Journal of International Development
J. Int. Dev. **22**, 265–281 (2010)
Published online in Wiley InterScience
(www.interscience.wiley.com) DOI: 10.1002/jid.1678

POLICY ARENA

REDUCING THE CLIMATE VULNERABILITY OF COASTAL COMMUNITIES IN SAMOA

MICHELE DALY[1]*, NAMOUTA POUTASI[1], FILOMENA NELSON[2] and JUDE KOHLHASE[3]
[1]*Beca International Consultants Ltd, Auckland, New Zealand*
[2]*National Disaster Management Office, Government of Samoa, Apia, Samoa*
[3]*Planning and Urban Management Agency, Government of Samoa, Apia, Samoa*

Abstract: This paper describes a project undertaken in Samoa to address climate change and other hazards, the method from which could provide a useful model for other small island developing states (SIDS). To reduce Samoa's coastal vulnerability and strengthen institutional and community response capability, land use planning and disaster management frameworks were integrated through: (1) Developing coastal infrastructure management plans for every district supported by a national strategy and integrated with national disaster management arrangements. (2) Intensive participatory village consultation which respected traditional and emerging cultural practices. (3) Training government staff to undertake the consultation work in villages and build capacity. Copyright © 2010 John Wiley & Sons, Ltd.

1 INTRODUCTION

Samoa as a small island developing states (SIDS) in the Pacific is subject to a range of climate-related hazards such as storm surge, cyclones and landslips, as well as other coastal hazards such as tsunami. Between 70 and 80 per cent of the population of 219 998 people (World Fact Book, 2009) live on or near the coast with the majority living on the island of Upolu. Most of the country's important physical and social infrastructure is located along the coast (e.g. Figure 1), indicating a need for improving development policy within the context of climate-related and other coastal challenges.

*Correspondence to: Michele Daly, Beca International Consultants Ltd, Auckland, New Zealand.
E-mail: michele.daly@beca.com

Figure 1. Coastal erosion affecting infrastructure, including the house in the background (photograph from Beca International)

Samoa has a relatively youthful population with 37.6 per cent between the ages of 0 and 14 years, 56.7 per cent of the population between 15 and 64 years and only a small proportion of 5.7 per cent over 65 years (World Fact Book, 2009). The median age of a Samoan is 20.8 years and this youthfulness is also reflected in high fertility rates (4.16 children born per woman).

Twenty-three per cent of Samoa's population lives in the urban area in and around Apia on the island of Upolu and the rate of urbanisation is 1.7 per cent (World Fact Book, 2009). There are more males than females (1.06:1.00) and life expectancy is just under 72 years. The majority of the population is of Samoan ethnicity 92.6 per cent (Government of Samoa, 2001).

Samoa's economy has traditionally depended on development aid, family remittances from overseas, agriculture and fishing, conforming to many aspects of Bertram and Watters' (1985) MIRAB economy for small islands which means an economy based on migration, remittances, aid and bureaucracy. Agriculture employs two-thirds of the labour force and furnishes 90 per cent of exports, featuring coconut cream, coconut oil and copra. Tourism is an expanding sector accounting for 25 per cent of GDP; 122 000 tourists visited the islands in 2007 (World Fact Book, 2009).

Approximately 80 per cent of the 403 km coastline is 'sensitive' or 'highly sensitive' to erosion, flooding or landslip (Gibb, 2001). Samoa suffered two major cyclones in two consecutive years (1990 and 1991) leading to international funding and aid of approximately US$500 million for recovery and rebuilding costs. Given the frequency of cyclones (Carter, 1990) in this part of the Pacific and the possibility of even greater storm intensity due to climate change, this level of dependency on overseas aid is unsustainable. At the time of writing (September 2009), Samoa had experienced a tsunami resulting in loss of life and complete destruction of several coastal villages. Recovery and rebuilding costs will again rely on international funding and aid.

In order to reduce the vulnerability of Samoa's coastal infrastructure to climate-related hazards within the context of wider development challenges such as urban planning (e.g.

DOI: 10.1002/jid

Jones and Lea, 2008), the Government of Samoa undertook a significant project in partnership with communities which sought to assess the vulnerability of the country's infrastructure to climate-related hazards and to develop a land-use and disaster management framework (in this paper, we refer to 'disaster management' and 'disaster risk management' rather than 'disaster risk reduction' because those phrases were used in the project). The Samoa Infrastructure and Asset Management (SIAM) project provided a unique opportunity to explore how these frameworks could be integrated into policy and practice, including how implementation could occur practically at a local level. It was recognised early in the project that sustainable development required disaster risk management as a component of climate-related development policy and practice (e.g. Shea, 2001, 2003). Integrating these concepts through developing a national policy and practice framework together with local implementation was a major project goal.

2 PROJECT OVERVIEW

The SIAM project was a World Bank funded initiative and led locally by the Planning and Urban Management Agency and National Disaster Management Office (NDMO) of the Ministry of Natural Resources and Environment (MNRE) of the Government of Samoa. The Government of Samoa commissioned New Zealand based consultancy Beca International Consultants Ltd to undertake the project, which included the provision of training and support for government staff and local partners to undertake much of the implementation and ongoing work.

