Title	NbS for Resilient Societies to Climate Change in Pacific Atoll Nations (NbS-PATS) -Policy and Governance Workshop-
Venue	Majuro, Marshall Islands Resort (MIR)、Roo: Lomalo
Date	Date: September 4, 2025, Time: 9:00-12:00
Participants	Around 35 people (From departments and Agencies of RMI government, Japanese government, USP, CMI, NGOs, other)

■ **Presentations were made according to the program (see attached), followed by the following presentations and Q&A sessions.**

(1) Presentation

1) Researcher; Dr. H. Kayane (PI)

- My research findings on Majuro in 2007 clearly demonstrate that atoll islands are formed entirely from gravel produced by corals and foraminifera. This unique characteristic should be fully taken into consideration when considering the sustainability of atolls.
- Atoll islands formed in this way enjoy a unique balance of physical and biological conditions, but recent population concentration and the effects of climate change threaten this balance.
- To address the impacts of climate change, among other issues in atolls, nature-based solutions (NbS) that maintain ecosystem health and utilize its functions are necessary and effective.
- In particular, with regard to the restoration of coral reef ecosystems, Japan has accumulated many years of research on sexual reproduction methods and the cultivation of coral seedlings that are resistant to high water temperatures, which can also be applied to RMI.
- In Majuro, there are many pits excavated for rock collection on the reef flats, and these can be effectively utilized as nurseries for cultivating coral seedlings.
- Furthermore, concrete vertical seawalls have been built along the east coast of Majuro to protect residential areas from waves. However, in such locations, the sediment produced by ecosystems cannot be deposited due to the effects of reflected waves. Seawalls should be designed to create sustainable coastal areas.

2) Researcher; Dr. N. Sena

- I am conducting workshops with the University of the Marshall Islands (CMI) to co-design NbS solutions to climate change issues in small island societies. I will explain our achievements so far and future challenges.
- To this end, our goals are to design and evaluate NbS, engineering, and social adaptation solutions, develop economic and ecosystem models and evaluate the merits of adaptation solutions, and create adaptation scenarios involving local and international organizations and their funding.
- As a social-ecological research, this activity is characterized by stakeholder-participatory problem analysis. To this end, we have sought cooperation from the University of the Marshall Islands (CMI) and held workshops and seminars.

- Another feature of this activity is the use of a systematically organized database of effective countermeasures called the Tool-Box.
- On August 29th, we held a co-design workshop with many professors and students from CMI, focusing on Majuro, where we spatially mapped social issues related to climate change.
- We will continue to hold workshops with CMI to analyze the issues and concretize NbS solutions.

3) CCD Director; Mr. Clarence Samuel

- The presentation will be broken down into three sections: Adaptation Pathway, Early NAP Actions, and Sector Actions/Responsibilities.
- The "Tile Til Eo Committee" coordinates and integrates climate and resilience activities. This committee manages the implementation of RMI's 2050 climate strategy, "Tile Til Eo (Lighting the Way)." This committee belongs to the Cabinet and the Office of Chief Secretary Oversight, and is divided into the Mitigation Working Group, Adaptation Working Group, and NDC Partnership Working Group depending on the issue.
- An adaptation pathway has been set out as an implementation policy through to 2040. Islands are divided into three types, and the highest priority measures will be implemented for each.
- In the Outer Atolls and Rural Atolls, NbS and highly economically efficient social resilience measures will be promoted, assuming a period up to 2070. Islanders will also be encouraged to relocate appropriately according to their circumstances.
- In Semi-urban Atolls, projects will be implemented to respond to a 0.5m sea level rise by 2070.
- In Urban Atolls, assuming a 0.5m sea level rise by 2070, communities and government facilities will be relocated to appropriate locations in accordance with the protection criteria.
- However, 30 to 40 billion yen will be needed to address climate change, and RMI does not currently have such funds, so effective use of climate finance will be necessary.
- The initial activities of the NAP are expected to focus on broad dialogue and consultation, the use of mangrove forests and other resources as NbS, and the establishment and operation of a Center of Excellence.
- Action plans have been established for six sectors. These are public works and infrastructure, energy, health and social services, education, skills and training, fisheries, interior affairs, and natural resources and commerce.
- There are challenges in implementing the NAP. For example, it is important to respect the opinions of other relevant agencies and communities while coordinating.
- Some agencies are reluctant to implement the measures outlined in the NAP due to a lack of capacity. Furthermore, relevant government ministries and agencies do not have sufficient human resources to implement the NAP. Staff capacity and awareness must also be improved. It is important for relevant agencies to implement the plan responsibly.
- In addition, donors need to work together to avoid overlapping projects.
- Implementing the NAP requires the participation and cooperation of many people from each island.
- We also hope to deepen communication with universities and other educational institutions to gain cooperation in terms of knowledge and human resources.

