

Climate Change Opportunities for Small Island Developing States (SIDs) – the Sāmoan experience.

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Abstract

The paper explores the opportunities that climate change offers for Small Island Developing States (SIDS) with particular emphasis on Samoa. There is an extensive literature reporting on the adverse impacts of sea level rise, especially on small islands and low lying coastal areas with the possibility of wiping out entire island communities. A further two-degree rise in global temperature will fuel more frequent and severe tropical cyclones /hurricanes as witnessed with Irma and Maria in the Caribbean in September 2017. Increasing ocean acidity will not only threaten the livelihood of fishing communities in the SIDS, but will also accelerate erosion of coastal infrastructures particularly sea walls and coastal roads. Among this gloom and doom, there is optimism in the positive influences and opportunities that climate change may generate for Samoa. Green Climate Fund (GCF)resources are pivotal to address climate change threats, risks and vulnerabilities that Samoa are experiencing since the completion of the first assessment report of the Intergovernmental Panel on Climate Change (IPCC) in 1990, the same year cyclone Ofa struck the Samoa islands. The opportunities presented by GCF are highlighted as the way forward and around the ongoing climate change conversation.

Keywords: Climate change, livelihood, sea level rise, opportunities.

Introduction

The paper explores some critical issues pertaining to the impacts of climate change on Small Island States (SIDs) with particular reference to the Sāmoa group of islands. But first, a recap of how 'climate change' is defined in the literature. According to the Intergovernmental Panel on Climate Change (IPCC), climate change is a change in the state of the climate as a result of natural and man-made activities as manifested in changing statistical information (such as average temperatures, rainfall variability) collected over extended periods of time (IPCC Fourth Assessment Report 2007). The United Nations Framework Convention on Climate Change (UNFCCC) definition of climate change, however, focuses on human activities and how they alter global temperatures as observed over comparable time frames (United Nations 1992: 7). Putting this climate change definition into perspective is best illustrated by looking at the impacts on small island states (SIDs). The 2014 SIDs conference in Apia, Sāmoa, generated a plethora of discussion papers and publications on the impacts of climate change on small island states. For example, the Intergovernmental Panel on Climate Change (IPCC) Fourth and Fifth Assessment Reports give a succinct and clear indication of what is in store for SIDs in terms of air temperature increases and precipitation change over three 30 year periods in the different regions (Table 1 and 2).

Table 1: Projected increase in air temperature (degree centigrade) by region, relative to the 1961-1990 period.

Region	2010-2039	2040-2069	2070-2099
Mediterranean	0.60-2.19	0.81-3.85	1.20-7.07
Caribbean	0.48-1.06	0.79-2.45	0.94-4.18
Indian Ocean	0.51-0.98	0.84-2.10	1.05-3.77
Northern Pacific	0.49-1.13	0.81-2.48	1.00-4.17
Southern Pacific	0.45-0.82	0.80-1.79	0.99-3.11

Source: IPCC Fourth Assessment Report 2007

Table 2: Projected Change in Precipitation (%) by region, relative to the 1961-1990 period.

Region	2010-2039	2040-2069	2070-2099
Mediterranean	-35.6 to +55.1	-52.6 to +38.3	-61.0 to +6.2
Caribbean	-14.2 to +13.7	-36.3 to +34.2	-49.3 to +28.9
Indian Ocean	-5.4 to +6.0	-6.9 to +12.4	-9.8 to +14.7
Northern Pacific	-6.3 to +9.1	-19.2 to +21.3	-2.7 to +25.8
Southern Pacific	-3.9 to +3.4	-8.23 to +6.7	-14.0 to +14.6

Source: IPCC Fourth Assessment Report 2007

Risks and Hazards

The tropical and sub-tropical locations of SIDS imply strong ocean-atmosphere interactions that determine the climatic variations observed over the years. Extreme weather conditions such as hurricanes and tropical cyclones are linked to increased storm surges, coastal flooding and erosion causing extensive damages to coastal infrastructure. The small size of many SIDS mean that when hurricanes, cyclones, earthquakes and drought strike, the entire island(s) are affected. In the case of Sāmoa, it is expected to receive more frequent and extreme rainfall events as well as more frequent and longer dry spells (UNDP 2011) that will pose serious risks to agriculture, food and water resources as well as the general health of the population.

This paper presents a case study from Sāmoa where positive influences and possible opportunities generated by climate change are presented.