Two of the major integrated streams of work were:

1. The development of a national level policy for the management of coastal infrastructure and local implementation plans (known as Coastal Infrastructure Management Plans or CIM Plans) for all Samoa's coastline (approximately 403 km).
2. The development of a national level framework as legislation in the form of the Samoa Disaster and Emergency Management Act (2007) plus the Samoa National Disaster and Emergency Management Plan (2007). This covers disaster management, institutional strengthening of the NDMO and engagement of private sector response agencies in disaster risk management linked to the wider context of climate and development endeavours.

The above workstreams were supported by state of the environment reporting which involved surveying all of Samoa's 403 km coastline and mapping the extent and condition of natural environments (e.g. landforms, mangroves, lagoons), identifying natural resources (e.g. aggregate and offshore sand resources) and mapping coastal hazards (coastal inundation and erosion). The latter also aimed to assist tsunami risk reduction in addition to dealing with climate-related hazards.

The project was completed in two stages. Stage 1 (pilot) (2000–2002) covered 15 districts and 92 villages, with approximately 2000 people directly consulted. That resulted in the development of 15 CIM Plans.

Stage 2 (2005–2007) covered 26 districts and 191 villages, with approximately 5000 people directly consulted (e.g. Figure 2). That resulted in the development of 26 CIM Plans. In addition, 42 organisations participated in developing the disaster management framework, including the development of individual agency response plans and participation in several

DOI: 10.1002/jid

Figure 2. Villagers looking over aerial photograph-based hazard maps during a village consultation meeting (photograph from Beca International)

simulations. These simulations were based mainly on cyclone events, but also included other potential disasters such as pandemic.

At the conclusion of the project, the entire country was covered by the CIM Plans. The order of the first stage of districts and villages to be consulted was selected by the Government of Samoa by need and perceived urgency. Consideration was given to the need for equality of treatment between the islands of Upolu and Savai'i. The order for consulting the districts was also based on existing local knowledge about family and historical ties. Usually, districts next to each other were consulted in a cluster over several weeks to make best use of staff time.

3 CIM PLAN STRUCTURE AND DEVELOPMENT

The CIM Plans describe the existing environment and identify and assess the resilience of existing infrastructure against coastal hazards as well as potential solutions to reduce exposure. The CIM Plans assess resilience by identifying key infrastructure, associated problems, potential solutions and assigned actions to address the solutions. They also include a disaster response plan for the village and district. This guidance provides the ability to be adaptive and responsive while enabling an informed recovery process after a hazard event (i.e. to be resilient according to Paton, 2006).

Many of the solutions identified in the CIM Plans were developed by the villagers themselves. Research shows that community resilience for policy and practice can be increased when communities are empowered to discuss hazards and risks and to participate in collective problem solving (Paton, 2008; Daly *et al*., 2009; Mercer, 2010).

Actions to address the solutions identified were assigned to various government departments and local villages to implement. The CIM Plans were formally signed by

DOI: 10.1002/jid

village representatives, the CEO and the Minister of the MNRE, thus acknowledging the Government's commitment. This cemented the partnership amongst the key participants to implement each Plan's provisions while signifying an acknowledgement by each party of the roles and responsibilities of the other. The CIM Plan actions requiring government assistance have also been tabulated and are in the process of being implemented. These are important steps for evaluating the sustainability and effectiveness of the project over the long term.

Community preparedness, response and immediate recovery measures for cyclones were discussed with the villages and also incorporated into the CIM Plan. The villagers did not see any separation between risk reduction and response and wanted a conversation about all aspects of dealing with cyclones and other climate-related challenges in the context of development. In particular, they understood how the sustainable management of their natural resources such as offshore sand was important to mitigate cyclone effects and how dwellings built on reclaimed land might increase their vulnerability to climate-related hazards. All of these concepts (land use planning, natural resource management, disaster risk management) were integrated and treated as a seamless topic for policy and practice at the village level, demonstrating the successful integration of climate and disaster topics into development approaches.

To demonstrate the commitment to the process by the government and the intention to use the CIM Plans to guide land-use and development planning in Samoa, the completion of a CIM Plan by a village is a prerequisite for access to government funds for village mitigation projects.

Examples of CIM Plan map outputs and text are shown in Table 1 and Figures 3–5.

4 VILLAGE CONSULTATION

With an empowerment consultation model in mind, the consultation process for the CIM Plans was based on previous participatory exercises undertaken for development-related policy and practice topics in Samoa (e.g. Huffer and Sóo, 2000, 2005; Pearce, 2000), were led by Samoans, and is summarised as follows.

4.1 Village Meeting

4.1.1 Ava ceremony

This welcome ceremony was conducted in the local village meeting house 'fale' with the village high chief(s), orators, matai and the pulunu'u (mayor). An orator, project leader, supporting Government of Samoa staff and representatives of the consultant project team made up the visiting group. The ava ceremony (e.g. Fáasíi, 1993) is a very formal and traditional process undertaken in Samoan with specific etiquette involving where to sit, the giving of ava sticks, introductions, speeches, drinking ava and sharing food/eating a meal. The ceremony involves sitting crossed legged on concrete floors for several hours at a time. All discussions are held in the Samoan language.

