: Integrated coastal ecosystem management system among multiple stakeholders, including marine and terrestrial areas, is established.**

< Indicator 1-1. A technical group and technical sub-groups are established under the existing framework of coastal ecosystem management (GEF6-JCB), which is

composed of multiple stakeholders, with their terms of reference to support GEF6-JCB and meetings are held regularly. >

- ➔ A technical group and technical subgroups of project teams were established under the GEF6-JCB at their 13th regular meeting on August 11, 2022.
- ➔ Regular meetings were held on August 11 (13th) and December 1 (14th) in 2022, March 2 (15th), June 8 (16th), September 6 (17th) and December 15 (18th) in 2023 and May 7 (19) in 2024.

< Indicator 1-2. Protocols, plan and guideline from outputs 2 and 3 are endorsed by the GEF6-JCB. >

- ➔ Concept of draft protocol, plan and guideline from outputs 2 and 3 were approved by the GEF6-JCB at their 19th regular meeting on May 7, 2024.
- ➔ Mangrove monitoring protocol and conservation plan were approved by the Bureau of Environment at the meeting with the Director of BoE on February 4, 2025.
- ➔ Sediment monitoring protocol and guideline were approved by the EQPB at the meeting with CEO of EQPB on February 5, 2025.

< Indicator 1-3. Action plan for enhancement of integrated coastal ecosystem management is endorsed by the GEF6-JCB. >

- ➔ Concept of draft action plan for enhancement of integrated coastal ecosystem management was approved by the GEF6-JCB at their 19th regular meeting on May 7, 2024.
- ➔ Action plan for enhancement of integrated coastal ecosystem management was approved by the Dmakeiukl 2 states at the Dmakeiukl Leadership Meeting on January 23, 2024. TNC will support to coordinate Dmakeiukl state PAN Coordinators and Rangers to discuss the action plan on its endorsement at the next Dmakeiukl Leadership Meeting with all 4 states of Dmakeiukl during the second quarter of 2025. PICRC, BoE and EQPB will support to implement once the Dmakeiukl 4 states endorse the plan.

- **Output 2: Mangrove ecosystem monitoring and management mechanism is properly developed.**

< Indicator 2-1. At least five (5) meetings of the technical sub-group on mangrove monitoring are held. >

➔ Technical sub-group meetings on mangrove monitoring were held on April 28, July 25, November 29 in 2023, April 12, September 20 and October 8 in 2024 to discuss mangrove monitoring protocol.

< Indicator 2-2. Baseline survey report on status of mangrove ecosystem is shared to the GEF6-JCB and the relevant agencies. >

➔ Baseline survey results were reported and shared to the GEF6-JCB at their 14th regular meeting on December 1 in 2022.

< Indicator 2-3. Draft monitoring protocol of mangrove ecosystem is approved to the GEF6-JCB and the relevant agencies. >

➔ Draft monitoring protocol of mangrove ecosystem was approved to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

< Indicator 2-4. At least three (3) field tests for mangrove ecosystem monitoring and its data utilization are carried out and in total at least fifteen (15) people are trained.>

➔ Field tests for mangrove ecosystem monitoring and its data utilization were carried out at the Airai and Ngiwal states in December 2024 and a total of fifteen participants were trained.

< Indicator 2-5. At least two (2) monitoring stations are set up. >

➔ Two (2) monitoring stations of mangrove ecosystem were set up in Airai and Ngiwal states.

< Indicator 2-6. Reports on mangrove ecosystem monitoring are shared to the GEF6-JCB and the relevant agencies. >

➔ Results of mangrove ecosystem monitoring were reported and shared to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

< Indicator 2-9. Draft Mangrove conservation plan is approved to the GEF6-JCB and the relevant agencies. >

- ➔ Draft Mangrove conservation plan was reported and approved to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

< Pilot Activity >

< Indicator 2-7. At least one (1) pilot activity for community-based sustainable mangrove management is planned and implemented. >

- ➔ A pilot activity on ecotourism development was conducted for community-based sustainable mangrove management in Ngiwal state including tour operator training, infrastructure development and management and operational planning.
- ➔ Ngiwal mangrove ecotour was officially launched on January 14, 2025 by the Ngiwal state government and community members.

< Indicator 2-8. Report on the pilot activity is shared to the GEF6-JCB and the relevant agencies. >

- ➔ Results of the pilot activity on ecotourism development in Ngiwal were reported and shared to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

● **Output 3: Monitoring system on soil run-off and sedimentation impact on coastal ecosystems and a guideline for their prevention are developed.**

< Indicator 3-1. At least three (3) meetings of the technical sub-group on soil run-off and sedimentation monitoring are carried out. >

- ➔ Meetings of the technical sub-group on soil run-off and sedimentation monitoring were carried out on April 28, July 25 and November 29 in 2023 and April 24 in 2024 to discuss monitoring protocol of soil run-off and sedimentation.

< Indicator 3-2. Baseline survey report on soil run-off and sedimentation is shared to the GEF6-JCB and the relevant agencies. >

- Results of baseline survey on soil run-off and sedimentation were reported and shared to the GEF6-JCB at their 14th regular meeting on December 1 in 2022.

< Indicator 3-3. Draft monitoring protocol of soil run-off and sedimentation is approved to the GEF6-JCB and the relevant agencies. >

- Draft monitoring protocol of soil run-off and sedimentation was approved to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

< Indicator 3-4. At least three (3) trainings for soil run-off and sedimentation monitoring and its data utilization are carried out and in total six (6) people are trained. >

- Trainings for soil run-off and sedimentation monitoring and its data utilization were carried out in November and December 2024. A total of six (6) participants were trained.

< Indicator 3-5. At least two (2) monitoring sites are set up. >

- Two monitoring sites of soil run-off and sedimentation were set up in the Airal and Ngiwal states.

< Indicator 3-6. Report on soil run-off and sedimentation monitoring is shared to the GEF6-JCB and the relevant agencies. >

- Results of soil run-off and sedimentation monitoring were reported and shared to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

< Indicator 3-7. Report on the mechanism of soil run-off and sedimentation (e.g. causes, processes) and impacts on coastal ecosystems is shared to the GEF6-JCB and the relevant agencies. >

- The mechanism of soil run-off and sedimentation and impacts on coastal ecosystems were reported and shared to the GEF6-JCB at their 19th regular meeting on May 7 in 2024 as a part of the contents of sediment guideline.

- ➔ The results of the sediment pilot monitoring were also shared with the Governor of the Airai State Government in September 2024 to show the soil runoff sources and countermeasures to prevent sedimentation in the Airai Bay.

