CYCLONE EVAN IN SAMOA

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INTRODUCTION: NATURAL HAZARD AND DISASTER EVAN

In December 2012, a tropical depression formed in the South Pacific, which was subsequently named Tropical Cyclone Evan and eventually developed into a Category 4 tropical cyclone. In its path, Evan brought heavy winds and rain to the island nations of Tonga, Fiji, Samoa and the French territory of Wallis and Futuna. This case study will present an analysis of the cyclone's impacts on Samoa with a particular focus on migratory effects including evacuations, shelter, reconstruction and possible relocation in the Small Island Developing States (SIDS).

Pacific SIDS, such as Samoa, are often portrayed as the first victims of climate change in international negotiations, especially in the context of sea-level rise. Apart from this, they rarely make news headlines in Europe or the United States of America in case of a disaster. This is arguably due to their isolation and small size, particularly with respect to their populations. Yet, the size of Samoa's population – 187,820 (OCHA, 2012b) – should not impede their inclusion in analyses of natural disasters and related migration. The South Pacific is one of the most natural-disaster-prone regions of the planet and therefore a "hotspot" of climate change not only with respect to rising sea levels. For Samoa, sea-level rise, coastal erosion and climate change are mentioned, among others, as key issues related to the country's natural environment in the National Disaster Management Plan (National Disaster Council, 2011:16). Additionally, Samoa's exposure to natural hazards is highlighted, including ever-present threats such as volcanic eruptions, earthquakes and tsunamis as well as seasonal threats such as droughts, floods and tropical cyclones (ibid.:17). The following table shows the "extreme"- and "high"-risk hazards identified in a risk assessment for Samoa. Levels of risk were based on the likelihood of a disaster caused by a hazard and the consequences of the hazard.