4.1.2 Project discussion

Following the ava ceremony, a project overview was provided by the team leader. The meeting would then split up into several smaller socially acceptable groupings of people:

DOI: 10.1002/jid

Table 1. Extract from Alataua West Coastal Infrastructure Asset Management Plan identifying issues, solutions and implementation guidelines

Infrastructure	Best solutions and other solutions proposed	Other benefits	Implementation guidelines
Main South Coast Road	Relocate the main road inland from the coast to improve resilience and reduce risk from natural disasters Approximate length of new road 1.6 km Approximate cost of new road WST 368 000 Benefit cost ratio 0.94 Responsibility: MWTI/MNREM Best solution	Improved rate of recovery Improved access to elevated areas Improved costal protection Safer village houses and roads Improved tourism potential Improved sustainability of natural resources	Prepare environmental impact assessment for relocated road
Coastal protection	Upgrade existing seawall at Falelima to protect existing coast road Approximate length of seawall 400 m Approximate cost of upgrade WST 162 800 Benefit cost ratio 0.73 Responsibility: MWTI/MNREM *Note*: The option of providing a replacement seawall does not meet the benefit cost ratio criteria of 0.80 or better. However, it is important to maintain the seawall on a short-term basis to ensure lifeline access while the alternative road is being investigated and built Plant appropriate tree species along coastline to reduce erosion Responsibility: Village/MNREM Regulate sand mining Responsibility: Village/MNREM		Ensure that seawall is upgraded in accordance with the permit process Consultation with people/villages affected by interruption to coastal process Village/families to recognise the role that vegetation plays in stabilising coastal areas Coastal areas to be planted as soon as possible with suitable species MNREM to advise on appropriate tree species and where possible, provide seedlings Village to share control with Government over sand mining activities
Access roads	Improve drainage of storm water overflow and reduce flooding behind the residences of Neiafu-tai Responsibility: MWTI/village		Undertake regular inspections and maintenance of road and drainage Provide for works in budget programmes

(*Continues*)

Table 1. (Continued)

Infrastructure	Best solutions and other solutions proposed	Other benefits	Implementation guidelines
Electricity lines in CEHZ and CFHZ	Provision of underground electricity Relocate electricity lines away from CEHZ and CFHZ at reasonable distance from family houses Responsibility: EPC	Improved safety and access	Ensure regular maintenance of electricity lines Provide for works in budget programmes
Telephone network	Provision of underground telephone network Provision of upgraded cell phone coverage Responsibility: SamoaTel	Improved resilience and improved rate of recovery	Provide for works in budget programmes
Historic sites	Monitor and provide for protection specific to the historic sites Responsibility: Village/MNREM	Improves awareness of cultural heritage	Monitor effects of erosion and flooding on historic sites Provide for works in budget programmes
Emergency management	Identify schools and churches outside of the CEHZ and CFHZ as safe havens Prepare a District Emergency Response Plan identifying resources needed for the safe havens Prepare signs in English and Samoan to be erected throughout the district identifying actions in the event of emergencies including a location map of nearest emergency facilities and safe haven Responsibility: MNREM/district/village	Improves preparedness of district for cyclones Improves resilience and ability to respond	District response plan should include procedure for who prepares, maintains and opens the safe haven as well as procedures to notify villagers and visitors in an emergency and to maintain and replenish supplies Identify location of facilities on CIM Plan maps

Key to Abbreviations in Table 1. *Note*:
WST = Samoan currency, Western Samoan Tala
MWTI = Ministry of Works, Transport and Infra
MNREM = Ministry of Natural Resources, Environment and Meteorology (now called the Ministry of Natural Resources and Environment)
EPC = Electric Power Cooperation
CEHZ = Coastal Erosion Hazard Zone
CFHZ = Coastal Flooding Hazard Zone

DOI: 10.1002/jid

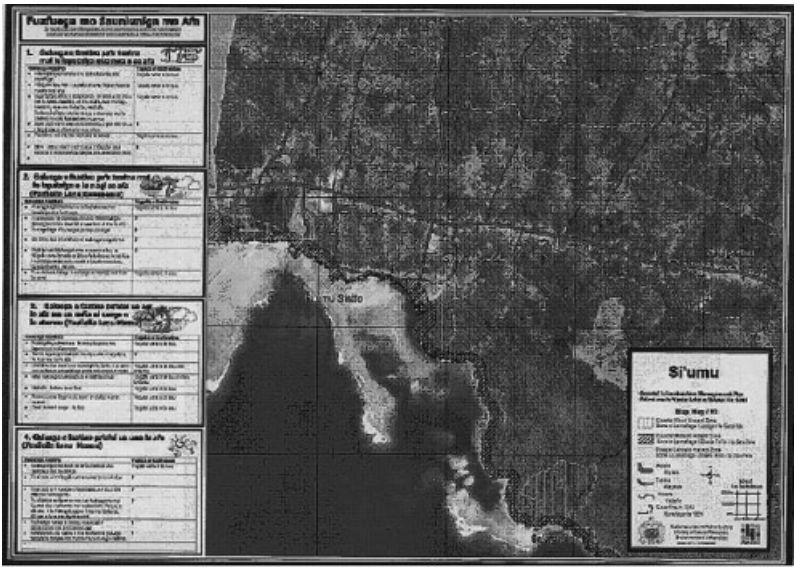

Figure 3. District hazard map for the village of Si'umu showing hazard zones and key infrastructure. The map, copies of which are left in the village, also records village actions to be undertaken in the cyclone season (preparedness phase), when a cyclone warning has been issued, as well as actions during and immediately after an event

matai, high chief, women and ali'i (youth). Each group would be facilitated by a Government of Samoa staff member, and discussion would revolve around issues that the village currently faces during hazard events and potential solutions. Large scale aerial photographs showing infrastructure and hazard zones were used to aid discussions