4) Researcher; Dr. H. Yamano (Deputy PI)

- Majuro Atoll in the Marshall Islands has been selected as the research field, and through in-situ observations, satellite observations, and numerical simulations, we are understanding changes in the marine environment from the past to the present, as well as the characteristics of the current marine environment and ecosystem.
- The main research objectives are 1) to identify priority coral conservation areas on the atoll (lagoon side) and 2) to investigate the feasibility of using sand and gravel deposited in the atoll's sand apron (lagoon side) for beach nourishment.
- To identify priority coral conservation areas, we are conducting detailed spatial and temporal simulations of water temperatures inside and outside the lagoon of Majuro Atoll using a hydrodynamic model. To obtain verification data, environmental monitoring equipment is being installed in the lagoon to continuously monitor water temperature, salinity, current direction, and current velocity.
- To understand the potential use of the deposited gravel for beach nourishment, past research results are being utilized to estimate sediment production by foraminifera in the northern part of Majuro Atoll.
- In ongoing spatial planning work, monitoring surveys are being continued to predict future coral distribution based on temperature and other physical conditions, ecosystem mapping using satellite data, and mapping of the social value of coral reefs.

- In addition, with regard to the use of the produced sediment, plans include estimating sediment production by foraminifera, investigating sediment accumulation rates, and considering sustainable beach nourishment methods.

5) Researcher; Dr. Y. Tajima

- From an engineering perspective, he is conducting analyses to gain a detailed understanding of the wave characteristics of Majuro Atoll, and researching coastal protection measures that are resilient to climate change.
- Focusing on Majuro Atoll, we are conducting literature research to identify and organize past cases of flooding, and are conducting reproduction calculations using a wave model (SWAN) based on knowledge gained from global reanalysis data and field observations.
- As a result, we have learned that on the open ocean side, waves mainly arrive from the east-northeast along the north-facing coast, that high waves on the northern reef deposit sediment along the southern side of the northern reef, and that on the southern side of the atoll, waves are relatively calm and mainly arrive from the southeast.
- Conversely, within the lagoon, relatively calm waves are characterized by arriving from the east-northeast.
- As coastal protection measures for the Long Island area, which is suffering from erosion, we are considering beach nourishment, as well as the installation of underwater jetties and artificial reefs to

control sediment movement along the coast, and the use of special technology to solidify coral sand for this purpose.

- As a measure to improve the problems of upright concrete seawalls, we are considering the installation of wave-dissipating blocks, sandbags, and wave-dissipating structures made from solidified coral sand in front of them. We are also considering the use of small structures to trap coral sand produced at the reef tip and a second embankment to prevent water from overflowing the embankment and flooding residential areas.

(2) Questions and Answers

- I heard that survival rates in coral restoration projects vary. What are the key factors influencing these changes? (Mr. Miyazoe, Project Implementation Unit, Ministry of Public Works)
- There are multiple factors, but we prioritize preventing predation of juvenile corals. (Mr. Nakamura)
- How do we increase mangrove forests? Can CMI's technical personnel collaborate with CCD? We look forward to a partnership with CCD. (Dr. Rosalindo, STEM Chair, CMI)
- The NAP has not yet determined the technical details. Coordination is needed regarding which islands to implement measures on. We hope to continue consulting with CCD on specific issues. However, there are few mangrove forests in Majuro. (CCD Director)
- Majuro used to have many mangrove forests. (CMI, STEM Chair)
- I would like to see CMI's engagement considered. There are diverse talents with local knowledge. I would like to actually conduct research. (CMI/JO-JIKUM)
- USP has experts and students in fields such as physics and biology. I would like to collaborate on future research activities. (USP Professor)

Research project; NbS Pacific Atolls ＜NbS-PATS＞

Workshop in RMI

Nature-based-Solutions (NbS) for Resilient Societies to Climate Change in Pacific Atoll Nations

NbS-PATS, Workshop Agenda, on *September 4*

(Final announcement)

Time Approx.	Subject	Speaker	Description
8:30 a.m.	**-Registration** **-Drink and breakfast**	–	-Please give your name and affiliation. (Buffet style)
9:00 a.m.	**Keynote Speech**	**Mr. Nobuhiro Kikuchi** The Japanese Embassy 1st Secretary	Climate change impacts in Pacific Island Countries and Japan's initiatives
9:15 a.m.	~~**Issue Presentation**~~	~~**Ms. Moriana Phillip**~~ ~~*CMAC Chair~~ ~~**or Other on behalf of Chair**~~	~~Coastal issues in RMI related to climate change~~
9:30 a.m.-	**Overview of the Research Project**	**Dr. Hajime Kayanne** *Principal Investigator (PI), Research Team	Purpose, duration, targets, social implementation of the research, and its current status
10:00 a.m.-	**Planning and Project on Adaptation**	**Ms. Clarence Samuel** *CCD Director	Challenges of the National Adaptation Plan (NAP) and ongoing and planned adaptation projects.
9:50 a.m.-	**Collaboration with Stakeholders**	**Dr. Naya Sena** *Research Team	Participatory problem analysis and action package formulation with stakeholders
10:10 a.m.-	**Discussion & Q&A**	**Mr. Bear Salomon** * Climate Change Coordinator	Q&A session
10:25 a.m.-	**Coffee Break**	–	–
10:40 a.m.-	**Research Details (1)**	**Dr. Hiroya Yamano** *Vice Principal	Coastal ecosystem conservation measures
11:00 a.m.-	**Research Details (2)**	**Dr. Yoshimitsu Tajima** *Research Team	Coastal community resilience (sediment use, engineering approaches)
11:20 a.m.-	**Discussion & Q&A**	**Mr. Clarence Samuel** * CCD Director	Q&A session
11:40 a.m.-	**Closing Remarks**	**Dr. Hajime Kayanne**	Summary of meeting and upcoming workshop schedule
12:00 a.m. -1:00p.m.	**Buffet Lunch**	**–**	**Group photo and lunch**