< Indicator 3-8. Report on beach erosion is submitted to the Ngiwal state and PICRC. >

- ➔ Report on beach erosion was submitted to the Ngiwal state government and PICRC.

< Indicator 3-9. Draft guideline for soil run-off prevention is approved to the GEF6-JCB and the relevant agencies. >

- ➔ Draft guideline for soil run-off prevention was approved to the GEF6-JCB at their 19th regular meeting on May 7 in 2024.

- **Output 4: Communication, Education and Public Awareness (CEPA) for the importance of coastal ecosystem is strengthened.**

< Indicator 4-1. Education materials are improved for events and exhibitions in PICRC and for coursework and practices in PCC and schools. >

- ➔ Education materials were improved for school education events and aquarium exhibitions in PICRC, and mangrove guidebook was produced for PCC students. According to a pre and post survey for the mangrove outreach event, 20 % of participants have never visited mangroves in the lifetime, 90 % of participants did not know that there are 19 species of mangroves in Palau. However, after the mangrove activities, 86 % of students have a better understanding of mangrove ecosystems and 93 % of students would like to learn more about mangroves.

< Indicator 4-2. Understanding and awareness of grade 1-12 and college students about coastal ecosystem management are improved. >

- ➔ Understanding and awareness of grade 1-12 and PCC college students on coastal ecosystem management were improved through school events and site visits at the mangrove ecosystem. For example, through the

questionnaire survey taken in 2023 and 2025, we found that the perception of the word “mangroves” increased from 62% to 90%. The rate of students who have visited mangroves also increased from 44% to 80%.

< Indicator 4-3. Awareness of community people about coastal ecosystem management is increased. >

- Awareness of community in Ngiwal state on coastal ecosystem management was increased through pilot activity on ecotourism development. There has been no opportunity for the community to learn about the mangrove ecosystems, but 20 community members (10% of whole community members) participated in local tour guide training and learnt about mangrove ecosystem, so the understanding of mangrove ecosystems has increased from 0% to 10%.

< Indicator 4-4. Information of the project is shared at least two (2) national conferences and at least three (3) international conferences such as Our Ocean Conference (OCC), International Coral Reef Initiative (ICRI) and Asia Pacific Coral Reef Symposium (APCRS). >

- Project members attended two (2) national conferences (31st Pacific Islands Environment Conference (PIEC) on August 2, 2023, and Project Ending Presentation on December 10, 2024) and three (3) international conferences (7th Our Ocean Conference on April 14, 2022, 37th International Coral Reef Initiative General Meeting on September 23, 2023, and 5th Asia Pacific Coral Reef Symposium from June 19 to 23, 2023) to share the project results.

< Indicator 4-5. Knowledge and experience are shared with Dmakeiukl state governments through at least one (1) seminar/workshop and/or training. >

- Knowledge and experience of the project were shared with Dmakeiukl state governments through Co-Sponsored Mangrove Workshop with Dmakeiukl (Ngardmau, Ngeremlengui, Ngatpang and Aimeliik), Airai & Ngiwal on November 26, 2024.

2-2 Project Purpose and indicators

(Target values and actual values achieved at completion)

< Project Purpose: Capacity for integrated coastal ecosystem management taking into consideration significance of connection between terrestrial and coastal area is enhanced. >

< Objectively Verifiable Indicators: The mechanism of integrated coastal ecosystem management is improved by multi-sectoral stakeholders' participation, development and implementation of the action plan, and evaluation based on the ecosystem monitoring. >

- ➔ The mechanism of integrated coastal ecosystem management was included in the Babeldaob JCB framework and member state governments through the processes of state master planning and its implementation for sustainable resource management. The project provided mangrove monitoring protocol and conservation plan, sediment monitoring protocol and guideline, ecotour development and environmental education and awareness and enhance their ecosystem management activities.
- ➔ However, the JCB framework could not secure the funding to implement the draft action plan to utilize the project outputs. PAN Office of BOE, the potential leading agency of the draft action plan, has concentrated on implementing their own strategic plan (2022-2027) and did not have enough capacity to implement the project's draft action plan.
- ➔ Dmakeiukl framework consisted of 4 states of Babeldaob JCB and received technical support from TNC on coordination and funding support from international organizations to conduct management activities for coastal ecosystems.
- ➔ The modified action plan to support mangrove and sediment monitoring and management of Ngermeduu Bay could be implemented by Dmakeiukl as a pilot action to enhance further coastal ecosystem management for other states of Babeldaob and outer islands of Palau that would contribute the overall goal of the project.
- ➔ After the project ends in February, PICRC team agreed to follow up the implementation of the action plan (ver.2) with TNC and try to involve MAFE,

EQPB and related agencies to support the coastal ecosystem monitoring and management challenges between national and state governments.

3. History of PDM Modification

- **Output 4: Communication, Education and Public Awareness (CEPA) for the importance of coastal ecosystem is strengthened.**

- **Modification at the Monitoring Sheet ver. 2**

Although the questionnaire survey was planned to evaluate the effectiveness of the educational event after the pre-survey in 2023, Outreach Department of PICRC identified that more intensive survey was needed to collect necessary information and decided to continue the event without questionnaire survey.

*< Means of Verification 4.3. **Questionnaire survey report** >*

➔ **4.3. Report of school events**

*< Means of Verification 4.4. Report of **event** >*

➔ **4.4. Reports of community events**

- **Additional means of verification at the Monitoring Sheet ver. 2**

The reports were divided into the international and national conference / symposium (4.5) and the domestic workshop (4.6).

*< Means of Verification 4.5. Report of **seminar/training** >*

➔ **4.5. Report of conference/symposium**

➔ **4.6. Report of seminar/workshop/training**

4. Others

4-1 Results of Environmental and Social Considerations (if applicable)

4-2 Results of Considerations on Gender/Peace Building/Poverty Reduction, Disability, Disease infection, Social System, Human Wellbeing, Human Right, and Gender Equality (if applicable)

- ➔ During the pilot activity on the promotion of mangrove ecotourism, the project involved women's group as a key stakeholder for the ecotour.

III. Results of Joint Review

1. Results of Review based on DAC Evaluation Criteria

The result of the project was reviewed with the 6 evaluation criteria developed by the Organization for Economic Co-operation and Development (OECD)-Development Assistance Committee (DAC).

(1) Relevance: High

● Coherence with development plan

After the Palau National Master Development Plan (1996) launched, Palau Development Plan 2023-2026 (Office of the President 2022) was published by the Office of the President in 2022. It mentioned “sustain the environment” with “growth of economy” as the mid-term outcome and the environmental goal of the plan was “A Palau that is enriched by a healthy environment that sustains our culture and livelihoods, expands our economy, and strengthens the resilience of our island ecosystems and communities” that still showed the same direction of the project overall goal.