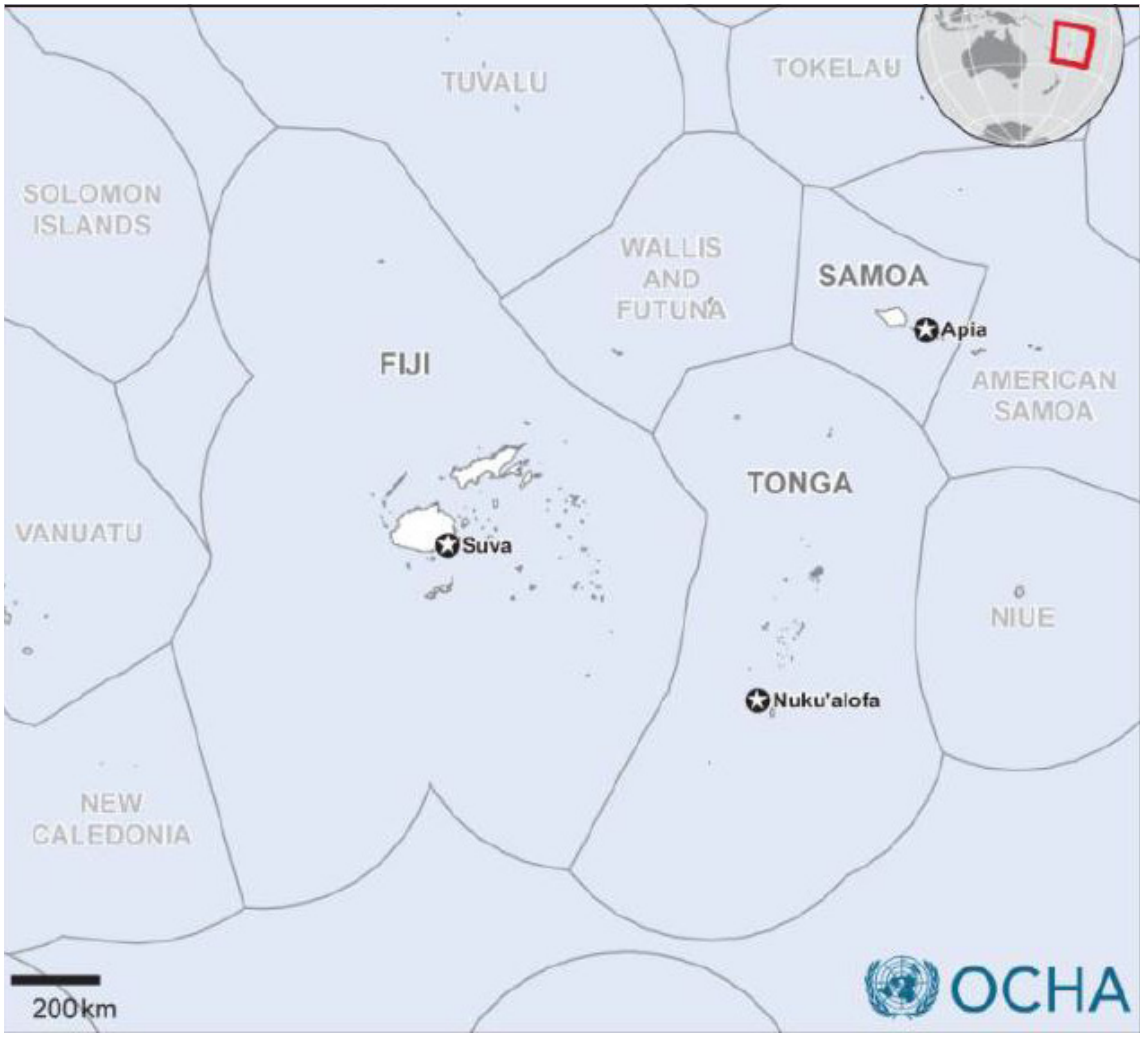
Table 1. Highest risk hazards for Samoa

Risk Level	Type of Hazard
Extreme	Cyclone (inluding stormsurge)
Extreme	Volcanic Eruption
Extreme	Tsunami
Extreme	Apia: Urban Fire
Extreme	Public Health Crisis
Extreme	Environmental Crisis: Invasive Species
High	(Inland) Flooding (due to heavy rain)
High	Earthquake
High	Landslide
High	Forest Fires
High	Airport: Aircraft Emergency
High	Hazchem Incident: Marine

Source: based on "Table 1: Highest risk hazards for Samoa" (National Disaster Council 2011:18)

Tropical Cyclone Evan is a typical example of a natural hazard that has turned into a disaster. It will be analysed as such in this case study. First, the essential facts on Cyclone Evan and its impact on Samoa will be presented. The section will include a description of the storm, information on its economic effects and initial disaster response and management as well as insights into the context of natural disasters in Samoa and the country's vulnerability to them. Second, the migratory effects of the cyclone will be addressed including evacuation and return of the affected population, rebuilding and relocation. Finally, a conclusion will, finally, summarize the findings and put them into their broader context, the state of environmental migration in 2012.