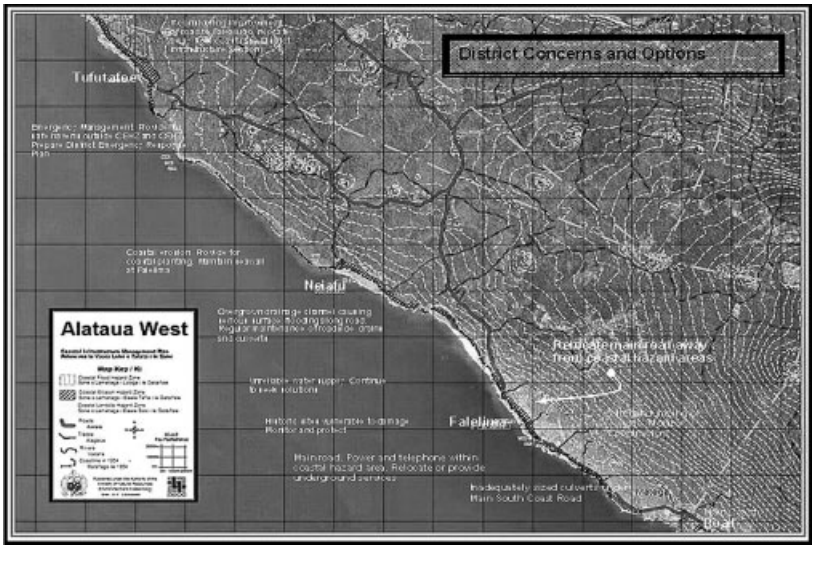

Figure 4. Map for Alataua West District Plan, describing district concerns and possible options for addressing these concerns

DOI: 10.1002/jid

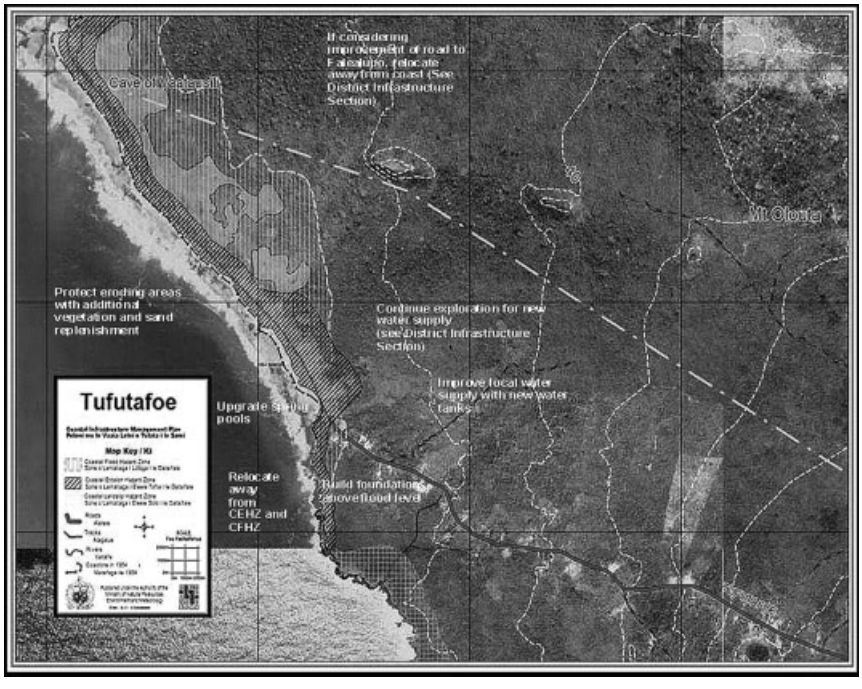

Figure 5. Tufutafoe CIM Plan solutions

(Figure 2). Once discussions were complete, each government representative would report back on the issues raised. Typically decision making and speaking in this kind of forum is predominantly undertaken by the matai (extended family representative) who is traditionally a man; however, there are now an increasing yet small proportion of female matai. It was quite unorthodox to request the input of women and ali'i (youth) as happened for this project. Even more unorthodox was that the project team Government of Samoa representatives included young women and men.

4.1.3 Site visit

The meeting would then break while villagers showed the project team around the village noting key areas of interest. Examples are a blocked drain that floods and blocks the coastal road; the lack of a seawall; susceptible village pools and reclamations; or unsealed inland roads.

4.1.4 Meeting close

The meeting was formally closed with an acknowledgement of gratitude for holding the meeting which was reciprocated by the project team.

4.2 District Meeting

A week or so later, a District meeting would be held with all the villages within the district to discuss wider issues and potential solutions. An example is having only one route to the hospital via the susceptible main coastal road and then determining whether alternative

DOI: 10.1002/jid

routes were possible or how the existing route could be made less vulnerable. Villages were represented at these meetings by a committee made up of a matai, a woman, an ali'i and the pulunu'u.

4.3 Drafting the CIM Plan and Village Feedback

Based on the state of the environment reporting, hazard mapping and information from consultation meetings, a CIM Plan for the district and villages was drafted by the project team of consultants and government staff. Once drafted, the plans would be returned to the village in another meeting for further comment (usually 3 months later).