For protecting biodiversity, “Revised National Biodiversity Strategy and Action Plan (NBSAP) 2015-2025” was published in 2016. The strategic areas of the NBSAP included “Reducing Direct Pressures on Biodiversity Through Sustainable Use” and the pilot activity of the project contributed this strategy.

“Palau National Environment Management Strategy (NEMS) 2022-2030” (SPREP 2022) was published in May 2023. It aimed to minimize the impact of development on the environment, especially sedimentation that was one of the main targets of the project. NEMS 2022-2030 also focused on the management and conservation of mangrove forests, that was another main target of the project.

PAN Office of Bureau of Environment, MAFE published “Palau Protected Areas Network Strategic Plan 2023-2027” with support of the United States Agency for International Development in September 2024. This five-year strategic plan entails the work of the Protected Areas Network covering a span of tasks from ridge to reef. The project output 3 focused on sedimentation monitoring and it showed connectivity between terrestrial and marine areas that proved the concept of ridge to reef management.

According to these government documents, the aim and direction of the project were relevant and coherent with the national policies on environmental conservation and management in Palau.

- **Coherence with development needs**

Mangroves surround 80% of Babeldaob's coastline (SOE 2019) but its damage has been observed from clearcutting and girdling for coastal development. SEO (2019) also mentioned that the national government leadership on mangroves remains a gap. MAFE assumed the mission of coordination and assistance for the state governments on mangrove management and sediment control under the NEMS 2022-2030.

Although sedimentation onto reefs is considered one of the main pressures on coral reefs, it is not monitored and there is very little quantitative information on sedimentation (SOE 2019). The 2017 State of the Environment Report reported that the siltation rate on Babeldaob increased between 2003 and 2011, but there are no new similar studies available to update the trend. On Babeldaob, Golbuu et al. (2011) found that reef sedimentation rate and reef turbidity increased strongly with increasing number of earthmoving permits, concluding that "land-based development activities have a direct impact on the amount of sediment that goes into rivers and eventually ends up on coral reefs. Babeldaob Island, the project target area, was facing to the risk of the impact from the economic development in the future and needed to prepare harmonization between development and conservation.

Project purpose was to enhance capacity of integrated coastal ecosystem management focusing on the mangrove and sedimentation and met the needs of the state governments on Babeldaob Island.

- **Adequacy of the project plan and approach**

To enhance coastal ecosystem management for supporting existing effort on coral reef monitoring, mangrove monitoring and management, sedimentation monitoring and prevention were critical issues, and the project plan and target outputs were appropriate to address these issues.

However, the project counterpart, Palau International Coral Reef Center

(PICRC) is a semi-governmental research institute and provides scientific data and information to the national and state governments for their decision making and policy development processes, but PICRC itself does not have mandate to develop policies or national framework such as CEMC. The basic design of the project with PICRC counterpart was not effective enough to achieve the project purpose and overall goal. To enhance the capacity of the national system on coastal ecosystem management, the project counterpart should include national government agencies.

It was also suspected that the concept of the coastal project was not well discussed with the MAFE, because they already started the GEF6 project before the coastal project to enhance capacity of state governments and coordination between national and state governments on integrated resource management which had a same perspective of integrated management between terrestrial and marine ecosystems. In addition, MAFE also started to work with the USDA Forest Services to include Palau as a partner of the Pacific wide mangrove monitoring project (PACMAN) in 2022 that overlapped a part of the coastal project with almost the same timing of the project period.

(2) Coherence: High

● Collaboration with other JICA projects

As described below, JICA has had a long-term collaboration with PICRC since its establishment in 2000. There are other related projects in the area of blue economy and tourism.

➤ Palau International Coral Reef Center Strengthening Project (2002 - 2006)

After the establishment of the Palau International Coral Reef Center (PICRC) with JICA grants in 2000, JICA provided grant for a project to support PICRC on the development of human resources in areas such as strengthening the organization of the center to ensure its self-sustaining development, operating and managing the aquarium, establishing coral reef research and monitoring functions, and Education and enlightening students and residents from 2002 to 2006. The project was targeted to improve the conservation and sustainable use of the country's coral reefs and related

organisms.

➤ *The Capacity Enhancement Project for Coral Reef Monitoring (2009 - 2012)*

Three years after the PICRC strengthening project, JICA provided another grant to support PICRC for strengthening the center's research and education functions as well as strengthening collaboration with the local community for 3 years from 2009. Since the former JICA project targeted to develop human capacity on basic research and science of coral reefs, this project focused more on coral reef monitoring to provide appropriate information for the management to tackle the threats on coral reef ecosystems such as destructive fishing practices, overfishing, coastal development and Climate Change. PICRC developed monitoring protocol of coral reefs for Protected Areas Network (PAN) management and conducted nationwide coral reef monitoring.

➤ *Sustainable Management of Coral Reef and Island Ecosystems: Responding to the Threat of Climate Change (2013-2018)*

To enhance high quality research on coral reef ecosystems and biodiversity, JICA and Japan Science and Technology Agency (JST) conducted a Science and Technology Research Partnership for Sustainable Development (SATREPS) project between PICRC and the Japanese research team led by the University of the Ryukyus. This project took both global and local perspectives, working through activities such as environmental monitoring, environmental impact assessments for coral island ecosystems, social scientific assessments, and assessments of impact on biodiversity to produce suggestions concerning sustainable approaches for island society. The project produced scientific papers of collaborative research on coral reef monitoring and biodiversity assessment as well as risk management against Climate Change impact such as sea level rise. The SATREPS project improved PICRC capacity on more scientific based management oriented, but still mainly for coral reef ecosystem. The coastal project was identified as an expansion of the research target to wider coastal ecosystems including mangrove and

monitoring of environmental stresses on the ecosystems in line with the past JICA and SATREPS projects.

➤ *Blue Economy project (Forming Good Practices of Islands-Type Blue Economy in Palau) (2022-2025)*

The project provided information on pilot activity on ecotour development in Ngiwal state for the Blue Economy Project as a good practice of community development for sustainable resource use.

➤ *SDG14 project (Project on Pacific Islands Capacity Enhancement for Achieving SDG 14) (2020-2025)*

The project organized a session on the “From science to management: Integrated approach of science-based management of coastal ecosystems” at the 5th Asia Pacific Coral Reef Symposium (APCRS), international symposium for coral reef science and management, to share the project approach of ecosystem management and invited SDG14 project to share their presentation at the session.