Map 1. Map of Islands Affected by Evan



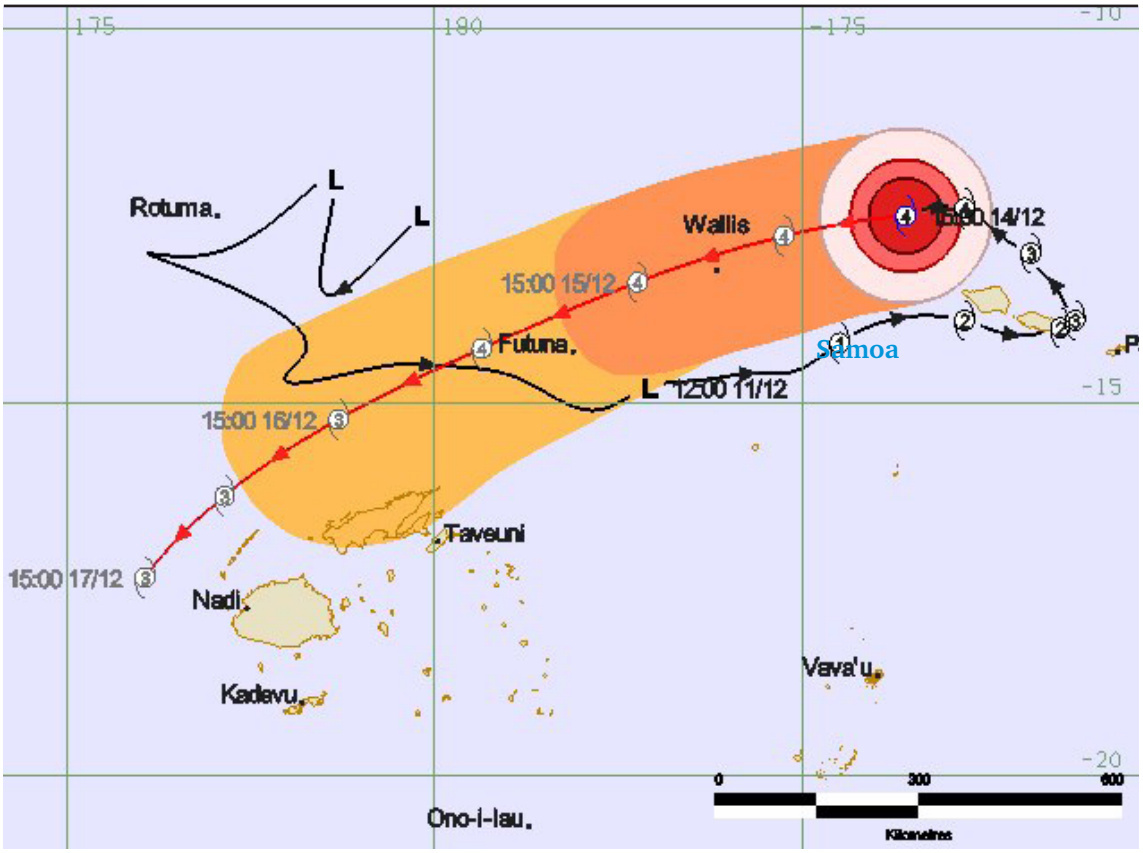
Source: OCHA 2012b

1. A STORMY AFFAIR: EVAN'S MARK ON SAMOA

1.1. Natural hazard Evan: wind, rain and floods

On 9 December, a weak tropical depression was noticed about 700 km northeast of Suva, Fiji (Government of Samoa, 2013:4). At 8 a.m. (Samoan time) on 12 December 2012, the US Joint Typhoon Warning Centre issued a tropical cyclone advisory. Around 5 p.m. the Tropical Depression 04F was upgraded to a Category 1 tropical cyclone and named Evan by the Regional Specialized Meteorological Centre, RSMC (Budvietas, 2012; Fiji Meteorological Service, 2012a). Evan intensified and was upgraded by the RSMC to a Category 2 storm at 2 a.m. on 13 December (Budvietas, 2012). That night, the Samoa Meteorological Services issued a special weather bulletin including a storm warning, hurricane watch and flood advisory (Samoa Meteorological Services, 2012; Radio New Zealand, 2012). Evan was stationary over the country for about 24 hours, where it intensified into a Category 3 tropical cyclone; the RSMC upgraded it at 8 p.m. on 13 December (OCHA, 2012a; Budvietas, 2012). The main damage was done during the late afternoon of 13 December in a two-hour period from 4 p.m. to 6 p.m. (ABC Radio Australia, 2013a). Of the two main islands of the country, Upolu and Savai'i, the former was particularly affected with significant damages particularly on the south coast and in the capital Apia (OCHA, 2012a, 2012b). After leaving Samoa, Evan continued towards Fiji, transforming into a Category 4 tropical cyclone (OCHA, 2012d). At its peak, Evan reached wind speeds of 185 km/h according to the US Joint Typhoon Warning Centre (Budvietas, 2012).