4.4 CIM Plan Finalisation

Once comments were received, the drafts were amended and the plans were signed off by a designated committee member for each district, the CEO and the Minister of the Environment at a formal meeting. Copies of the plans, including laminated maps, were provided to the village. The significance of these parties signing the plan was to emphasise the concept of partnership, an important underlying principle of the project whereby each party would agree to take control and responsibility for those matters most directly under its control in a mutually supportive manner.

The project involved almost 300 village meetings, each lasting most of a day and more than 120 District meetings, of approximately half a day duration each.

5 TRAINING AND SUPPORT OF GOVERNMENT STAFF AND LOCAL PARTNERS

In order to undertake such extensive consultation, a large number of personnel were deployed from both the consultants' staff and the Ministries of the Government of Samoa staff. Staff training in consultation was an important part of the project and involved more than 60 Government of Samoa personnel spread across several government ministries. Training was delivered in preparatory workshop sessions where standard team protocols, information sheets and data recording schedules were discussed. This was supplemented by practical training on-site during the consultation when new staff were added to the consultation teams.

The Government of Samoa now has a substantial developed capacity to maintain and update the CIM Plans as well as to engage with communities on development issues. The general principles of consultation developed in this project can be applied within the context of the traditional social structures of Samoa where Government needs to consult with villages on any matter.

6 NATIONAL DISASTER AND EMERGENCY MANAGEMENT PLAN AND LEGISLATION DEVELOPMENT

At the same time as village consultation was taking place (in Stage 2), the national disaster management framework was reviewed. At the time, a draft national plan existed, but there was no disaster management legislation.

DOI: 10.1002/jid

Some 42 agencies including community development agencies (e.g. Red Cross), government ministries, first responders (e.g. fire, police) and utilities (e.g. power, water, telecommunications) participated in a series of workshops and simulations designed to help develop a national framework including legislation and a National Disaster and Emergency Management Plan within wider development processes. A key outcome was an increased understanding of the national response arrangements and the roles and responsibilities of various agencies in an emergency. The process resulted in increased levels of inter-agency cooperation and understanding of how agencies depend on each other (in terms of services, resources and skills) to respond to and recover from a disaster. Agencies were encouraged and supported to improve or develop their own response plans and this resulted in a greater appreciation of the importance of business continuity management as a key component in an individual agency's disaster resilience (see also MNRE, 2008). Involvement of agencies in the development of the national plan, including discussions and simulations, enabled informed changes to the legislation's development.

As a result of the concurrent CIM Plan development process, climate (and other) risk reduction policies were integrated across disaster management and environmental management frameworks. The importance of community-developed response plans (see also Boura, 1998; Brennan *et al*., 2005), which were a component of the CIM Plans, was recognised in both the legislation and National Disaster and Emergency Management Plan.

7 GOOD PRACTICE ELEMENTS

7.1 The Importance of Partnerships and Meaningful Implementation

The elements of good practice in this project included recognising up front the importance of partnerships and meaningful consultation (see also Chambers, 1980, 2002; Cooke and Kothari, 2001; Kumar, 2002). A partnership approach identifies what the government 'can and will do' and what villages and private agencies 'can and will do' in creating mutually supportive roles. This approach creates better ownership of addressing climate (and other) risks by the community along with a shared responsibility for managing those risks (e.g. Ballinger *et al*., 2002; Valency, 2007).

Implementation was meaningful for the villages in that, at the end of the process, each village had a prioritised list of mitigation and preparedness projects which they could work in partnership with the government to undertake. A CIM Plan is required to secure access to a government small projects fund and is used to support land use decision making. A CIM Plan database of villages, infrastructure at risk and project-based solutions enables the Government to prioritise villages for support. The CIM Plans have been pivotal in establishing a new way of writing plans, using a collaborative, consensus-building multi-level governance approach, blending traditional decision making systems with contemporary ones.

7.2 The Importance of a National Policy Framework to Support Local Land Use Planning and Implementation

The recognition that sustainable development requires local disaster risk management, climate-related and otherwise, as a component is an important element of the project (for islands see also Lewis, 1999; Douglas, 2006). A national policy framework leads to

DOI: 10.1002/jid

consistent messages at all levels and better support across national, district and village levels. The integration of village-based local planning within a framework provided by a national policy document (both for environmental management and disaster management) is key to the long-term sustainability of local planning and implementation. A national policy framework, support and commitment at government level is important to ensure sustainability, build trust and give credibility to the partnerships (for other approaches in Samoa, see, e.g. King and Fáasili, 1999; Pearce, 2000).

Land use planning in Samoa is in its infancy, with the Planning and Urban Management (PUMA 2004) Act being passed in 2004 and with much previous academic work on land use planning (as opposed to only describing land use) being related to tourism (e.g. Pearce, 2000; Twining-Ward and Butler, 2002). The PUMA 2004 is strongly modelled on New Zealand's legislation with the intention to progressively introduce statutory land use plans, although in the Samoan context. Simultaneously, and in anticipation of such plans, the CIM Plans provide the following non-statutory guidance for future planning in Samoa:

- A framework for local village land use planning. Land is predominantly communally owned by extended families and the allocation of various land uses is traditionally controlled at a village level by the village council (fono a matai).
- A framework for PUMA 2004 to process the required development consents.
- A framework for further public and private investment.
- A framework to introduce statutory land use plans under PUMA 2004. These will likely be developed slowly over the next 10 years, initially focusing on developed areas such as Apia. In rural areas, a statutory approach will need to take into account the village-style decision making.