➤ *Expert on tourism in Palau Visitors Authority (PVA) (Ms. Mika Onodera) (2024-2026)*

The project team discussed with the expert on ecotour operation of Ngiwal state and PVA supported the promotion of the tour for Ngiwal state.

➤ *JICA Volunteer in Melekeok Elementary School (Ms. Maiko Dodo) (2022-2024)*

The project organized a mangrove ecotour for the Melekeok Elementary School and the volunteer attended the tour to support her capacity on environmental education.

● **Coherence with direction of international cooperation of Japanese government and JICA on natural environmental conservation sectors**

The Ministry of the Foreign Affairs published “A guideline of bilateral development cooperation for Republic of Palau” in 2019 that mentioned

priority on environmental conservation and management including climate change countermeasures. The Ninth Pacific Islands Leaders Meeting (PALM9) declared Leader's Declaration mentioned commitment to sustainable management, use and conservation of marine and marine resources, and emphasized Climate Change countermeasures. Goal 14 of JICA's position paper for SDGs showed ecosystem conservation as one of the focused efforts and addressed international cooperation on vulnerable coastal ecosystems as well as strengthening integrated climate risk management for the key effort of the goal 13. These directions and policies of government and JICA corresponded to the purpose and concept of the coastal project that was enhancement of the integrated management of coastal ecosystems for strengthening their resilience to Climate Change.

- **Collaboration with other projects**

- GEF6 (Integrating biodiversity safeguards and conservation into development) (2018-2024)

The project worked with the GEF6 project to provide project results and outputs for the JCB member state governments in Babeldaob Island for enhancing their capacity of coastal ecosystem management.

- GEF8 (Transforming productivity in Palau's food systems through nature positive innovations) (2025-2028)

The project input project contents and results into the GEF8 planning process to secure potential funding to implement the project action plan. The components of the GEF8 included the concept of the project action plan and could provide funding opportunities for implementing the plan.

- Ocean Account program by MoF (2024-)

MoF was preparing to conduct Ocean Account (OA) program including national scale ecosystem monitoring. OA is a program of UN Economic and Social Commission for Asia and the Pacific (ESCAP) for economic valuation of environment and ESCAP sent Mr. David Adama, an advisor on the System of Environmental Economic Accounting (SEEA), to Palau for

coordinating the program. Mr. Adema supported to develop indicators of mangrove monitoring for PAN rangers.

➤ *Pacific Mangrove Monitoring Network (PAC-MAN) by BoE / USDA Forest Service (2022-2025)*

BoE and USDA worked on long-term mangrove monitoring for carbon stock estimation and project collaborated with their nation-wide mangrove monitoring. The mangrove expert of the PAC-MAN (Dr. Richard Mackenzie) also supported for developing the monitoring protocol.

➤ *NOAA Blue Carbon Inventory Project (2021-)*

National Oceanic and Atmospheric Administration (NOAA) conducted an international program on blue carbon to enhance monitoring and awareness of greenhouse gas inventories at the wetland including mangroves and seagrasses. They included Palau as a partner country to provide funding to support monitoring and awareness. NOAA conducted a Palau Mangrove Workshop (September 3-5, 2024) and the project attended to discuss indicators of mangrove monitoring.

➤ *Mangrove Campaign Initiative (2023-2025)*

The PAC-MAN expert (Dr. Mackenzie) led the mangrove conservation campaign with collaboration of local NGOs and funding support from the U.S. Embassy. The project CEPA team and Outreach department of PICRC collaborated with the initiative on the education and awareness activities of mangrove conservation. The project provided several educational materials for the activities and the Ngiwal state ecotour site was one of the useful venues of field trip.

➤ *Dmakeiukl project coordinated by TNC (2022-2025)*

Dmakeiukl is a framework of 4 state governments (Aimeliik, Ngardmau, Ngatpang and Ngeremlengui) of western Babeldaob Island to enhance resource management of the member states. The framework was coordinated by TNC, and their major funding sources were the U.S. Office of

Insular Affairs (OIA) grant, Pacific BioScapes Programme of European Union (EU) implemented by Secretariat of the Pacific Regional Environment Programme (SPREP). As Mangrove monitoring and sedimentation of Ngermeduu Bay were the major issues, project provided a package of management actions as an action plan for their implementation.

- **Collaboration with International Framework**

- *International Coral Reef Initiative (ICRI):*

The International Coral Reef Initiative (ICRI) is an international framework on conservation of coral reefs and related ecosystems including seagrasses and mangroves. ICRI organized a Global Coral Reef Monitoring Network (GCRMN) to collect scientific data for effective management. GCRMN mainly engaged coral reef monitoring but no other ecosystems that required to be enhanced. The project shared the project results of mangrove and sediment monitoring with the ICRI member countries during their general meeting in 2023. The project and ICRI secretariat co-hosted a session at the Our Ocean Conference (OOC) in 2022 to share the project challenges for enhancing awareness of coastal ecosystem management.

(3) Effectiveness: High

- **Achievement of project purpose**

The project purpose was that “Capacity for integrated coastal ecosystem management taking into consideration significance of connection between terrestrial and coastal area is enhanced”. And the indicator of achievement of project purpose was that “The mechanism of integrated coastal ecosystem management is improved by multi-sectoral stakeholders’ participation, development and implementation of the action plan, and evaluation based on the ecosystem monitoring”. However, PICRC, the project counterpart, did not have mandate to develop a nationwide mechanism of integrated management and involved an existing framework of GEF6-JCB as a target mechanism to be improved.

As described in “1-3 Activities” or “2. Achievements of the Project, various

project activities have been implemented and many documents has been produced as planned. Even though there were some activities and outputs unachieved or remained as the issues, in general, the project was implemented as planned and produced sufficient outputs. In the following, we emphasized the difficulties and issues to be followed after the project end, in addition to the result of each output.

Output 1 of the project worked on providing the project results into the GEF6-JCB framework during the JCB regular meetings. Protocol of mangrove monitoring, protocol of soil run-off and sedimentation, mangrove conservation plan, guideline of soil run-off prevention and action plan were shared with the JCB member states and positively accepted. However, the PAN Office, a potential leading agency of the action plan, did not have enough capacity to implement the plan. To utilize the project results, the project team collaborated with TNC to involve Dmakeiukl, a framework of 4 states government of Babeldaob west coast, as another stakeholder. The action plan was modified focusing on their 4 states and a workshop was organized for Dmakeiukl state PAN Coordinators and Rangers to share the revised action plan. The plan was accepted the participants of the workshop and would be transferred to the regular meeting of Dmakeiukl for its endorsement. TNC continued to coordinate the Dmakeiukl activities with the external funding support mainly from U.S. and EU and could support the implementation of the action plan with additional funding opportunities of NOAA and GEF8 project as well. The achievement of the project seemed to be scaled down to state and regional level of capacity enhancement from the initial purpose of nationwide mechanism development including governmental support and coordination.