Map 2. Tropical Cyclone Evan Forecast Track Map



Source: Fiji Meteorological Service, 2012b

In Samoa Evan brought winds of up to 110 km/h and a total rainfall between 9 a.m. on 13 December and 9 a.m. on 14 December that amounted to 413 mm in Afiamalu and 207 mm in Nafanua, both on Upolu Island (OCHA, 2012a). Apart from the capital, the rural areas of western Upolu and the south-coast villages Siumu, Safata and Lefaga were most severely affected (Government of Samoa, 2013:40). Flooding of the banks of the Vaisigano River caused by the cyclone also led to major damages (ONE News, 2013a). For example the floods of the river, which runs into Apia, completely destroyed the village of Magiagi with water rising up to five metres high (ONE News, 2012) and led to severe flash floods in the capital (OCHA, 2012a).

1.2. Natural disaster Evan: destruction, damages and loss of human lives

A total of five people were killed by Cyclone Evan in Samoa (Government of Samoa, 2013:5) including two children (Budvietas, 2012) and it has been pointed out that this number stayed comparably low because the storm hit during daytime (ABC Radio Australia, 2013a). The search for 10 missing persons was called off in mid-January (Press Secretariat Government of Samoa, 2013a). These included fishermen lost at sea (OCHA, 2012c; Budvietas, 2012).

In the immediate aftermath of the cyclone, the whole of Samoa was without electricity and running water (OCHA, 2012a). There was substantial damage to three hydropower plants, minor damage to two others (Government of Samoa, 2013:81) and a significant amount of debris-restricted access to affected areas (OCHA, 2012g).

There was severe damage to infrastructure, including roads and buildings, and many trees were downed (Budvietas, 2012; Government of Samoa, 2013:5). To illustrate this, the Post Disaster Needs Assessment (PDNA) states that "the estimated value of destroyed physical assets represents 109 per cent of the normal value of construction activities in Samoa" (Government of Samoa, 2013:xiii).

The tourism industry stated that damage was worse than after the 2009 tsunami (OCHA, 2012e) and amounted to USD 12.1 million.

Additionally, revenue losses are projected to sum up to USD 9.5 million for the time period from 2013 to 2015 (Government of Samoa, 2013:33f). For the agriculture and fisheries sector damage

and loss are estimated at about USD 32.8 million (ibid.:21). The worst hit areas suffered losses of up to 100 per cent of banana trees, 50 per cent of breadfruit, 80 per cent of other economically important crops such as cocoa, citrus and coffee as well as 30 per cent of root crops (Press Secretariat Government of Samoa, 2012). These losses were concentrated on Upolu Island, where the worst-hit areas were the south-western, central and southern parts and the central highlands (OCHA, 2013c; Government of Samoa, 2013:18). On the contrary, Savai'i Island was hardly touched and could provide food supplies to the rest of the country (ABC Radio Australia, 2013a). However, many families lost their private gardens, which are used for personal consumption, as well as parts of their root crop productions, used for subsistence and selling (European Commission, 2013). About 7,000 households, equivalent approximately to 30,000 people, were affected and many small farmers are expected to lose around half of their 2013 annual income (Samoa Observer, 2013a). Consequently, people with low incomes and subsistence farmers were most adversely impacted by the cyclone (Government of Samoa, 2013:xiv ff.).

The total economic effects of the cyclone were also substantial. Initial estimates of total damages were made at more than USD 200 million (ABC Radio Australia, 2013b; Samoa Observer, 2013a) and the PDNA set the total effects to USD 203.9 million (Government of Samoa, 2013:xiii). For a country with a GDP of approximately USD 1.128 billion (CIA, 2013), this represents a substantial sum amounting to 18.1% of GDP. The public sector incurred 55 per cent of the disaster effects and a total loss of about 9,600 equivalent jobs was estimated (Government of Samoa, 2013:xivff). As a consequence of production losses and increased expenditures, GDP forecasts for the next years were lowered. Growth might be zero or negative for 2013 and might not fully recover in 2014 (ibid.:101).