The 'hands on' training provided in the project has ensured a supply of human resource capital to maintain the system.

What makes the CIM Plan process innovative is that a grassroots (bottom up) approach with additional expert advice was used, so that the plans were then approved and implemented by the national government alongside villagers at local and district levels. The process involved consensus decision making transcending all governance levels – village, district and national. This process helped to avert the conflicts that resulted in other development approaches in Samoa (e.g. Cox and Elmqvist, 1997).

7.3 Effective Consultation

Another important success factor for the project has been the consultation style used in the villages. Approximately 7000 people were consulted, representing around 4.8 per cent of the country's adult population being directly involved in developing the 41 District CIM Plans.

Until recently, i.e. PUMA 2004, consultation by the government with local villages was uncommon. Previously, infrastructure was generally built without direct consultation or comment by landowners. The CIM Plan project involved a systematic and coordinated approach using the village pulunu'u (mayor) to coordinate village meetings. The project team adopted a conventional New Zealand style consultation process adapted to reflect the particular social and political structure prevailing in Samoa. These included the concepts of 'fa'a matai' and 'fa'a Samoa' which loosely translated are 'the way of the matai (chief)' and 'the way of Samoa' (Hooper, 1998; Watson, 2007). Both concepts relate to the

DOI: 10.1002/jid

traditional model of community decision making by consensus under the leadership of the matai.

Another creative addition to the consultation methodology instigated in Stage 2 was the departure from the traditional meeting involving matai, high chiefs and orators only, to invite women and ali'i (untitled youth) to participate. That matches the principles of gender inclusion articulated for climate, disasters and development (Enarson and Morrow, 1998; Sweetman, 2009). It is highly unusual to include the latter groups in formal village consultation because Samoan culture has a hierarchy where everyone has a clearly defined position and role in society. To facilitate discussions (because women and youths are not typically allowed to speak if they do not have a matai title), smaller groupings of matai, orators and mixed groups of women and/or youths were created.

Additionally, a village representative committee was established with a matai, an untitled youth, a women's representative and the pulunu'u which attended district meetings. Meetings were conducted in Samoan, so at least a basic understanding of the language was required. District level meetings were also held to address cross-boundary risks and management issues.

Numerous opportunities for village residents to have input into each plan were provided:

- At the village meetings.
- During the additional three district meetings held to confirm issues raised and discuss broader district issues.
- After draft plans were prepared (3 months later).
- At the final meeting where all representatives signed off the document (3 months later).

It was important that the underlying theme of community participation, which is fundamental to PUMA 2004 and which will ultimately be a major determining factor in the success of CIM Plans, was secured in an appropriately Samoan manner. The CIM Strategy and Plans provide a substantial basis for this to occur.

7.4 Culturally Appropriate Processes and Plans

Much consideration was given to the use of materials to take to, and leave in, the villages. Rather than traditional maps (with a two-dimensional perspective), aerial photograph-based hazard maps (Figure 2) were developed in a way that laypeople could understand them, including being developed in both Samoan and English while being shown at a large scale with landmarks clearly identified (see also Haynes *et al*., 2007; Maceda *et al*., 2009). The villagers were able to verify buildings' locations, discuss the hazard zones and speak of their experience and knowledge of past flood and storm events. It is essential that the knowledge of indigenous communities is a primary source of information for climate and development activities (Mackinson and Nottestad, 1998; Shaw *et al*., 2008). Being able to discuss past events and to have this knowledge and experience directly recorded in the CIM Plan and on the hazard maps empowers the villagers involved and contributes to building community resilience (Paton, 2007, 2008).

The plans are written in both Samoan and English. The most effective means of ensuring the CIM Plans are implemented and used at both a local and national level was to make them easy-to-read and readily accessible. The CIM Plans' content and layout were specifically developed to be user friendly. They consist of an A3 portrait flip book with substantial numbers of illustrative photographs, plans, charts and lists of actions. The CIM

DOI: 10.1002/jid

Plans for all of Samoa include approximately 1200 Samoan language plans (since each village received four copies) plus additional hard and electronic copies in both Samoan and English for the Government of Samoa, held by the Planning and Urban Management Agency. Because paper is rare in villages, at each Stage 2 meeting, eight detailed maps of the villages and district were printed and laminated, and then left with the villages. The CIM Plans are also now available on the MNRE website at http://www.mnre.gov.ws.

7.5 Having a Pilot Stage

Splitting the project into two stages was a valuable exercise. This enabled the pilot stage to focus on those areas with the greatest identified need, for funding to be sorted out thoroughly and to fine tune the methodology as much as possible prior to running the project out to the entire country. Examples are ensuring the inclusion of women and untitled youths in meetings and the improved practice of breaking the meeting into smaller groups to obtain more comprehensive feedback.

8 PROJECT CHALLENGES

The scale of village consultation was the largest project challenge, but was managed with careful planning and coordination. For Stage 2 of the project, two teams worked at the same time in neighbouring districts in order to undertake the consultation in a consolidated manner, reducing costs of accommodation and travel, but increasing workload on government staff.