Output 2 of the project produced a protocol of mangrove monitoring (Mangrove Monitoring Protocol) for management of state PAN sites. It was the first protocol of mangrove monitoring for state PAN Coordinators and Rangers and could enhance their management capacity of PAN site. However, it was submitted to the PAN Office and BoE for their confirmation before organizing the training of the protocol for the state PAN rangers, but it had not been confirmed yet within

the Bureau and the Ministry because of the transition period of the president election and it was pending. Therefore, the project organized a field test of the protocol with Airai and Ngiwal state PAN rangers at the project sites. The monitoring skills were well transferred to the state PAN rangers in both of 2 states who could teach the protocol for other state rangers in future. The project also produced a mangrove conservation plan (Mangrove Ecosystem Conservation Plan) that was a useful guidance for management planning process of the PAN mangrove sites. It was also submitted to the PAN Office and BoE and accepted to consider the official process of endorsement for the PAN technical committee.

Output 3 of the project produced a protocol of soil run-off and sedimentation monitoring (Monitoring Protocol for Soil Run-off and Sedimentation Management Impact on Coastal Ecosystems) for EQPB. This protocol is for more technical purposes than the mangrove monitoring and enhances the capacity of EQPB on sedimentation monitoring for protecting coastal ecosystems. Another outcome from the output 3 of the project was a guideline for soil run-off prevention (Guideline for Soil Run-off and Sedimentation Management Impact on Coastal Ecosystems) also for EQPB and PALARIS. Besides the existing guide for sediment control for constructor (PALAU EROSION & SEDIMENT CONTROL FIELD GUIDE), this guideline provides specific methodologies to identify the source of soil run-off and counter measures of reducing the soil run-off from the terrestrial areas for protecting coastal ecosystems. The project team conducted a series of training on the monitoring protocol for EQPB, PICRC and PALARIS. Field work and data analysis processes were well transferred to the participants, and it enhanced their future monitoring efforts. EQPB CEO and Board members accepted the protocol and guideline and were keen to consider the official endorsement process.

Output 4 of the project produced education materials (posters, stickers, T-shirts and exhibits) for events and aquarium exhibitions in PICRC that improved the capacity of their activities. Project team of output 4 and Outreach department of

PICRC conducted several educational events for school children. These activities enhanced the capacity of PICRC as well as the understanding and awareness of targeted students on coastal ecosystem management and conservation. Output 4 team planned a questionnaire survey to evaluate the effectiveness of one of the educational activities by the PICRC outreach department such as Education Carnival. However, this type of assessment required sociological expertise for its analysis and PICRC did not have such a scientist at that moment. Although the questionnaire survey was canceled at the Education Carnival 2024. The project also planned community interview and awareness events for Airai state, but the collaborators of state PAN Coordinator considered that they would not invite enough participants because of other community commitments, and the event was postponed combining with other community awareness activities planned by the Mangrove Campaign Initiative in 2025 after the project. The project concept and update information were shared with the international conferences and the audiences' awareness was well enhanced on coastal ecosystem management as well as national audiences. A regional workshop in Micronesia was considered to be organized to share project experiences with neighboring countries at the end of the project. But instead of regional spillover, the project prioritized organizing a national workshop to share the project result and discuss implementation of action plan. The workshop was co-hosted by the TNC, and the recommended action plan was positively accepted by the Dmakeiukl states PAN Coordinators and Rangers during the workshop.

(4) Efficiency: High

- **Project expenses**

The total expenditure at the beginning of the project was planned as 240 million Japanese Yen and an additional 20 million Japanese Yen was allocated from the donation. Therefore, the actual expenditure was 257 million Japanese Yen (214 million yen from original expenditure and 43 million yen from donation), and it was within the planned expenditure.

Two long-term experts on chief advisor and project coordinator / CEPA were

dispatched for 3 years. Four short-term experts on Mangrove ecosystem monitoring, Soil run-off and sediment monitoring, Coastal community development and GIS analysis were dispatched appropriately as necessary during the 3-year project period.

The project sent 8 Palauan persons in 2 training in Japan. Three PICRC staff, 1 BOE staff and 1 Airai state PAN Coordinator participated a mangrove monitoring training in Okinawa, Japan 2023. For the 2nd training 1 Ngiwal state PAN Officer, 1 Ngarchelong state PAN Ranger and 1 Peleliu state PAN Coordinator participated a Coastal Management in Okinawa, Japan 2024.

Twenty-five million Japanese Yen was spent on a 33ft boat with twin engine, a 2.4L pick-up truck and a double axel trailer for the 33ft boat.

Total operational cost was 39 million Japanese Yen including equipment for mangrove and sedimentation monitoring and pilot activity for ecotour development.

- **Project period**

The planned project period was 3 years, and the actual project period was the same. However, there was a presidential election 3 months before the project ended and the governments had their transition period following 2 months. Therefore, the schedule of project wraps up process with the government was quite tight.

- **Cause and effect**

A short-term expert on Coastal community development working on the pilot activity resigned his company in the middle of the assignment of the project. A short-term expert on Mangrove monitoring held dual positions to take over his task on community development besides his main task on mangrove monitoring. Two long-term experts also supported maintaining the pilot activity implementation.

The training for 8 persons of counterpart and partners in 2 times was quite effective and the participants improved their capacity and skills on mangrove monitoring and coastal management.

The additional expenditure could bring additional sets of equipment for

sedimentation monitoring, and it improved the quality of data collection and contributed to the accurate results of the analysis. Although the procurement of some research equipment was sometimes delayed because of the complicated procedure and strict rules, survey and monitoring activities of the project were conducted as planned.

The additional expenditure was also used for supporting the pilot activity on infrastructure development and tour equipment. This investment of funds invited external funding opportunities from the partner state government that enhanced the operation of the pilot activity implementation.

The vehicle, boat and trailer were the most useful and essential equipment to maintain the project operation.

