

Vulnerability in Samoa

Karen Sutherland, Barry Smit, Violet Wulf and Taito Nakalevu assess vulnerability to climate change and adaptive capacity in Samoa: the case of Saoluafata Village

As a small island developing state, Samoa is expected to be particularly vulnerable to climate change. Projected sea level rise could increase coastal erosion, cause loss of land and property, and dislocate island inhabitants. Changes in tropical cyclone systems may alter risks to life, property and ecosystems. Water supplies and food security could be threatened by changes in climate. As a Least Developed Country, Samoa is considered to have limited ability to cope with the risks associated with changes in climate. This has been recognized by the international community, and in Article 4.4 of the United Nations Framework Convention on Climate Change (UNFCCC), which makes explicit commitments to the most vulnerable developing countries:

“The developed country Parties shall assist the developing country Parties that are particularly vulnerable to the adverse effects

of climate change in meeting costs of adaptation to those adverse effects.” This international commitment was reaffirmed at the Eighth Conference of the Parties (COP) to the UNFCCC with particular attention paid to small island developing states: “Adaptation to the adverse effects of climate change is

MAIN POINTS

- **The authors describe** the particular vulnerabilities to climate-related risks in Samoa.
- **They summarize** research designed to assess the vulnerability of Saoluafata Village as a basis for identifying measures to improve local adaptive capacity and mainstream adapta-

tion into the national policy framework.

- **They conclude** that Saoluafata’s adaptive capacity is probably insufficient to accommodate future changes in exposure to climate-related risks, and suggest several possible adaptive measures.

of high priority for all countries. Developing countries are particularly vulnerable, especially the Least Developed Countries and Small Island Developing States. Adaptation requires urgent attention and action on the part of all countries.” In Samoa, there is a need to assess vulnerabilities to climate-related risks in order to identify measures to enhance Samoa’s adaptive capacity to better cope with a changing climate.

This paper summarizes the Samoan component of the Capacity Building for the Development of Adaptation Measures in Pacific Island Countries (CBDAMPIC) project sponsored by the Canada Climate Change Development Fund and co-ordinated by the Pacific Regional Environment Programme (PREP). The project was undertaken in Samoa by the Ministry of Natural Resources and Environment and it focussed on two communities, one of which, Saoluafata Village, is described here. The project was designed to

assess the vulnerability of Saoluafata Village as a basis for identifying measures to improve the community's adaptive capacity and for mainstreaming adaptation into the national policy framework.

The concept of vulnerability

Scholarship from a wide range of disciplines, including natural hazards, political economy, risk management and climate change, helps conceptualize 'vulnerability'. Most researchers now recognize that the vulnerability of a community is a function of its exposure to climatic conditions and its adaptive capacity to deal with those exposures. Exposure depends on the frequency, magnitude and extent of climate-related risks, and whether the community lives in a hazardous environment. A community's exposure to tropical cyclones, for example, reflects both the occurrence of cyclones and the location and structure of the community.

Adaptive capacity refers to the ability of a community to prepare for, and cope with or recover from, exposure to climate-related risks. Adaptive capacity is determined by community characteristics such as wealth, equality, political and social stability, access to infrastructure, institutional support and 'social capital', all of which can facilitate or constrain the ability of the community to deal with climate-related risks. This conceptualisation of vulnerability provides the basis for this analysis of community vulnerability in Samoa.

The vulnerability approach

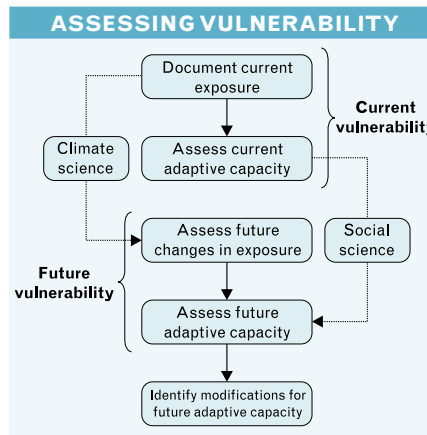
The analysis of vulnerability was done using principles from the vulnerability, or 'bottom-up' approach increasingly used in the climate change adaptation field. The assessment begins at the community-level and examines the conditions that give rise to vulnerability based on the personal experiences and insights of local people. The approach requires intensive participation of community members to identify climatic conditions relevant to the community and to assess the effectiveness of adaptive strategies. The ultimate objective is to identify opportunities to strengthen the adaptive capacity of the community to climate change.