The second major challenge was keeping all the agencies involved in the development of the national disaster management arrangements and agency response plans motivated and engaged throughout the process. Agencies were supported by the mentoring of staff as well as through learning with peers during the workshops. In addition to an eventual statutory requirement to participate, the value of doing so was emphasised from a business perspective in that agencies recognised that working together and understanding collective resource limitations was important for business continuity management and service provision (see also MNRE, 2008). That is an important part of capacity building/development for future work (e.g. Glantz, 2003).

9 POTENTIAL FOR REPLICATION

The SIAM project could be a useful model for approaches taken for climate, disasters and development policy endeavours in other Pacific islands and coastal zones, especially by learning from the challenges in order to improve and through adapting the good practice elements from this project.

This project covered Samoa's 403 km coastline, most mountainous areas and the majority of the country's urban and rural villages. For other locations, the scale and context could be modified for a reduced number of villages, a more rural/urban mix, inland and coastal villages (depending on the climate and development context), and different hazards beyond climate (e.g. tsunami and volcanic eruptions). The village consultation style would need to be adjusted to the culture and traditions of the country or area.

The style and structure of the CIM Plan may differ depending on the land-use planning framework in place. In Samoa, statutory land-use planning was in its infancy and the CIM

DOI: 10.1002/jid

Plans will form the basis for assisting with land-use planning over the next 10 years. In addition, the long-term sustainability of the benefits from undertaking such a project in other locations would rely on national policy and frameworks being in place, or being developed as part of the project, as occurred in the Samoa case reported here.

Some basic hazard and vulnerability mapping, preferably on a GIS platform but accessible for the people living in the locations, would be useful as well. If such mapping does not already exist, then this component could be built into a project, as was done for Samoa. That also ensures that capacity is developed and that data and products are left behind as part of the process.

Another important part of the work in Samoa, which could be applied in other locations, relates to the 5-year implementation plan for the NDMO that was developed as part of the National Disaster Management Plan. Priority areas include an extension of the preparedness and response plan component of the CIM Plans to non-climate hazards such as tsunami and pandemic, along with identifying villages requiring additional disaster risk management support and developing the national school curriculum to include disaster risk management (e.g. Petal, 2007). That means that climate-related lessons are being applied for development policy beyond the focus on climate, an essential aspect of appropriate development policy including disaster risk management (e.g. Gaillard, 2010; Mercer, 2010).

10 CONCLUSIONS

Samoa is undertaking a comprehensive programme of work which recognises that sustainable development requires disaster risk management as a component of climate-related development policy and practice. The purpose is to reduce the vulnerability of Samoa's coastal infrastructure to climate-related hazards within the context of wider development challenges, as reported in this paper. The programme has sought to integrate these concepts through developing a national policy and practice framework together with implementation at the local level. Local communities and public and private sector agencies have been directly involved in the development and implementation of national and village/district level land development and disaster management frameworks.

Other SIDS face similar challenges with respect to integrating disaster risk management and climate-related policy and practice with other development frameworks (Mercer, 2010). There is potential to adapt the approach taken in Samoa to other SIDS and, in doing so, to achieve similar levels of integration. The CIM Plan approach provides a way of linking across a number of frameworks in a way which provides for community involvement and ownership. Recognition of the significance of this project was given when the CIM Plan Project was awarded New Zealand's premier award for excellence in planning practice (the Nancy Northcroft Award) at the 2007 New Zealand Planning Institute's Planning Conference. It is, though, important to continue recognising the strengths and limitations of this project's process, as discussed earlier, and to continue seeking improvements.

In particular with regards to improving this process, the effectiveness of the CIM Plans and the influence they have had on development policy and achieving disaster risk reduction and climate adaptation outcomes in practice remains to be formally evaluated. The September 2009 tsunami in Samoa provides an opportunity to use the CIM Plans to guide recovery and rehabilitation of the areas affected and to monitor closely the effectiveness of that.

DOI: 10.1002/jid

REFERENCES

Ballinger RC, Taussik J, Potts J. 2002. *Managing Coastal Risk: Making the Shared Coastal Responsibility Work. Summary Report to the LGA Coastal Special Interest Group*. Local Government Association: London.

Bertram G, Watters RF. 1985. The MIRAB economy in south pacific microstates. *Pacific Viewpoint* **26**(3): 497–519.

Boura J. 1998. Community fireguard: creating partnerships with the community to minimise the impact of bushfire. *Australian Journal of Emergency Management* **13**(3): 59–64.

Brennan MA, Flint CG, Barnett RV. 2005. Community volunteers: the front line of disaster response. *Journal of Volunteer Administration* **23**(4): 52–56.

Carter R. 1990. *Probability and Recurrence of Tropical Cyclones in Western Samoa. SOPAC Technical Report 106*. SOPAC (South Pacific Applied Geoscience Commission): Suva.

Chambers R. 1980. The small farmer is a professional. *Ceres* March–April: 19–23.

Chambers R. 2002. *Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities*. Institute of Development Studies: Brighton.

Cooke B, Kothari K (eds). 2001. *Participation: The New Tyranny*? Zed Books: London.

Cox PA, Elmqvist T. 1997. Ecocolonialism and indigenous-controlled rainforest preserves in Samoa. *Ambio* **26**(2): 84–89.

Daly M, Becker J, Parkes B, Johnston D, Paton D. 2009. Defining and measuring community resilience to natural disasters: a case study from Auckland. *Tephra* **22**: 15–20.

Douglas CH (ed.). 2006. Small island states and territories: sustainable development issues and strategies – challenges for changing islands in a changing world. *Sustainable Development* **14**(2): 75–147.