1.3. Initial disaster response and subsequent disaster management

A declaration of disaster was issued on the national radio around 2 p.m. on 13 December by the deputy prime minister who was also the acting chairman of the National Disaster Council (Tusani, 2012). When it expired after 48 hours it was renewed until midday on 17 December (OCHA, 2012b). That day, a state of emergency was declared for 30 days (OCHA, 2012c). Parliament reconvened on 18 December (Samoa Observer, 2012).

In the morning of 13 December the National Emergency Operations Centre was activated to coordinate the emergency response (OCHA, 2012a). It included four sub-committees: First Response, Community Welfare and Internal Displaced Persons, Housing Reconstruction and Settlement, Early Recovery and Recovery Needs Assessment (Press Secretariat Government of Samoa, 2012).

Restoration of the water and power supply as well as providing support for the shelters were identified as the most critical humanitarian priorities (OCHA, 2012g). Debris was cleared by 12 January and water supply restored up to 90 per cent by 15 January (Press Secretariat Government of Samoa, 2013a). The Electric Power Corporation had restored 80% of electricity on Upolu Island by 6 January (Press Secretariat Government of Samoa 2013b). With respect to the emergency centres, the situation in Apia was reported as good with less information on those shelters located in rural areas (OCHA, 2012f). Issues raised regarding the shelters were mainly the supply of drinking water and sanitation (OCHA, 2012b), food (OCHA, 2012d) and later on also safety due to a lack of police presence (OCHA, 2012e). The government provided water, food and non-food items (Press Secretariat Government of Samoa, 2012) and installed pit latrines (Press Secretariat Government of Samoa, 2013a). One issue reported in the PDNA was that shelters were prioritized for distribution of relief items, which was particularly problematic as people were not aware of this prioritization (Government of Samoa, 2013:111).

In addition to provisions from the government and local religious and humanitarian organizations, international assistance was important. Foreign governmental help was received from New Zealand, Japan, Australia, the United States, American Samoa and the EU. International organizations including UNDP, WHO, OCHA, UNESCO, the Asian Development Bank and the World Bank also provided assistance (OCHA, 2012b, 2012d, 2012g; European Commission, 2013; ADB, 2012; Samoa Observer, 2013a). International help mostly encompassed shelter, sanitation, tools as well as technical expertise (Press Secretariat Government of Samoa, 2012).

Damage assessments commenced directly after the storm. Initial ground assessments were completed for Upolu Island on 17 December and indicated considerable damage while reports from Savai'i Island suggested that damage was minimal there (Budvietas, 2012). The Post Disaster Needs Assessment and Damage and Loss Assessment mission took place from 7 to 20 January with the infrastructure and shelter parts starting on 3 January (OCHA, 2013a). For the first time ever UNESCO additionally undertook an assessment of the

impacts on the cultural sector, especially concerning cultural heritage, which were moderate with the exception of some landmarks suffering severe damage (UNESCO Apia, 2013).

1.4. Putting the storm into context: Evan and other natural hazards in Samoa

Samoa is located in Polynesia in the South Pacific. This region is one of the most vulnerable places in the world to natural disasters with up to today millions of people affected by them and billions of dollars of economic losses (Bettencourt et al., 2006:viii; The International Bank for Reconstruction and Development and The World Bank, 2010:30). Pacific nations figure prominently among the world's countries with the highest annual losses from disasters as a proportion of GDP (The World Bank, 2013). For Samoa, the average annual impact on GDP in disaster years (for the period from 1950 to 2004) was 45.6 per cent with 6.6 per cent average impact in all years (Bettencourt et al. 2006: 2) and the country is expected to suffer USD 10 million/year in losses caused by earthquakes and cyclones (SPC/SOPAC et al., 2011:1). In the region, cyclones are the most common type of disaster and climate change is intensifying the situation. Over the past 50 years, the overall number of hurricane-strength cyclones has increased in the region. Today, an average of four of these cyclones occurs in the south-west Pacific every year. Additionally, the intensity of cyclones increases. Wave heights, for example, have exceeded the predictions made in climate change models (Bettencourt et al., 2006:1).