Sāmoa

Sāmoa (formerly Western Sāmoa) is situated in the central South Pacific between latitudes 13° 15' and 14° 5' south and longitudes 171° 20 and 172° 50' west. The group consists of ten volcanic islands of Upolu, Savaii, Manono, Apolima which host a population of 187,820 and the remaining smaller islands, Namu'a, Nu'utele, Nu'ulua, Nu'usafe'e, Nu'ulopa and Fanuatapu are designated tourist sites, bird sanctuaries or village conservation lands (SBS 2011). The islands cover a land area of 2,830 sq.km with a coastline of about 403 kilometers and are aligned in a southeast-northwest direction along a chain of volcanic vents of which the oldest are in the southeast and youngest in the northwest (Ward and Ashcroft 1998). The rock mass is volcanic basalt from the sub crustal magmatic material common to the Pacific Basin and built progressively higher by successive lava flows, producing four distinct topographic divisions: lowlands (sea level to about 750 ft.), foothills 750ft to the start of the upland plateau of 1,800-2,000 ft), upland (2,000ft to about 4,000 ft.) and the highlands above 4,000 ft. (Wright 1963: 11).

Sāmoa is one of the Least Developed Countries that graduated to Developing Country status in 2010. But the decision to graduate into a Developing country status was put on hold for three years due to the global financial crisis around that time and the 2009 tsunami that killed 155 people and completely destroyed several coastal villages in the south and south-east coast of Upolu Island. In January 2014, Sāmoa moved from a Least Developing Country to a Developing Country status with a global Human Development Index ranking of 94 out of 182. Sāmoa is placed fourth out of fifteen Pacific Islands in the Pacific Human Development Index (World Bank 2011: 11).

The economic basis of Sāmoa is premised on foreign aid, private remittances, services (tourism), agriculture and fishing. According to the Asian Development Bank Outlook for 2016, the country's GDP stood at 6.6 percent (785.9 million US dollars) in 2016 propelled by a 41.0 percent increase in fisheries and a 9.4 percent increase in visitor arrivals (Asian Development Bank 2017). Similar increases in Hotels and restaurants income were recorded at 36.9 percent due to higher visitor spending despite slower growth in visitor arrivals. Steady tourism and low fuel prices contributed to 21.9 percent growth in transport during the year (Asian Development Bank 2017). However, a lower growth of 2.0 percent is predicted in 2017 and will slow down to 1.5 percent in 2018.

Positive influences of climate change

Any positive influences of climate change for Sāmoa can be conceptualized through the Government of Sāmoa support and ratification of several conventions, agreements and treaties related to climate change and sustainable development. By committing the country to multilateral systems both at the global and regional levels demonstrates how Sāmoa views these systems as a vehicle to address climate change. Actions to address climate change cut across all levels from government to non-government, private sector, village and community to households and individuals. For instance, piloting climate change adaptation in the coastal zones targets rural areas on a national scale. There is also capacity building for government ministries across all sectors at the national level through National Adaptation Programmes of Action to identify priority activities to address urgent and immediate needs to adapt to climate change (Pacific Center for Environment and Development 2011).

The increasing volume of scientific evidence forecasting rising sea levels and increased intensity and frequency of tropical storms in the Pacific region is gradually aiding in convincing Sāmoans that climate change poses a real threat to the livelihoods of communities and their ecosystem services. Cyclone Evans in 2012 demonstrated the value of mangroves in coastal protection, where coastal areas that had undertaken extensive mangrove rehabilitation programmes in the mid-1990s sustained less damage from storm surges and coastal flooding compared to areas completely stripped of their pre-existing mangrove forests. This incident was significant in raising awareness among the coastal communities on the links between climate change, ecosystems conservation and their livelihoods.

Climate risk financing is another positive off shoot of climate change for Sāmoa and the Pacific Islands. Initiated by Tuvalu in the Pacific government officials' forum in Apia in June 2017, the consensus was to present the idea at the Pacific Leaders meeting hosted by Sāmoa in September 2017. Climate risk financing includes insurance against agricultural productivity loss from frequent and severe climate events including 'slow-onset' events like coral bleaching and sea level rise. And given the costly and restrictive nature of the insurance sector to things such as material possessions (house, car), life and health, any proposed insurance against climate-related shocks and disasters that directly affect people's livelihoods is equally important.

The plethora of research studies and discussion papers triggered by climate change dialogue and forums that particularly focus on the Pacific [Sāmoa for example] is an indication of the realization that climate change will continue to pose risks to the physical, social and economic wellbeing of Pacific islanders (Latai-Niusulu 2017; Nunn 2017; Taylor et al. 2016), these in

themselves are positive influences to talk about the plight of small island states and their coping mechanisms that will draw the world's attention and funding to the region. The UNESCO office in Apia for example, is one of many UN agencies working with the local communities to deliver awareness programs focusing on community understandings of climate change and down scaling the science of climate change to community level adaptation. Acknowledging climate change as a one of many drivers of food security in Sāmoa is a positive step in the right direction to embrace 'climate smart' approaches. Creating employment and careers is perhaps another positive influence of climate change in Sāmoa that is particularly linked to the Secretariat of the Pacific Regional Environment Programme (SPREP) and the UN agencies set up in Apia such as the UNDP (Climate Change and Tourism Adaptation Expert), FAO (Climate Change Advisor).