Enarson E, Morrow BH (eds). 1998. *The Gendered Terrain of Disaster: Through Women's Eyes*. Praeger Publishers: Connecticut.

Fáasíi U. 1993. Gospel and culture in the ava ceremony. *Pacific Journal of Theology* **10**(2): 61–63.

Gaillard JC. 2010. Vulnerability, capacity, and resilience: perspectives for climate and development policy. *Journal of International Development* **22**(2): 218–232.

Gibb J. 2001. Samoa Sensitivity Index Database, Beca, Auckland, New Zealand.

Glantz MH. 2003. *Climate Affairs: A Primer*. Island Press: Washington, DC.

Government of Samoa. 2001. *2001 Census*. Government of Samoa, Ministry of Finance, Census of Population & Housing: Apia. Available at: http://www.spc.int/prism/Country/ws/stats/census_survey/CenSurvey.htm.

Haynes K, Barclay J, Pidgeon N. 2007. Volcanic hazard communication using maps: an evaluation of their effectiveness. *Bulletin of Volcanology* **70**(2): 123–138.

Hooper A. 1998. Pacific Islands Stakeholder Participation in Development: W Samoa. Pacific Islands Discussion Paper Series Number 3, East Asia and Pacific Region, Papua New Guinea and Pacific Islands Country Management Unit, World Bank: Washington, DC.

Huffer E, Sóo A (eds). 2000. *Governance in Samoa*. Institute of Pacific Studies: Suva.

Huffer E, Sóo A. 2005. Beyond governance in Samoa: understanding Samoan political thought. *The Contemporary Pacific* **17**(2): 311–333.

Jones P, Lea JP. 2008. What has happened to urban reform in the island pacific? Some lessons from Kiribati and Samoa. *Pacific Affairs* **80**(3): 473–491.

King M, Fáasili U. 1999. A network of small community-owned village fish reserves in Samoa. Chap 25. In *Partnerships for Protection: New Strategies for Planning and Management for Protected Areas*, Stolton S, Dudley N (eds). Earthscan: London; pp. 235–242.

DOI: 10.1002/jid

Kumar S. 2002. *Methods for Community Participation: A Complete Guide for Practitioners*. ITDG Publishing: Warwickshire.

Lewis J. 1999. *Development in Disaster-Prone Places: Studies of Vulnerability.* Intermediate Technology Publications: London.

Maceda E, Gaillard J-C, Stasiak E, Le Masson V, Le Berre I. 2009. Experimental use of participatory 3-dimensional models in island community-based disaster risk management. *Shima: The International Journal of Research into Island Culture* **3**(1): 46–58.

Mackinson S, Nottestad L. 1998. Combining local and scientific knowledge. *Reviews in Fish Biology and Fisheries* **8**: 481–490.

Mercer J. 2010. Disaster risk reduction or climate change adaptation: are we reinventing the wheel? *Journal of International Development* **22**(2): 247–264.

MNRE (Ministry of Natural Resources and Environment, Government of Samoa). 2008. Building Samoa's disaster risk management capacity and capability: a partnership approach. In *Private Sector Activities in Disaster Risk Reduction: Good Practices and Lessons Learned* Dannenmann S (ed.). United Nations International Strategy for Disaster Reduction: Bonn.

Paton D. 2006. Disaster resilience: integrating individual, community, institutional and environmental perspectives. In *Disaster Resilience: An Integrated Approach*, Paton D, Johnston D (eds). Charles C. Thomas: Springfield, Illinois.

Paton D. 2007. *Measuring and Monitoring Resilience in Auckland. GNS Science Report 2007/18*. GNS Science: Wellington.

Paton D. 2008. *Modelling Societal Resilience to Pandemic Hazards in Auckland. GNS Science Report 2008/13*. GNS Science: Wellington.

Pearce DG. 2000. Tourism plan reviews: methodological considerations and issues from Samoa. *Tourism Management* **21**(2): 191–203.

Petal M. 2007. Disaster risk reduction education material development, organization, and evaluation. *Regional Development Dialogue* **28**(2): 1–20.

Shaw R, Uy N, Baumwoll J (eds). 2008. *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region*. United Nations International Strategy for Disaster Reduction: Bangkok.

Shea E. 2001. *Pacific Island Regional Assessment of the Consequences of Climate Change and Variability (The Pacific Assessment)*. East-West Center: Honolulu.

Shea E. 2003. *Living With a Climate in Transition: Pacific Communities Plan for Today and Tomorrow*. East-West Center: Honolulu.

Sweetman C (ed.). 2009. Climate changes and climate justice. *Gender and Development* **17**(1): 1–135 (Special Issue).

Twining-Ward L, Butler R. 2002. Implementing STD on a small island: development and use of sustainable tourism development indicators in Samoa. *Journal of Sustainable Tourism* **10**(5): 363–387.

Valency RA. 2007. *Building Disaster Resilient Communities: Good Practices and Lessons Learned*. UNISDR (United Nations International Strategy for Disaster Reduction): Geneva.

Watson BE. 2007. Reconceptualising Disasters: Lessons from the Samoan Experience. Master of Arts in Geography Dissertation, University of Canterbury, Christchurch.

World Fact Book. 2009. Samoa. Available at: http://www.cia.gov/library/publications/the-world-factbook/geos/ws.html.

DOI: 10.1002/jid