Pacific Australia Climate Change Science and Adaptation Planning Program
Adaptation planning and decision making

Analysis of climate change implications for settlements and infrastructure, including tools for planners

Background

Infrastructure is crucial to development as it helps people live healthy and productive lives, and links people to services, markets and jobs.[1] Across the Pacific, different countries face different challenges in supporting their infrastructure, according to their location and ability to cope with both development and natural stresses.

On small islands, there is often limited economic infrastructure, intermittent government social services and a mixture of traditional and imported infrastructure supporting the population. Larger islands tend to have more centralised infrastructure based around urban centres providing water, sanitation, drainage and waste treatment systems, and more ready access to building materials for housing and other social infrastructure.

Pacific countries face great challenges to deliver services to all of their people. Most of these services occur from a variety of buildings which may be damaged during storms and floods, or be impacted by coastal inundation as sea level rises. Transport infrastructure is especially critical in the Pacific, because of the highly dispersed population and the need to obtain goods and services across large areas. It becomes even more critical in times of disaster when emergency services are essential.

Most people involved with infrastructure are aware of the potential risks, but struggle to quantify the risk or the specific event that will impact most severely on them. The capacity to plan is restricted by financial resources, the skills and expertise needed, and the availability of information. Some major considerations for infrastructure managers in the region are:

- Being able to identify where the infrastructure is. Is it mapped? Is it above ground or below ground? Is technical information on the infrastructure available?

- Understanding the interdependence of infrastructure. Is there clarity on the risks to interconnected infrastructure if one part of a network fails?

- Knowing who is responsible for the management and ownership of the infrastructure. In the Pacific, many different government departments may own and be responsible for their own buildings, which can make coordination difficult. Traditional land issues are also a major consideration in the Pacific.

- Having the capacity to undertake risk assessments or cost-benefit analysis. What tools are available, and do managers have the skills to access and use them?

A changing climate will create new risks for managing infrastructure in the Pacific. Acknowledging the critical nature of infrastructure and related services for Pacific Island communities, this

[1] http://www.theprif.org/home

PACCSAP activity proposes to explore the potential for a regional overview of infrastructure risk and adaptation options and to work with selected countries to review their current infrastructure and planning frameworks in the context of future climate change impacts, and to identify what tools can support this process. The activity will build on existing activities and programs across the Pacific, and acknowledges that many countries have already developed infrastructure management plans.

Some examples of existing programs in the Pacific that the PACCSAP proposes to engage with in this process include:

- The Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) is a joint initiative between the Secretariat of the Pacific Community SPC/SOPAC, the World Bank and the Asian Development Bank. PCRAFI has provided, through the Pacific Risk Information System (PacRIS), country-specific information on assets, population, hazards and risks.

- PacRIS has catalogued buildings (residential, commercial, and industrial), major infrastructure (such as roads, bridges, airports, and electricity), major crops, and population. The database includes more than 500,000 buildings. About 80,000 buildings and major infrastructure were physically inspected. In addition, about 3 million buildings and other assets, mostly in rural areas, were inferred from satellite imagery.

- The Pacific Region Infrastructure Facility (PRIF) is a multi-partner infrastructure coordination and financing mechanism. It builds on successful activities in the Pacific, helps address gaps in existing infrastructure, and is developing innovative approaches to the problems of delivering infrastructure services in the Pacific. PRIF was initiated in 2008 by the ADB, AusAID, the New Zealand Aid Programme and World Bank. The European Commission (EC) and the European Investment Bank (EIB) became members in 2010.

Proposed approach

This PACCSAP activity proposes to undertake the following steps:

1. Survey existing programs and country information to determine the availability of data to inform infrastructure planning. A major resource will be the Pacific Catastrophe Risk Assessment and Financing Initiative, and the information contained within the Pacific Risk Information System.

2. Explore the potential for a regional overview of infrastructure risk and adaptation options. Such an overview would be informed by PacRIS and could provide if feasible an initial quantitative assessment of spread of infrastructure assets exposed to particular climate change risks. Looking across the whole region can help identify where common interests may reside in adaptation options.

3. Responding to country requests and priorities, as well as data availability, the PACCSAP will review existing planning processes used by Pacific Island countries and partners, specifically to learn how climate change considerations have been integrated. Do these plans include such measures as zoning and set-back regulations, and do they consider possible impacts on land ownership? If possible, the PACCSAP will attempt to review regional plans to consider a different scale of risk management.

4. The activity will undertake an assessment of exposure of select critical infrastructure in these communities to future climate change. This will draw on projections information made available through the research in the Pacific Climate Change Science Program, which will provide projections for temperature, rainfall, wind speed, extreme events, (including tropical cyclones, extreme hot days and heavy rainfall days), sea-surface temperature, ocean acidification, and sea-level rise for three future 20-year periods centred on 2030, 2055 and 2090, and for three different scenarios of greenhouse gas and aerosol emissions: B1 (low), A1B (medium) and A2 (high).

5. As part of this process, the PACCSAP will identify critical interdependencies between sectors. This might entail understanding what would happen in the event of a sustained power failure or disaster situation in a major urban centre, and consider the economic and health dimensions that then flow through to impact on communities. The activity will work with country partners to identify one or two locations to undertake a detailed assessment, and consider how well existing infrastructure will manage the climate in 40 to 80 years' time.

6. Finally, this activity proposed to identify or develop tools that are appropriate for managing long-term planning and understanding how to respond to risks posed by future climate change. There are already many tools available, but the capacity to access and apply these tools is often constrained for different users considering their different requirements.

Discussion questions

1. How would you rate the level of understanding and capacity to manage risks from climate change for infrastructure in your country or area of expertise?

    a. If there are constraints, what do you think is the biggest barrier?

2. Does your country or organisation have a long-term plan to manage infrastructure, and does it consider climate change?

3. Can the PACCSAP assist your country and those involved in managing infrastructure?

    a. Does the process above need further consideration? What do you like, and what would you change or improve?

    b. Who would you work with – both inside and outside your country or organisation – to address infrastructure planning issues?