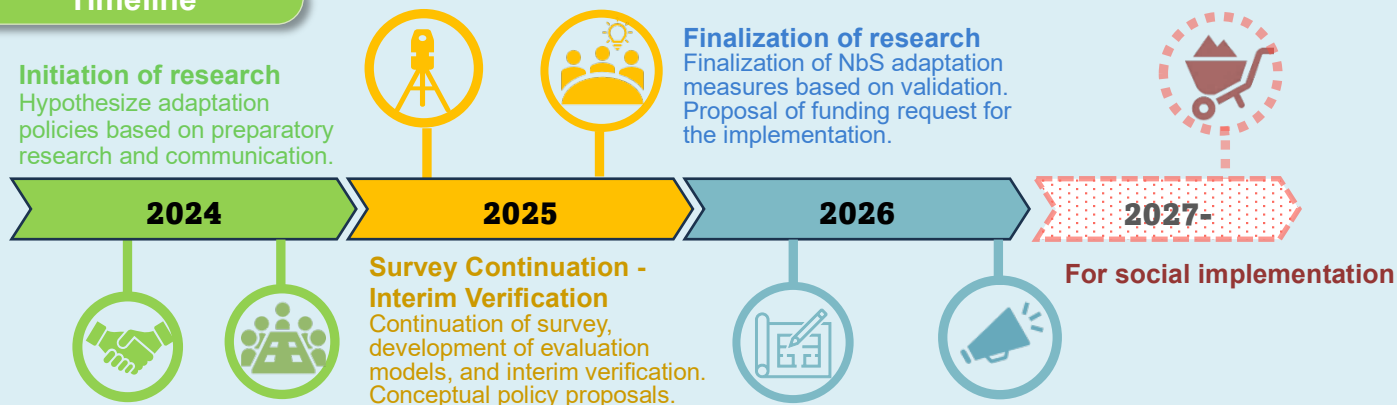


Timeline



Our team

coral reef science



PI: Hajime KAYANNE (PhD)
Project researcher, the University of Tokyo
Research Director and Supervisor

coastal engineering



Yoshimitsu TAJIMA (PhD)
Professor, The University of Tokyo
Assessment of disaster prevention functions of coral reef coasts



MAKINO Mitsutaku (PhD)
Professor, The University of Tokyo
Stakeholder participatory problem analysis



Hiroya YAMANO (PhD)
Professor, The University of Tokyo
Spatio-Temporal design of ecosystem conservation as NbS



Yuki YOSHIDA (PhD)
Researcher, National Institute for Environmental Studies (NIES), Japan
Valuation of marine space and stakeholder surveys



Jun YOSHIDA (PhD)
Associate Professor, Tohoku Gakuin University
Economic model building and analysis

community studies



Naya SENA (PhD)
Researcher, The University of Tokyo
Stakeholder participatory problem analysis

marine environment



Hiroya ABE (PhD)
Researcher, National Institute for Environmental Studies (NIES), Japan
Analysis of the use and conservation of marine environments and ecosystems

socio-economics



Tatsuhito KONO (PhD)
Professor, Tohoku University
Economic assessment of effect on adaptation measures including NbS

funding planning



Akihiko NONAKA (M.Eng.)
President, Nikken Sekkei Ltd.
Funding planning for social implementation

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Project Administration: Environmental Restoration and Conservation Agency of Japan (ERCA) URL: <https://www.erca.go.jp/erca/english/index.html>

Photo: Handmade Craft of RMI, Copyright: SPTO

A Ministry of the Environment Japan (MOEJ) funded Research Project Nature-based-Solutions (NbS) for Resilient Societies to Climate Change in Pacific Atoll Nations

FY 2024-2026



Location: Majuro Atoll
Photo: SPTO & David Kirkland



Nature-based-Solutions for Resilient Societies to Climate Change in Pacific Atoll Nations; FY 2024-2026

Preface

Background and Outline: This three-year project, funded by Japan's Ministry of the Environment from 2024, targets climate-vulnerable coastal areas in Pacific Island Countries. It brings together researchers to explore adaptive strategies for these atoll nations.