These observations also apply to Samoa, which lies in the South Pacific tropical cyclone belt (Sutherland et al., 2005:13) and whose tropical cyclone risk is classified as "extreme" (National Disaster Council, 2006:6). The 2012/2013 official cyclone season was 01 November 2012 to 30 April 2013 with mid-February to mid-March historically being the period with most tropical cyclones in the South Pacific; between 9 and 11 named cyclones were forecast (OCHA, 2013d). Therefore, experiencing a damaging storm as early as December means that the affected areas face the risk of being hit again and enduring severe damage in the following months. With respect to Evan, an ensuing tropical depression brought more rain, wind and flooding to Apia in mid-January (Tupufia, 2013a).

If Samoa have experienced various natural disasters including storms, Evan has caused devastation that had not been seen since Cyclone Val in 1991 (Budvietas, 2012; Government of Samoa, 2013:4).

In regard to other disasters, the 2009 tsunami destroyed 20 villages, killed 143 people, displaced 3,500 and caused damage of approximately USD 147 million (Fickling, 2012). Therefore, though less deadly, the economic damage of Evan is probably at least as severe. A staff member of the International Monetary Fund put the two into relation: "The disaster caused a significant disruption to economic activity, which had just recovered following the devastating effects of the 2009 earthquake and tsunami" (IMF, 2013). It is in the context of recurring disasters that policy responses to Evan need to be evaluated.

2. EVAN AND ENVIRONMENTAL MIGRATION

2.1. The difficulty of keeping track: evacuation and damage to houses

As a consequence of damages and destruction caused by high winds and the flooding of the Vaisigano River banks, about 6,000 people were evacuated (Government of Samoa, 2013:7). Giving concrete estimates of the people subsequently staying in evacuation centres is difficult due to a number of reasons.

First, people went to official evacuation centres in rural areas and in Apia but also turned to informal centres, which were often managed by denominational groups (OCHA, 2012b). This is explained as Samoans have strong religious ties and Church plays a crucial role in everyday life (National Disaster Council, 2011:16). Second, some families went to stay with relatives or neighbours instead of turning to an evacuation centre (Press Secretariat Government of Samoa, 2012). This was encouraged by the National Emergency Operations Centre, which requested people in rural communities to accommodate evacuees (OCHA, 2012a). Third, while numbers seemed to be decreasing in the days immediately after the storm as people returned home (OCHA, 2012b), they started to increase again at the end of December. Apparently, some "families that initially evacuated to family/friends […] decided that their needs are better met at the centres (timely food and supplies which the distribution evacuation centres have prioritised)" (Press Secretariat Government of Samoa, 2012). These three reasons make that different numbers were given by the government and international organizations such as the UN Office for the Coordination of Humanitarian Affairs (OCHA). The following diagram displays the statistics provided by the latter.

According to OCHA, the number of people in evacuation centres/shelters (see Side Note: Terminology for a discussion of terms) therefore equalled 4.1 per cent of the total population of Samoa (187,820) at its peak (OCHA, 2012b).

The actual number can be considered to be higher as neither all informally-run centres nor those people seeking shelter with relatives or friends are included in these official counts. Furthermore, the figures should, by no means, be seen as definite and complete; additional information and competing numbers for the same dates are also available. For example, Caritas Australia (2012) indicates 1,000+ evacuees staying at the basement hall of the Caritas Samoa office on 16 December. For 28 December, the ADB (2012) states 4,000+ people evacuated. Therefore, all figures should be seen as incomplete estimates. They can nevertheless give an indication of the number of people that evacuated to various formal or informal places. Additionally, the differing numbers illustrate the challenge of keeping track with a sometimes rapidly evolving natural disaster situation, especially if people resort to informal solutions, such as help from family and if needs differ largely. This was for example the case with respect to the period people spent at the shelters. While some stayed only one night or a couple of days, others remained at the shelters for the entire period they were open (Government of Samoa, 2013:109).