As summarized in the figure below, the assessment of vulnerability begins with docu-

menting the community's current exposure to climate-related risks, reflecting both the climatic conditions and location of human settlement, assets and infrastructure which place the community at risk. The current capacity of the community to cope with climatic conditions is assessed by consulting local residents on what they do to prepare for, cope with or respond to climate-related risks. Together, the exposure to climate-related risks and the adaptive capacity characterize the vulnerability of the community.

Future changes in the attributes of climate to which the community is particularly sensitive are estimated using climate science. For example, regional climate change models provide indications as to how particular climatic conditions are expected to change in the future. This provides an estimate of future community exposure to climate-related risks.

An assessment of the community's adaptive capacity to accommodate these future climatic conditions is made by evaluating the scope and limitations of existing strategies. In other words, would the community's current efforts or methods to deal with climate-related risks be sufficient if these risks increased in frequency and/or severity? Limitations or constraints placed on the community's adaptive capacity are considered here, as well as the sustainability of current coping mechanisms. The possibility of increased exposure limiting or compounding the community's ability to deal with climate-related risks is also exam-



ined. The interaction of future exposure and adaptive capacity represents the future state of community vulnerability.

Finally, modifications to strengthen or improve the community's adaptive capacity are identified. This involves targeting ways of overcoming limitations or constraints on the community's adaptive capacity, such as limited economic resources, institutional support or 'social capital'. It also involves implementing particular adaptive strategies to reduce vulnerability, such as measures to address coastal erosion, flood damage or threats to water security.

Community-level vulnerability assessment

The main source of data was from 'focus group discussions' (see photo). Five focus group discussion sessions were held, one each with the village chiefs, the chiefs' wives and women elders, unmarried women, untitled men, and the youth group and Sunday school. The focus groups reflected the social structure of the village and provided a setting in which participants felt comfortable expressing their ideas and describing personal experiences.

Research questions were posed in a semi-structured and open-ended manner, broadly reflecting the steps in the figure on page 12. The questions were structured to generate information on how climate affects the livelihoods and well-being of the groups in the village. Each focus group session began

with a very general and open discussion about problems faced by the group or village, climate-related or otherwise. This led into questions about the attributes of climate which the group or village had particularly sensitivities to. Participants were asked to identify climatic events from the past that were especially problematic for the village. This resulted in climate-related risks characterized by their severity, frequency and extent. The implications and effects that these climate-related risks had on livelihoods and well-being were discussed. The coping mechanisms or response measures taken to deal with climate-related risks were described by the participants. Participants provided information on the effectiveness or success of such coping mechanisms. The future success of these coping mechanisms in the face of increases in frequency and/or intensity of identified climatic events or conditions was considered. Focus group sessions ended with a discussion of possible adaptive strategies for the village in order to help people cope better with climate risks.

Vulnerability to climate-related risks in Saoluafata village

Current vulnerability to climate-related risks

Saoluafata is exposed to climate-related risks including tropical cyclones, coastal erosion and heavy rain. The narrow coastal plain bordered by steep headlands and the concentration of settlements along the coast contrib-



Focus group discussion in Saoluafata

Photo: CBDAMPIC Project

ute to Saoluafata's exposure. The strategies employed to cope with these risks range from self-constructed drainage ways and seawalls to financial remittances, and institutional support provided by the Village Council, the Church and development agencies.

Residents said tropical cyclones were particularly problematic. Samoa is located in the tropical cyclone belt of the South Pacific and Saoluafata is in a hazardous coastal area, thus predisposing it to exposure to tropical cyclones. The back-to-back cyclones in 1990 and 1991 caused extensive damage to housing, plantations, buildings and roads in Saoluafata and many other villages across Samoa (see cover photo). Most households suffered from a shortage of food, and those that sold their produce at the market suffered huge reductions in income.