Nature-based Solutions (NbS) are actions that protect, restore, and manage ecosystems—land, freshwater, and marine—to enhance resilience, biodiversity, and human well-being in response to climate change.

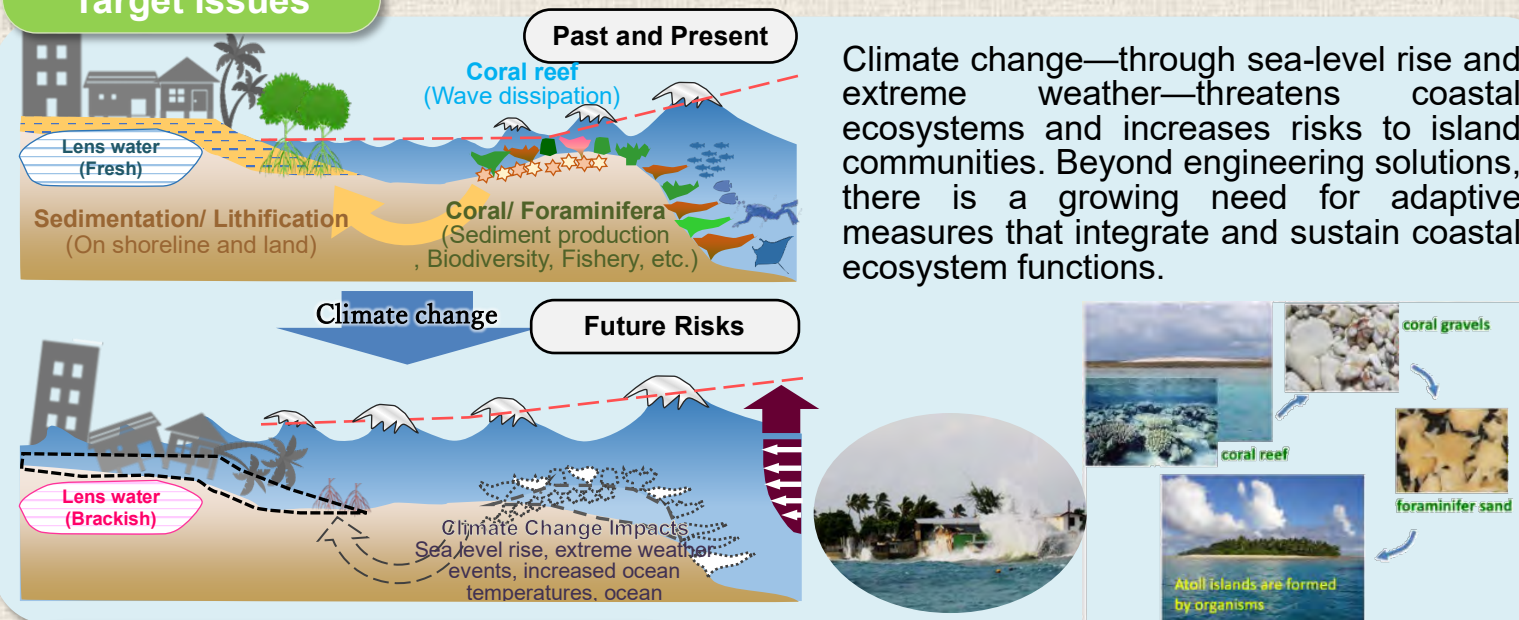
Objective

This project aims to develop and implement Nature-based Solutions (NbS) to strengthen the resilience of small island societies against sea-level rise, flooding, erosion, and other climate impacts. We will:

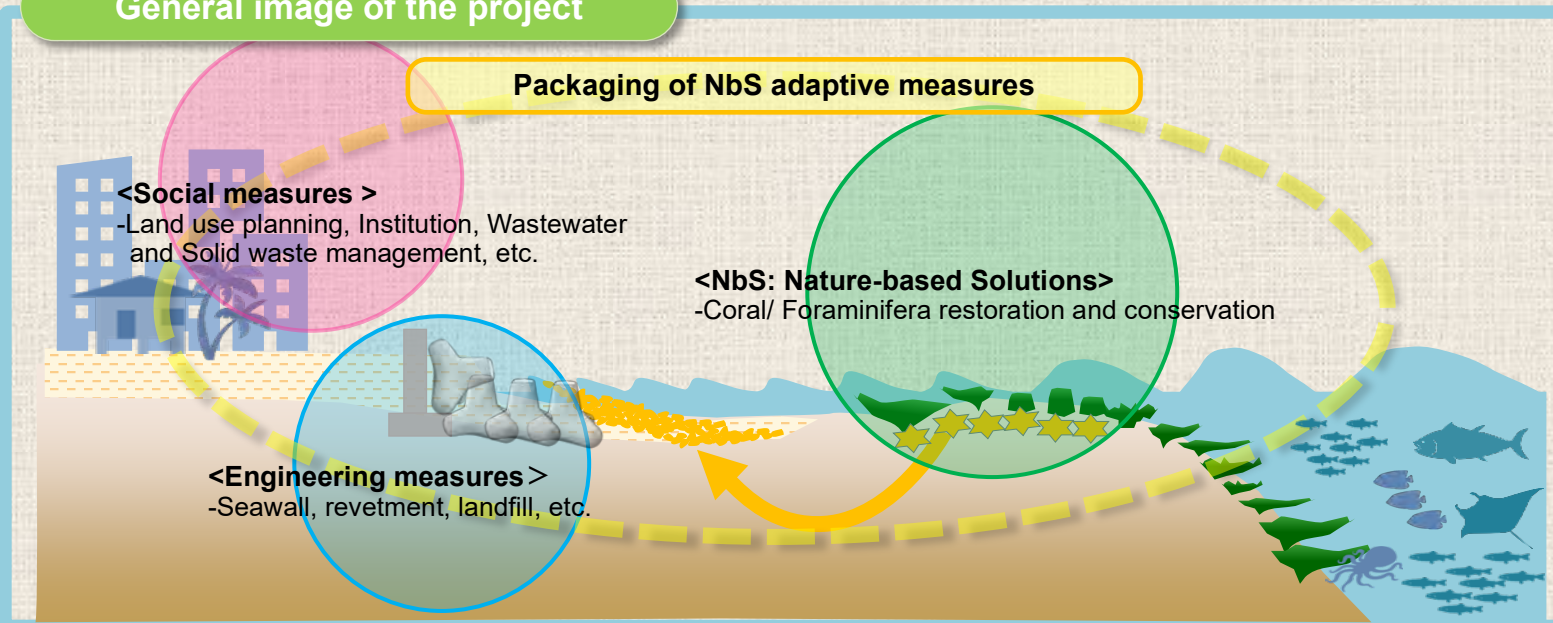
- Design and evaluate NbS, engineering, and social adaptation measures
- Develop models to assess their economic and ecological benefits
- Formulate adaptation scenarios with local and international partners, including financing mechanisms

Collaboration with island governments and communities is central to achieving these goals.

Target Issues



General image of the project



Sub-themes

Preparation

Stakeholder participatory problem analysis and development of action packages: [Makino, Sena] Solution packages and their implementation methods relevant to local context should be developed and evaluated by the parties concerned on their own initiative.

Restoration of coastal ecosystem [Kayanne] Evaluation of coral reef function as coastal protection and sediment supply for coastal resilience. Propose ecosystem restoration measures and improvement of coastal environment through wastewater and garbage management.