(5) Impact: High

- **Expectation of achievement of overall goal**

The overall goal of the project was “Coastal ecosystem services are sustainably provided and the resilience of the ecosystem to negative impacts of climate change is strengthened through effective and proper integrated coastal ecosystem management in Palau.” The project action plan aimed to strengthen mangrove and sediment monitoring to enhance effective management of coastal ecosystems around the Ngermeduu Bay in Babeldaob Island for the 3 years. If the plan is implemented by the Dmakeiukl states, the similar approach should be transferred to the states of eastern coast of Babeldaob Island as well as other outer island states to achieve the overall goal. These processes would require another 3 to 6 years after the implementation of the action plan and the achievement of the overall goal would be 2030 to 2033 (6 to 9 years after the current project completed) depending on the funding opportunities. TNC, a coordinator for the Dmakeiukl states, started preparation for seeking fund from the OIA and other donors to implement the action plan at the end of the coastal project in January 2025, and the implementation could be expected.

- **Cause and effect**

The project purpose was “Capacity for integrated coastal ecosystem

management taking into consideration significance of connection between terrestrial and coastal area is enhanced". If this purpose is achieved, the coastal ecosystem would be well managed and could provide ecosystem services for the people. If the ecosystems are well managed sustainably and long term, their resilience will be strengthened against the impact of climate change as the overall goal.

2030 is a benchmark of protected area management and international (CBD) and regional (MC) goals will be assessed for their achievement. To conduct ecosystem assessment, monitoring data and information should be critical and highlighted for the development of new management strategies and plans for ecosystems post 2030. This condition would accelerate the enhancement of ecosystem monitoring and management to achieve the overall goal.

The Ocean Account (OA) project by the MoF could also support national efforts to conduct ecosystem monitoring. If the OA project starts ecosystem monitoring soon, more monitoring data would be available by 2030, and it could enhance more effective management of coastal ecosystems.

MAFE is planning to work with USDA Forest Service to conduct nationwide mangrove monitoring as a part of PAC-MAN. It could attract more attention from the public on mangrove monitoring and management as well as provide more accurate data on ecosystem conditions.

- **Spillover**

If the action plan is implemented, mangrove ecotour could be highlighted as an effective tool of sustainable resource use in Babeldaob Island and similar actions would be spreading to other state governments that could also increase tourist pressures on the ecosystems around Babeldaob Island. The guidelines of mangrove ecotourism should be developed in future. However, concerns about the economic feasibility and efficient management of the tour business by the state government had still remained as future challenges.

(6) Sustainability: Fair

- **Policy and system**

PAN Office of BoE has implemented their Palau PAN Strategic Plan 2023 to 2027 to support state PAN site management. Although they focused on the implementation of the plan, PAN Office continues to provide technical and funding support for enhancing the PAN site management.

With the recovery of the tourism industry from the COVID disaster, the impact of the development was concerned in Babeldaob Island. Harmonization of ecosystem conservation and sustainable development is still a priority target for the state governments and national governments.

The project set up the target sites in Airai and Ngiwal states. Babeldaob JCB framework was keen to transfer the project activities to other state governments. Dmakeiukl framework also considered to learn from the project case studies of Airai and Ngiwal states. In addition, MAFE mentioned “areal extent of mangrove forested area remains stable” as one of the targets of the NEMS.

TNC was playing a role of coordinator for Dmakeiukl states to enhance activities of state PAN Coordinators and Rangers on environmental conservation. Even BoE, MAFE was keen to support the action plan, leadership and coordination by the government agencies were required for sustainability and expansion of the project action plan.

- **Organization structure of the counterpart**

Dmakeiukl consists of 4 states of west coast of Babeldaob Island and each state has PAN Coordinators and Rangers who are the main stakeholders of the action plan implementation. BoE, PAN Office and PICRC could provide technical support on mangrove monitoring and management planning. EQPB, PICRC and PALARIS would support sediment monitoring. PICRC also could support CEPA activities and TNC would support to coordinate all the activities. Dmakeiukl recognized the needs of actions for ecosystem management through the past regular meetings and could show their initiatives on the project.

- **Technical level of the counterpart**

As BoE, PAN Office and PICRC have organized a field test of mangrove monitoring for the state PAN Coordinators and Rangers, they could provide

technical support for Dmakeiukl states. EQPB, PICRC and PALARIS also had training in sediment monitoring and could collaborate to support the state governments.

These agencies and organizations could also extend their support to other states in Babeldaob and outer Islands in the future.

- **Finance of the counterpart**

TNC has coordinated Dmakeiukl activities with external funding sources from U.S. government and EU grant. TNC also could access other potential funding opportunities such as GEF8 and NOAA to support to implement the action plan for Dmakeiukl and expand to other states.

2. Key Factors Affecting Implementation and Outcomes

The project targeted the GEF6-JCB as a framework to enhance their capacity for coastal ecosystem management. The JCB was supported by the planning team of the Office of Strategic Support Services (OSSS) in the MAFE, and they coordinated the regular meetings, state master planning and pilot activities such as best practices on environmental conservation and sustainable resource uses for JCB states. However, the GEF6 project ended in July 2024 and the planning team was dissolved at the end of the project. Therefore, the sustainability of the JCB framework was a risk on the sustainability for post project system on the coastal ecosystem.

Another potential risk was funding opportunity to implement the action plan after the project is finished. National governments in Palau were managed with limited budget and most of the environmental projects were implemented with the external/international funds such as GEF, UN and EU grants. It was quite difficult for the governments to endorse any action plan without securing funds in advance.

PICRC was a semi-government research institution, and their major task was to provide advice or recommendation for the management based on scientific data and information, but not to develop policies. They also did not have a mandate to establish authority or official structure like committee.

3. Evaluation on the results of the Project Risk Management

To ensure sustainability of the JCB framework, the project worked closely with the GEF6 planning team to seek potential agencies to host the JCB after the GEF6 project ended in July 2024. The Governors Association was considered as the next host and the planning team sent an official letter to them, but the negotiation was not successful. The team finally identified the Ministry of Finance (MoF) as a host agency and the Office of Project Management (OPM) of the Bureau of Budget and Planning (BBP) in the MoF, and the secretariat task of the planning team of MAFE were handed over to them to maintain the JCB framework.

However, the JCB was in a transition process and there were any active programs or actions conducted in 2024, the project identified Dmakeiukl, an active network of 4 western states of JCB states on Babeldaob Island with external funding support to conduct management actions.

To seek the funding opportunity to implement the project action plan, the project collected information of other donors and donor projects regarding coastal ecosystem management and/or climate change. The project identified the funding opportunity from GEF8 project on protected area management, nature-based solution for environmental degradation. The project also found the possible funding from the US, EU on resource management and NOAA on the mangrove monitoring and awareness activities.

