



Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) Programme Critical Infrastructure in Vanuatu



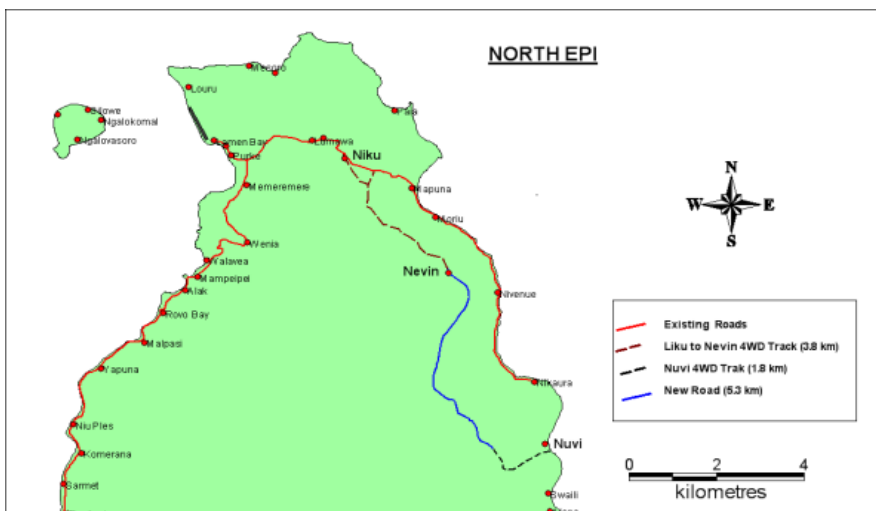
The Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) Programme has supported a number of Pacific Island countries to manage climate risks through targeted application of cost-benefit analysis in key sectors.

Roads connecting local communities in North Epi Island, Vanuatu, are highly vulnerable to the effects of extreme weather and coastal hazards. To help address this issue, PACCSAP commissioned a Cost-Benefit Analysis (CBA) to objectively compare the merits of different options to improve road access.

Situation Analysis

The first stage involved a **Situation Analysis** of existing infrastructure, weather and climate driven hazards in the area. The assessment found that extreme weather conditions cause damage to the road network in the form of shallow landslides and fallen boulders. If the damage is minor, the community usually clears the road with hand tools. If the damage is extensive, the Public Works Department (PWD) is called in to coordinate repairs, sometimes resulting in a long wait before the road is accessible.

Analysis of future climate trends revealed that the impacts of extreme weather on roads may worsen in the future. The intensity and frequency of extreme rainfall is also expected to increase and sea level is expected to rise, likely exacerbating current issues with the road network.



North Epi Island Road Network (Vanuatu PWD 2014)



Problem Analysis

Further analysis of the issue was undertaken during the **Problem Analysis** stage. Two main road infrastructure components (a coastal road, and a hilly road) were assessed for their sensitivity to climate impacts, by identifying relationships between aspects of the road network (for example drainage infrastructure, or road pavement) and climate driven hazards.

The greatest risks identified were risks to the coastal road due to sea level rise and severe tropical cyclones, and risks to the hilly road due to more intense extreme rainfall and associated landslides.



The 'coastal road' (Google Earth and I. Lercet)



The 'hilly road' (Google Earth and I. Lercet)

Solution Analysis

A number of adaptation measures for improving road infrastructure were developed during the **Solution Analysis** stage. Adaptation options included the construction a new road and upgrading the existing network to 'all weather roads' with concrete slabs, improved drainage and culverts.

Decision Support

A quantitative analysis of the costs and benefits of constructing a new road and enhancing the climate resilience of the existing network found that for every dollar invested, about three dollars in benefits¹ would be realised in the transport and agricultural sectors. Benefits to the health, education and employment sectors from an improved road network were also identified but these could not be monetised due to a lack of data.

The CBA demonstrated that the implementation of upgrade activities to increase the number of all-weather roads will greatly improve access in North Epi all year round.



Work conducted by PWD to construct concrete tracks and train local labour (Ian Lercet/PWD 2013)

¹1-in-30 year road standard, using local labour, discount rate 10%