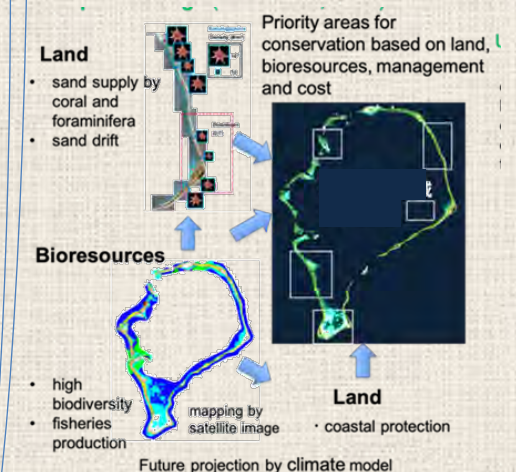
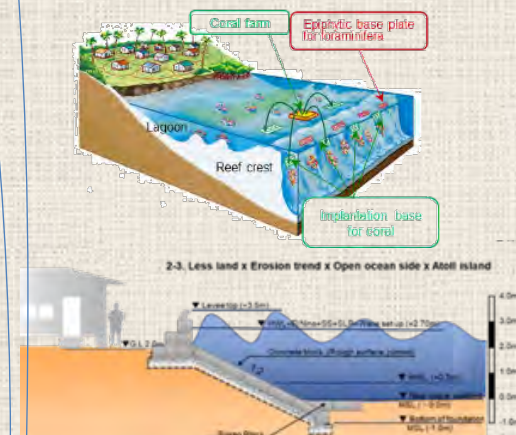
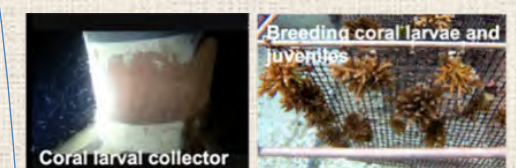
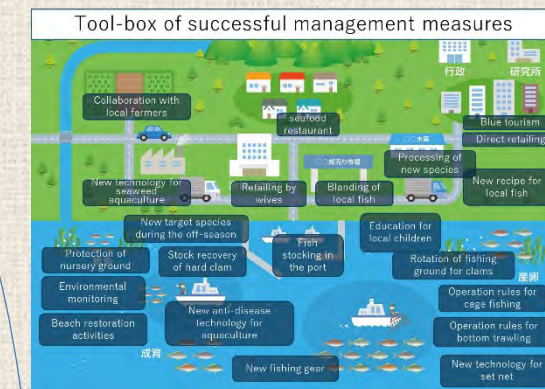
Engineering countermeasures for coastal protection [Tajima, Shimozone] Assessing the impact of climate change and the effectiveness of coastal protection measures on the coastal zone. Planning and proposal of engineering measures for coastal protection considering NbS.

Spatio-Temporal design for NbS [Yamano, Abe, Y Yoshida] Research of restoration and conservation of the coastal ecosystem as NbS adaptive measure. Proposal the priority areas for conservation based on land bioresources management and cost.

Economic assessment of effect on adaptation measures including NbS [Kono] Study and development of an integrated economic and ecosystem assessment model for NbS projects. Economic assessment of project ideas using the developed model.

Funding planning for social implementation [Nonaka] Financial planning for implementation of the project ideas. Support for funding proposal for the implementation.