To enhance management system, the project tried to use the GEF6-JCB, an existing framework of integrated management for the state governments instead of establishing a new government committee on coastal ecosystem management.

4. Lessons Learnt

Another potential risk was funding opportunity to implement the action plan after the project is finished. National governments in Palau were managed with limited budget and most of the environmental projects were implemented with the external/international funds such as GEF, UN and EU grants. It was quite difficult for the governments to endorse any action plan without securing funds in advance. To seek the external funding to implement the action plan, it is

important to develop a personal network to collect information of other donors and donor projects. For example, the project collected useful information from the other donor programs such as GEF8, Ocean Account, NOAA and EU to seek appropriate potential funding sources for implementing the action plan and finally identified a collaboration with TNC to tailor the draft action plan to the realistic and feasible action plan for the Dmakeiukl.

To achieve the overall goal, government system and structure needed to be developed for supporting and coordinating the state governments to enhance integrated approach of coastal ecosystems into their resource management processes. For this purpose, leadership and initiative of the governments were critical and the project counterpart should be within the government. PICRC is a semi government organization and research institution that provides scientific data and information for decision and policy makers but could not develop policies nor governmental structures. Only the governments could develop government policy and structures. Especially under the current government structure, sufficient discussion with the Minister of MAFE should be conducted to identify the appropriate structure of the project at the initial stage of the project planning.

Mangrove conservation plan and monitoring protocol were the final outputs of the project planned for endorsement by the partner agencies. However, the implementation of those plan and protocol were not clear after the project ends. There could be discussion and negotiation with the partner agencies to identify more practical outputs at initial and middle of the project period for tailoring the original planned outputs.

In addition, besides technical support on mangrove and sediment monitoring, the main partners (BoE and EQPB) required research equipment and tools for long-term monitoring. More detailed and continuous training on data analysis is also required for those partners to provide more accurate data and information for management processes. Those aspects should be considered during the planning process of the project.

5. Performance

To seek the potential funding sources to implement the action plan, the project

developed a relationship with other donors and donor projects for collecting the information of the related projects such as GEF8 project, Ocean Account project, NOAA Blue Carbon Inventory project. The persons in charge of those projects provided useful information, advice and positive comments on the direction of the action plan. The project also developed a close relationship with local NGO such as TNC and PCS who conducted a lot of environmental projects to consider potential collaboration and collected appropriate information from them.

6. Additionality

Regardless of JICA or JICA projects, it was important to identify the needs of the host country where the several technical projects of JICA were implemented in the field of management of coastal ecosystem, changing the situation of other donor projects and international trends around the project objectively with a wider perspective, and be flexible to accommodate with a prediction of the future.

Regarding the Project's public relations activities, the Project was afforded an opportunity to present its initiatives, along with the significance of sustainable coastal ecosystem management, through an interview video produced by the JICA PR Team in September 2024. This interview was organized to commemorate the 30th anniversary of diplomatic relations between Palau and Japan. The inclusion of a famous Japanese athlete as an interviewer drew considerable public attention not only in Japan but also within Palau. This unexpectedly contributed to promoting the Project's activities on a national scale.

IV. For the Achievement of Overall Goals after the Project Completion

1. Prospects to achieve Overall Goal

Overall goal:

Coastal ecosystem services are sustainably provided and the resilience of the ecosystem to negative impacts of climate change is strengthened through effective and proper integrated coastal ecosystem management in Palau.

The overall goal was relevant to the policy and the direction of the national development plan and environmental strategy of Palau. It was also coherent with direction of international cooperation on environmental sector of Japanese government and JICA.

Objectively Verifiable Indicators:

- **The framework of Coastal Ecosystem Management is active and PDCA (plan, do, check, and act) cycle for the integrated coastal ecosystem management is functional.**

The target framework of coastal ecosystem management was state governments and relevant government agencies and organizations to provide technical support and assistance. Both state governments and national government agencies need strong leadership to organize and enhance the management activities. The project action plan would be implemented with the assistance of local NGO, but the government leadership should be enhanced for functioning the framework actively and it's expected to need some more case studies after the action plan implementation.

- **Interim evaluation of the action plan's implementation and necessary revision are conducted to achieve its goal.**

Once the funding is secured, the action plan will be reviewed and modified by the key stakeholders for its implementation. The interim evaluation of the implementation could be conducted during the regular meetings of the

stakeholders and necessary revision and modification could be considered during the action plan implementation. To achieve the overall goal, stakeholder should be scaled up to involve all the state governments and the framework of the relevant government agencies and organizations should also be strengthened for providing strong support to the state governments after the action plan.

- **Sustainable monitoring system is secured and the results are compiled for interim evaluation of the action plan.**

It is expected that the regular meeting will function as a sustainable monitoring system for interim evaluation during the action plan implementation. For overall goal, the structure of framework should be enhanced after the action plan implementation.

- **Mangrove Ecosystem Conservation Plan and Soil Run-off Prevention Guideline are implemented by governing agencies and other organizations.**

Soil Run-off Prevention Guideline could be implemented by EQPB through the action plan implementation, and it will be extended for other states after the action plan. A part of the Mangrove Ecosystem Conservation Plan could be implemented through the action plan with assistance of NGO. However, the leadership of the national government would be still a challenge for completing the conservation plan.

- **Status of mangrove ecosystem, soil run-off and sedimentation are improved."**

The condition of soil run-off and sedimentation could be improved through the implementation of appropriate countermeasures that would be identified during the action plan. On the other hand, improvement of mangrove ecosystem status and growth need more time even if effective management plan is developed through the action plan and implemented.

2. Plan of Operation and Implementation Structure of the Palau side to achieve Overall Goal

Scale up the framework of the state governments

The action plan targets Dmakeiukl that consists of 4 state governments of western Babeldaob Island. The other 12 states should be involved in achieving the overall goal. Regional structure of the state governments could be more functional and practical for implementing management actions than single framework of all the states. Dmakeiukl, east coast of Babeldaob, northern reef and outer island states, and Koror are possible regional structure of state governments for overall goal.