The main evacuation centres were managed by the Samoa Red Cross Society, the Disaster Advisory Committee, local government, Caritas, Church Jesus Christ of Latter-day Saints and Seventh Day Adventist churches, to give some examples (Press Secretariat Government of Samoa 2012). This means that three main groups of actors were involved, the Samoan Government (local and national level), humanitarian organizations and churches. After Cyclone Evan was the first time there were officially designated emergency centres. These official shelters were located in urban areas while people in rural communities sheltered in make-shift refuges such as church halls or with other families (Government of Samoa, 2013:109).

The strong winds and floods brought by Evan affected a total of 2,088 houses including 253 that were completely destroyed (Government of Samoa 2013:54ff.). This number was reduced from originally almost 700 houses reported as destroyed (Press Secretariat Government of Samoa 2012), apparently because some people had put in multiple claims under different names or for outdoor toilets (ONE News, 2013b). As was the case for evacuee numbers, this indicates the difficulty of keeping track of disaster effects, which is essential for targeted disaster management and the coordination of relief efforts.

In addition to the destroyed houses, 353 were partially damaged and therefore unsafe so that a total of 606 houses were left in need for reconstruction. The remaining 1,482 affected houses suffered minor damages. The overall damage and loss including household goods is estimated at USD 19 million. Most of the damages occurred on more populous Upolu Island in Vaimauga West (north); followed by Safata, Siumu (both south); Falealili, Lefaga ma Faleseela (both south); Anoamaa West and Vaa o Fonoti (both north-east) (Government of Samoa, 2013:54ff.).

Thus, following the cyclone an estimated 4,242 people (based on average household size of seven members) were in immediate need of financial and technical assistance with reconstruction (ibid.:xvii). Applying this average household size to the total number of house damages, an estimated total of 14,616 people were affected, which represents about 7.8 per cent of the total population.

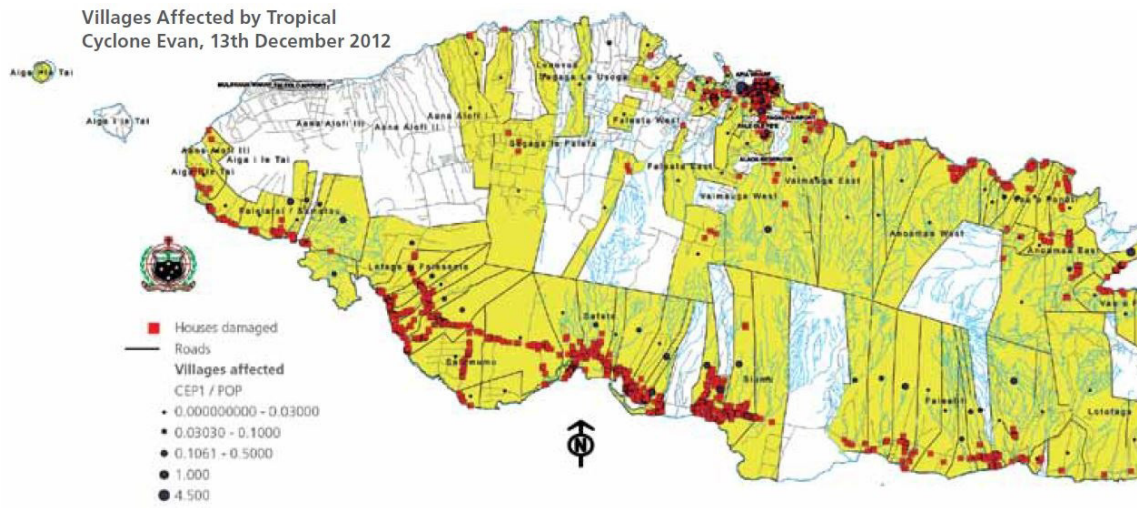
2.2. An official return of the affected population