Financial remittances sent from relatives working overseas made an important contribution to the adaptive capacity of Saolufata when recovering from the cyclones. This money was used to purchase food, rebuild houses, replant plantations and supplement lost income. Institutional support was provided by the Church in the form of shelter and food supplies, and by development aid in the form of seeds and materials for rebuilding. The Village Council coordinated the clean-up of debris and the repair of roads and buildings. Those households along the coast which could afford to do so, reclaimed the land lost or constructed a partial seawall in the hope

these attributes of climate are expected to change in the future. An increase in the daily intensity of precipitation is projected, suggesting an increase in the probability of more frequent floods. This could be intensified by future El Niño events. It is expected that the intensity and frequency of tropical cyclones in the Pacific Islands region will increase in the future. This would cause increases in wind speed, peak precipitation levels and destructive potential. An increase in the frequency of extreme high temperatures is also projected, thereby increasing the probability of heat stress conditions and droughts.

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of protecting their properties from future cyclones. Some chose to retreat from the coast and resettle further inland, while others resorted to tying their rooftops down with rope in attempts to withstand high winds.

Future exposure to climate-related risks

In addition to tropical cyclones, the residents of Saolufata identified intense rainfall, sea level rise and prolonged periods of drought to be particularly problematic. Numerous regional climate change models for the Pacific Islands region were reviewed to identify how

the Pacific Islands region. This increases the risk of inundation and coastal flooding, erosion, and saltwater intrusion into surface water and ground water supplies. Coupled with storm surges associated with tropical cyclones, sea level rise increases the risks of loss of land and displacement of communities. While the islands of Samoa can be as high as 2,000 metres, most settlements and economic activity is located near the coast, and is thus susceptible to damage and destruction from coastal erosion and flooding.

Future adaptive capacity to deal with climate-related risks

Saolufata's adaptive capacity is probably insufficient to accommodate future changes in exposure to climate-related risks. For example, the 'social capital' of Saolufata is a key component of its adaptive capacity. This social network is both within Saolufata, in terms of family and neighbours offering shelter, food and labour to those in need, and outside Saolufata, in terms of financial remittances sent from relatives working overseas. With more extreme events, the social network of Saolufata may be needed to respond to crisis situations more often. However, Samoa is experiencing a transition from traditional systems to a more Western-style society, and it is unclear whether the existing tight social networks and the sense of service to one's community will remain. Social instability would hinder Saolufata's capacity to deal with climate risks. Furthermore, as climate-induced losses increase, dependency on the flow of remittances will rise and there is no guarantee that losses will continue to be offset by remittances in the future.

Adaptive measures to reduce vulnerability to climate-related risks

In view of the projected changes in climatic conditions affecting Saolufata, and the assessment of the community's adaptive capacity to deal with future changes in exposure, local residents identified several adaptive measures. These included a seawall, a water

drainage system, water tanks, a ban on tree clearing, some relocation, a place to store food supplies and renovations to existing infrastructure.

Residents favoured the construction of a seawall to protect coastal settlements and properties from coastal erosion, storm surges and resulting loss of land. The safety and security of those living along the coast is the primary concern of the village. People feel very strongly about protecting the sacred grounds and burial plots of their ancestors, both of which are located near the coast and are susceptible to loss through coastal erosion. The people of Saoluafata see the land as a part of their heritage and preventing further land loss is therefore very important to them.

Seawalls have long been the traditional

response to coastal erosion and flooding in many small island states. The construction of a seawall would require significant financial investment, labour, materials and equipment. The majority of the required funds would need to come from development agencies or banks. For Saoluafata, a seawall may be the only practical option along the coast, where vital infrastructure, assets and settlements are at immediate risk.

The adaptive measures proposed above help to focus attention at the local scale. However, enhancing adaptive capacity involves more than just technical options; it must consider larger social, political and economic processes. Broader measures could be examined. These might include strengthening the institutional support provided by the Samoan government, promoting economic

development through trade, or implementing poverty alleviation measures which target subsistence households not receiving external assistance. An adaptation strategy will be successful when it is integrated with other policies, such as disaster preparedness, land use planning, environmental conservation, coastal management and national plans for sustainable development. This is likely to be the case for Samoa. National policies and programmes are currently being evaluated as to their effectiveness in capturing vulnerability to climate change. Possibilities for 'mainstreaming', or incorporating climate change adaptation strategies into national policy and programme frameworks, are being assessed. ■

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