

FEDERATED STATES OF MICRONESIA

PACC Country Brief

Pacific Adaptation to Climate Change



Adapting coastal road designs to take into consideration the impacts of climate change

The Pacific Adaptation to Climate Change (PACC) project is supporting the integration of climate change risks into policy frameworks and the implementation of community-based adaptation measures in 14 countries throughout the Pacific. These actions are intended to increase resilience in three key development sectors: water resource management, coastal zone management, and food production and food security.

In the Federated States of Micronesia (FSM), the development of coastal management capacity is the primary objective of the project. PACC FSM identified poor road design, specifically in the state of Kosrae, as a significant threat in the case of a climate change disaster. Utilised daily by Kosrae residents, PACC FSM actions aim to improve the roading infrastructure with new hydraulic design features which take into account flooding risks from increased rainfall and sea level rise.

Issues

FSM consists of 607 islands (totalling 271 sq mi in land mass), of which 65 are inhabited. Kosrae, one of FSM's four states, has a land area of 42 square miles. This state is very mountainous and covered in tropical vegetation with peaks approximately 2000 feet above sea level. The coastline is very dense with mangroves and forests. Humid temperatures and rainfall of over 200 inches annually characterise weather conditions in FSM.



Figure 1: In the Kosrae State of FSM much of the shoreline is fringed with beautiful, dense mangrove forests. Photo: PACC FSM

Seventy-five percent of Kosrae is experiencing coastal erosion. Given that most of the state's infrastructure, commercial enterprises and residential properties are along the coast, this erosion threatens the state's economy, communities and livelihoods. In addition, FSM has a growing population and migration rate, putting further pressure on habitable areas. With a growth in population and an increase in the harvesting of fish

and wildlife, economic resources will need to be proportionally increased.

Climate change is exacerbating the negative impacts of environmental threats on homes, communities, livelihoods, and the physical and financial wellbeing of citizens. In particular, a decrease in the predictability of climate patterns is affecting crop production. Many lakes and wells that were used for drinking water have turned brackish; this water in turn spreads to the soil and wetlands, destroying crops and trees. Land based activities—such as dredging, upland clearing, road development, developing infrastructure, mining and deforestation—are also contributing to these problems.

The dispersal of FSM's four states compounds these challenges. Distributing supplies and reaching out to various communities is difficult, and there is a lack of technical expertise and information readily available to the people.

Actions

Policy mainstreaming:

The first of the PACC outcomes is devoted to mainstreaming. The PACC approach to mainstreaming has a dual purpose: 1) to strengthen the ability of institutional frameworks, policies and plans to take climate change risks into consideration and 2) to improve the capacity of key national government and community decision-makers to integrate adaptation measures in key decisions. PACC FSM is supporting efforts to integrate climate change planning into its national policies and economic development activities. Towards achieving this, the precedent setting Kosrae State Law No. 10-2, adopted by the Tenth Kosrae State Legislature, explicitly takes climate change and adaptation measures into consideration for future development activities.

Community-based adaptation:

The second PACC outcome is to design and demonstrate innovative decision systems, hydraulic designs, technologies and practical measures to improve climate-resilience. To date, stretches of roads have been elevated, culverts redesigned and side drainage

Country Summary

Country: Federated States of Micronesia

Thematic Sector: Coastal Zone Management

Project Funding Source: GEF-Special Climate Change Fund

National budget allocation: GEF-SCCF: \$1,000,000

Co-financing: \$6,900,000

Programme Period: 2009-2014

Target area: Kosrae State

National Implementing Agent: Department of Infrastructure and Transportation, Government of FSM

National Implementing Partner: Kosrae Island Resource Management Authority

Regional Implementing Partner: SPREP

Implementing Agency: UNDP



of the Tafunsak road segments modified in view of climate change impacts and projections. Roads in Kosrae State will be climate-proofed through the inclusion of high quality road surfacing materials. Roadbed and culvert freeboard will be increased to accommodate the risks posed by increased precipitation as projected, coupled with high sea level events. Culvert numbers will be increased to take into consideration flooding risks.

Climate proofing assessments found that current roading designs are based on a maximum hourly rainfall of 178 mm, which supposedly had a return period of 25 years. Assessments carried out on the Kosrae site indicate that an hourly rainfall with a return period of 25 years is actually 190 mm. By 2050, the hourly rainfall with a 25-year return period is anticipated to increase to 254 mm as a consequence of climate change. As part of PACC FSM activities the road will be modified so that the drainage works can accommodate an hourly rainfall of 254 mm.



Figure 2: Kosrae State, Main Road Flooding
Photo: PACC FSM

Additionally, PACC FSM will install sea-level and climate monitoring equipment on Kosrae. The purpose of this measure is to provide baseline monitoring to ensure specific and actionable climate-related information is available to inform Kosrae State's future climate-sensitive decision making and infrastructure planning.

As part of PACC FSM's efforts to build community awareness and to showcase a practical adaptation measure, cement taro beds were created in response to flooding and salinization affecting plants and crops. Soil within the beds is being built by composting methods on a regular schedule (twice per week), while rainwater alone provides sufficient moisture. Residents reported that building these beds in soil pits prevented overheating of plants near the cement walls. Showcasing functional and tangible benefits from adaptation measures helps increase awareness and promotes replication.

Impacts

The key objective of the PACC FSM project is to demonstrate innovative decision systems in roading design. With these measures designed to be easily replicated in other areas, PACC FSM's efforts will also benefit the surrounding islands. An improved roading system will increase the resilience of the socio-economic infrastructure thereby preserving the livelihoods of the people dependent on passable roads. Improved roading will also impact

education and health outcomes by providing secure access to hospitals and schools. With these measures designed to be easily replicated in other areas, PACC FSM's efforts will also benefit the surrounding islands.

Through integrated coastal zone management and an improved roading infrastructure, the long-term impact of PACC FSM will be to strengthen local resilience and enhance the adaptive capacity of coastal communities. The results and lessons will be shared regionally and globally, and bring together new knowledge generated through the project as the basis for a strategic and regional approach to climate change adaptation among Pacific Island countries and territories. These efforts will enable vulnerable communities to adapt to the negative effects of climate change and sea level rise.

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