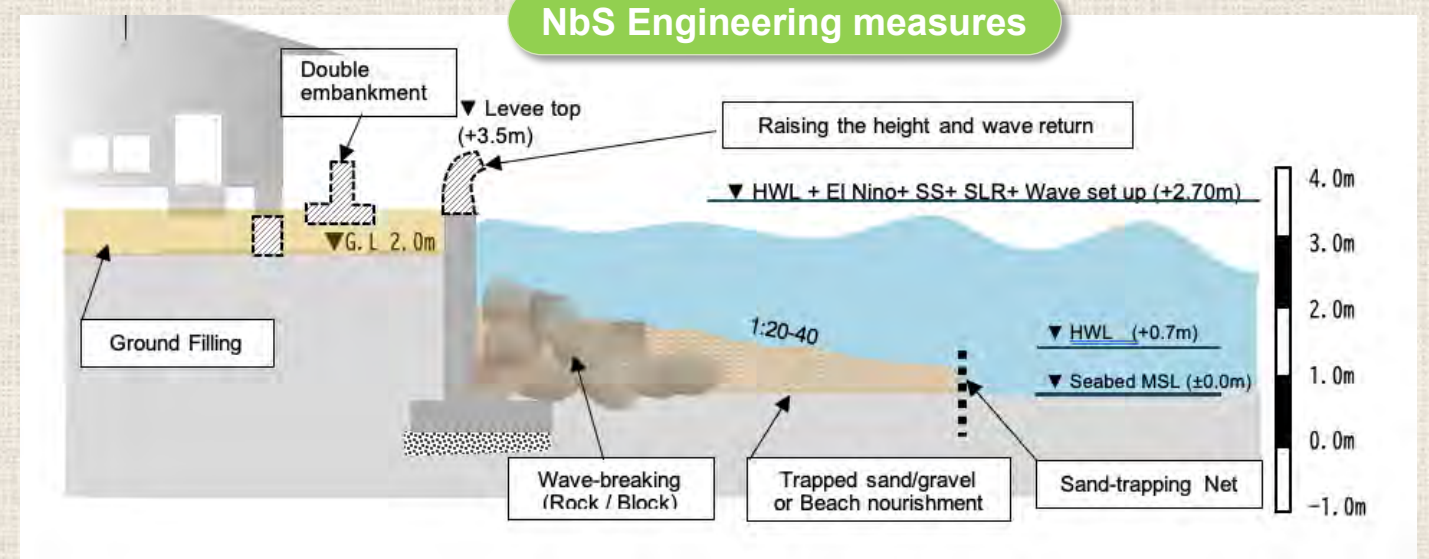
Implementation



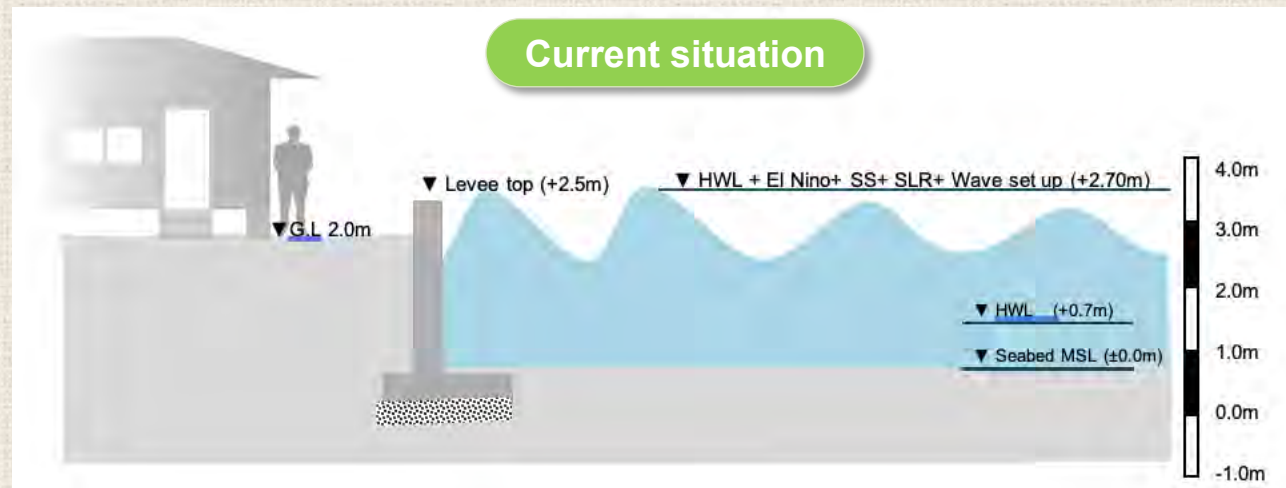
model site: Majuro Atoll Republic of the Marshall Islands