Positive opportunities generated

Sāmoa cannot do much about its small size and the projected global impacts of climate change on Small Island developing states (SIDs) in general (IPCC 2015; Keener et al. 2012). What can be done [and already underway] is focusing efforts on curtailing probable and possible risks to the islands particularly low lying coastal areas of the group. A partnership in 2014 between the Government of Sāmoa, through the Ministry of Natural Resources and Environment (MNRE), Ministry of Finance (MOF) and the United Nations Development Programme (UNDP) culminated in a pledge of US \$12.3 million from the Least Developed Countries Development Fund of the Global Environment Facility to strengthen national and local planning for adaptation to climate change as well as enhancing local communities (particularly those residing in the low lying greater Apia Urban Area) resilience to climate change induced flooding (UNDP 2014). More than 37,000 residents including the business community in the greater Apia Urban Area will benefit from an integrated flood management project that will upgrade and strengthen drainage infrastructure. In 2011, Sāmoa received a grant of USD 25 million from the World Bank for climate resilience investment to develop and implement urgent project based activities to adapt to climate change and climate variability. Two major intervention projects were funded from this grant; to enhance the climate resilience of (1) the main airport road (Apia to Faleolo) through major road extension work and (2) seawall construction particularly around the northern and western coasts of Upolu Island (World Bank 2011).

The Water Sector is one other area with substantial investment opportunities targeting climate change objectives. In 2010–2014, US\$4.17 million from the European Union (2010–2014) was injected into the sector for water policy development (water for life sector plan), budget support, improving public access to safe water supply, strengthening water resources management and improving rural water supply (Climate Finance in the Pacific 2017; Global Climate Change Alliance 2015). In December 2016, the government of Sāmoa signed an agreement with the Green Climate Fund (GCF) providing the latter with Privileges and Immunities. And the government of Sāmoa through its Prime Minister in his speech to open the GCF's board meeting of 2016 in Apia, acknowledged the crucial role of the GCF in providing positive opportunities to empower small islands such as Sāmoa to deal with climate change. Integrated flood management in the catchment of the Vaisigano river is one of the major projects under way to strengthen and widen the Vaisigano river channel and embankments to cope with increased water flow during flood events. Major infrastructure works to improve drainage are being carried out to ensure residential properties, government complexes, and the greater Apia Urban Area community assets, lives and livelihood are protected from increased incidence and intensity of flooding.

Integrating climate change risks into the agriculture and health sectors in Sāmoa is another significant opportunity to address food security issues and climate related water-borne and vector-borne diseases that is already undermining an overly stretched and poorly funded public health system. Given the country's growing dependence on imported refined food products, coupled with declining food production and unsustainable practices in ecosystem management, the opportunity exists for Sāmoan people to explore ways of producing a diversified range of food crops with the help of aid donors such as China as demonstrated in the recently signed China-Sāmoa Intergovernmental Agricultural Technical Cooperation Project in 2017. Moreover, the incidence of non-communicable diseases and obesity is on the rise, and this is one area that climate change funds are channeled into for public awareness and prevention programs implemented by the Ministry of Health.

Migration induced by climate change is another opportunity that has come up as one of the options open to Pacific island populations (Campbell and Warrick 2014). While economic and social factors are significant factors that determine people's migration decisions, climate change is also another contributing factor particularly for small low lying islands such as Tuvalu and Niue. Sāmoa's experience with climate related migration can be categorized into two forms. First, are internal movements (relocation) from the coastal lowlands into the elevated inlands of villages such as Lotofaga and Lepa (Flores-Palacios 2015). A handful of coastal villages in the south and south-east coast of Upolu island that were severely affected by the 2009 tsunami, have already moved inland. Improved access and trunk roads are fully operational to facilitate the relocation. Seasonal labor migration for work in New Zealand is the second form of climate-related migration, that is linked to economic opportunities. It is difficult to isolate climate-change and economic opportunities for migration in the context of Sāmoa [and other Pacific islands] given the precarious nature of subsistence farming in Sāmoa, where pests, disease, weed, poor soils, unpredictable weather and expensive fertilizers, are a few of the many obstacles small farmers encounter on a daily basis, which makes seasonal work a more attractive option to undertake and many of them have done so in the past five years.