Leadership of the government framework

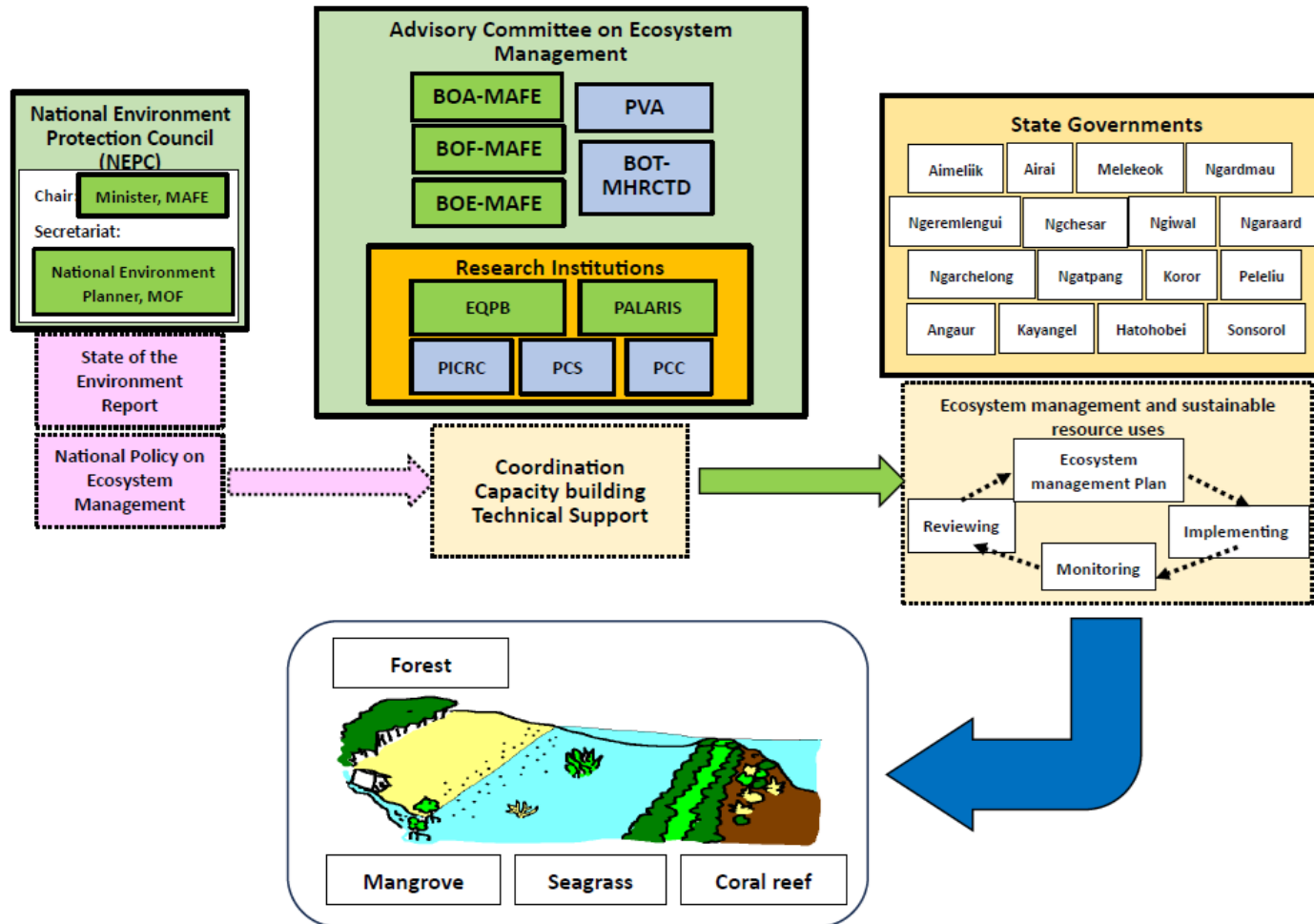
For supporting state governments, national government structure should be strengthened and more activated. Relevant agencies and organizations regarding coastal ecosystem management could formulate a government-oriented framework with strong leadership. MAFE could be relevant to organizing the government framework.

Involvement of National Environment Protection Council

Palau government has a National Environment Protection Council (NEPC) to provide policy and direction of environmental conservation. Even state governments are responsible for their lands and adjacent waters, national policy and guidance should be provided to show the direction of coastal ecosystem management. National policy of ecosystem management could enhance and support effective governance of state governments.

Technical support from research institutions

To support national and state governments, research institutions could be partners for the national and state government framework. The institutions provide scientific data and information to support appropriate management policies and decisions for both governments.



Possible implementation structure to achieve overall goal

3. Recommendations for the Palau side

1) To support for implementing Dmakeiukl action plan

Even TNC secures funding, support from the government agencies and organizations is necessary to implement the action plan effectively and efficiently. Technical support on mangrove monitoring and training should be provided by BoE, PANO and PICRC, sediment and soil run-off monitoring and training should be provided by EQPB, PALARIS and PICRC with assistances of Airai and Ngiwal states. BoE and PANO could also provide training in management planning for state PAN Coordinators and Rangers. Implementation of ecotour development requires support from PVA, BoT, PICRC, BNM and private sectors on tour guide training and operational planning. Ngiwal state could also share their experiences of ecotour development to support the Dmakeiukl states.

For education and awareness activities, PICRC, BoE and PANO could provide their expertise and experiences for the Dmakeiukl states.

2) To support for expansion of the action plan to the state governments of other regions

After the action plan implementation, transferring the action is recommended to the state governments of other regions such as Babeldaob east coast 6 states (Airai, Ngchesar, Melekeok, Ngiwal, Ngaraard, Ngarchelong), northern state (Kayangel), outer island 2 states (Angaur and Peleliu), Koror state and remote island 2 states (Hatohobei and Sonsorol). BoE and PANO could organize series of actions as a part of PAN site management program.

3) To support national government framework and leadership on coastal ecosystem management

Through the action plan implementation and expansion of the action to other regions, the role of the national government framework to support the state governments could be emphasized and enhanced. The technical support framework of the government should be strengthened for its longer-term sustainability. BoE and MAFE could lead the framework that could support existing NEPC for reflecting their national policy and guidance.

4. Monitoring Plan from the end of the Project to Ex-post Evaluation

Need and direction of monitoring and follow-up after the project completed:

➤ Monitoring for Dmakeiukl action plan

The activities of Dmakeiukl states should be monitored to identify the situation of action plan implementation.

➤ Monitoring of JCB activities

The activities of JCB framework and secretariat team of OPM of BBP, MoF should be monitored to identify their sustainability, challenges and achievement. If the JCB framework continues to work actively, the expansion of ecosystem management action could be conducted for the east coast of Babeldaob island within the JCB framework.

➤ Monitoring of the national policies, strategies and plans regarding coastal ecosystems management

Policies, strategies and plans of PANO, BoE and MAFE should be monitored to identify the direction of their policies and achievement on coastal ecosystem management. If these policies and strategies show the same direction to achieve the overall goal but some issues or challenges have remained, there will be some of the potential support or collaboration that could be identified.