NbS Engineering measures



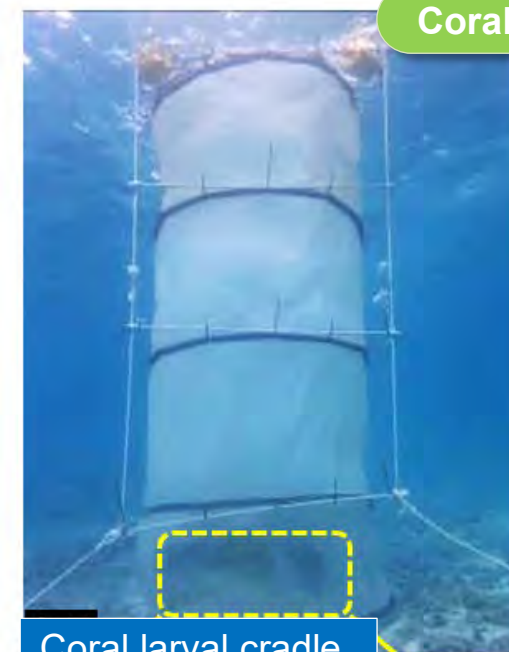
Current situation



Waves break at the vertical seawall, turning the site from sedimentation to erosion, causing the beach loss



Coral breeding technology



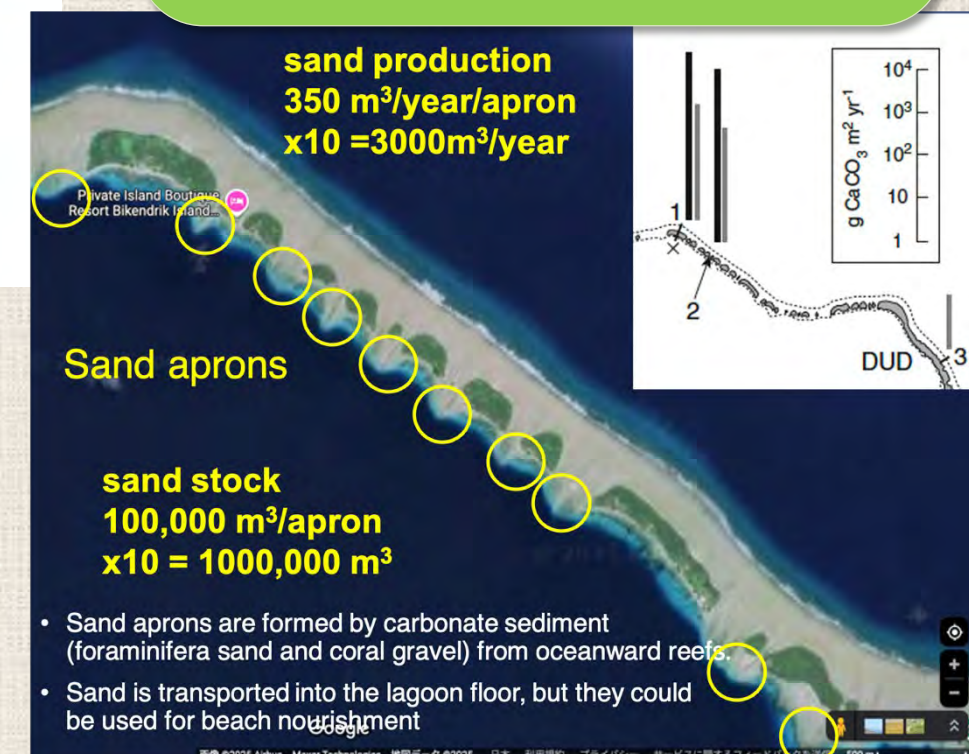
Coral larval cradle



adult corals



Utilizing high production of foraminifera for beach nourishment



The coral larval cradle in which corals are bred can be installed in the excavated pits. Coral larvae will be dispersed to the coral reefs, and juvenile corals will be raised and outplanted on the seawalls.