Pushing for renewable energy development has been a longstanding issue for Sāmoa. While Sāmoa and many of her island neighbors have low greenhouse gas emissions, the opportunity to contribute to reducing emissions demonstrates a level of commitment to walk the talk. In May 2015, at the Pacific Climate Change bi-annual meeting in Apia, Sāmoa's Prime Minister made a bold statement committing the country to 100 percent renewable energy by 2017 (SPREP 2015). The latest developments in Sāmoa's pathway to 100 percent renewable energy is stated in the country's national communication to the United Nations Framework Convention on Climate Change (UNFCCC) and the Strategy for the Development of Sāmoa 2012–2016 as follows:

- the target year is 2025 measured against the base year of 2014
- continued commitment is conditional on reaching the 100 percent renewable energy generation target in 2017.
- the target area is the energy sector to reduce greenhouse gas emissions from the electricity sector.
- the country's commitment to 100 percent renewable energy depends on external assistance both technological and financial

Further, the newly created Pacific Climate Change Center (PCCC) housed in the Secretariat of the Pacific Regional Environment Programme (SPREP) will enhance climate data collection for the region and provide a base for human resource training and capacity building on climate change issues. The center is touted as a hub for inclusive collaboration between island states' government officials, development practitioners and climate change experts.

Finally, climate change provides an opportunity for world leaders to hold meaningful dialogue to explore and embrace indigenous knowledge that have proven useful to indigenous societies long before climate change became a problem that is beginning to absorb almost half of the developed world's funds to solve. Indigenous knowledge of the land, sky, and ocean provides valuable insights to complement scientific data. Furthermore, indigenous or traditional knowledge can be used as a basis to build climate change adaptation and mitigation actions for small island communities like Sāmoa. For example, traditional taboos and fishing methods imposed on fishing a particular species such as sharks and bonito, avoids over fishing of the species and enables the species to regenerate.

Lessons learned

It makes good sense to inject funding into building and strengthening infrastructure and the people's resilience to climate change impacts. Equally important these investments will be less effective if the potential synergies between the country's overall development efforts and climate change are overlooked. Understanding the linkages between Sāmoa's social-economic development processes and climate change adaptation policies ensures the latter is factored into the national development strategies. In the same vein, development practitioners, government ministries and climate change donors need a community inclusive approach to raising awareness and understanding about the science of climate change particularly among the grass root communities. This is a positive step towards trust building and establishing strong working relationships to ensure the effective delivery of climate change mitigation and adaptation activities.

One of the important lessons learned from the Sāmoa case study, that is inadequately addressed in the government policy literature, is the need to expand on the energy and food sectors particularly in relation to a broader sustainable development focus. The energy, food and water sector have numerous linkages to climate related adaptation strategies. These linkages need to be clearly spelled out in national development strategies to ensure that the intended solutions to address problems in one sector do not compromise other sectors in the chain. For instance, while the country is aiming to reduce greenhouse gas emissions from the electricity sector, the increased importation of LPG for cooking and heating (water) has not reduced the pressure on forest resources for fuel (wood) supply. The opportunity exists to explore clean and renewable energy sourced from wind, waves and biogas, but that requires extensive technical cooperation and partnerships with the donor community.

Equally important is the need to adopt an integrated approach to managing climate change impacts among multiple stakeholders in government and the private sector. An important lesson learned in downstream flood mitigation is the need to regulate and manage all forms of development activities in the watershed. Extensive replanting of native tree species in the upstream areas of the watershed has strongly assisted in flood mitigation in downstream areas particularly in urban Apia. This is a reminder of the interconnectivity between upstream and downstream areas, that was once observed and spoken about in traditional and indigenous knowledge and practices,

such as the 'sa o manuvao' a ritual acknowledging sacred boundaries between people and the forest (Tui Atua 2017). Manuvao was the god of the forest, and in those days, before a tree was felled, a ritual was paid to Manuvao to acknowledge the relationship between humans, their environment and responsibilities.

Conclusion

Climate change impacts and the implementation of adaptation and mitigation programs is a challenging task as identified by Prime Minister Tuilaepa on Radio New Zealand (RNZ Pacific News, 7 March 2016). Efforts to address the implementation of adaptation programs require a multi-sectoral integrated approach to climate proof the island nation. Two important documents (National Policy on Combating Climate Change and the National Action Plan) spell out the country's commitment to tackle climate change as well as the prescribed actions. However, climate-adaptation solutions require sustainable funding, and sourcing and accessing funding can be a challenge. To overcome this hurdle, the government of Sāmoa is advocating strong partnerships between local communities, non-government organizations, private sector and government to address some of the inherent weaknesses such as poor institutional capacity to absorb and manage climate funds that is preventing ease of access to Green Climate Fund resources (Keresoma 2017). Locating the Pacific Climate Change Center (PCCC) in Apia will also provide the much needed support for Sāmoa and the rest of the small Pacific islands to tackle the effects of climate change (SPREP 2016). Optimism remains high that the real and forecasted impacts of climate change for Sāmoa will be managed in such a way that future generations will continue to have a place they call home.

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