Returning home to rebuild was encouraged by the government already few days after the storm (OCHA, 2012d, 2012g). The formal evacuation centres were closed at noon on 5 January, based on a decision by the National Disaster Council on 31 December, partly to prepare school buildings used as shelters for the beginning of the school year at the end of the month (Press Secretariat Government of Samoa, 2013b). However, as some people had nowhere to go because their houses had been destroyed, it took in practice a couple of weeks until everybody had left.[1] By March most of the temporarily displaced had returned and lived in temporary homes constructed of tarpaulins, plastic sheeting, and timber. Some people still lived with relatives or friends in overcrowded housing units (Government of Samoa, 2013:54).

Thus, the closing of the official evacuation centres should not be interpreted as a change back to normal. The tropical cyclone season was on-going making living conditions in temporary housing difficult and the returned population vulnerable to new rains and flooding.

1. Interview with Dr Sue Vize, Officer-in-Charge, UNESCO Apia, conducted on 11 March 2013 via email.

Map 3. Villages Affected by Cyclone Evan on Upolu Island



Source: Government of Samoa, 2013:12

2.3. Recovery in Samoa: reconstruction and relocation

Disaster response includes recovery, but can also be used to prepare for future developments such as the recurrence of natural disasters through risk reduction measures. For cyclone-prone Samoa, not only reconstruction is an issue, but relocation may become an adaptation strategy to environmental stressors as well.

Reconstruction constrained: financial challenges for an effective recovery of the most vulnerable households

The PDNA estimates the total amount of money needed for recovery and reconstruction in the housing sector alone at about USD 21.9 million and reconstruction to take two years. With respect to how reconstruction should go about, the PDNA recommends monitoring to ensure pre-disaster vulnerabilities are not recreated (Government of Samoa, 2013:54). For infrastructure some proposals include digging electricity poles deeper into the ground (ABC Radio Australia, 2013a), changing the alignments of water pipes that typically follow river flows, use below-ground pipework and create upstream flood protection (Government of Samoa, 2013:79). With respect to trees both cutting those close to homes, electricity lines (ABC Radio Australia, 2013a) and fences holding livestock (Government of Samoa, 2013:26) as well as replanting them selected locations were proposed. The latter is due to the fact that deforestation near rivers and streams increased the impact of flash floods (Samoa Observer, 2012). Suggestions also included homes elevations to protect from flooding (ibid.:132). Medium-term requirements for the building sector proposed in the PDNA also included an update of the building code (and ensuring it is correctly implemented), retrofitting and an increase in home-insurance coverage. During Evan it also became apparent that traditional Samoan houses were less damaged than European-style ones, something that was encouraged to be considered when rebuilding (ibid.:61f.).

Following the disaster, the Prime Minister stated that government has "been asking people to help themselves rebuild their homes" (ABC Radio Australia, 2013a). Similarly, the PDNA accords only a catalyzer and facilitator role to the government and focuses on technical advice ensuring that home owners "build back better using disaster-resilient standards" (Government of Samoa, 2013:54). However, many residents had difficulties financing the rebuilding of their homes and sometimes could not afford it at all (ONE News, 2013a). Overall access to financial means to purchase materials for reconstruction was identified as an important constraint (Government of Samoa, 2013:59).

Assistance provided by the government included relief supply for reconstruction such as tents, tarpaulins, tool kits and household items. While the Disaster Advisory Committee's Sub-Committee for Housing Reconstruction and Settlement had originally recommended considering only families living in shelters or camps for this distribution (OCHA, 2012g) hand-outs were eventually given to families leaving evacuation centres as well as to those whose houses were destroyed or

severely damaged. The total cost of the distribution amounted to USD 792,700 (Government of Samoa, 2013:58; OCHA, 2013b). Furthermore, the Ministry of Natural Resources and Environment and the Fire and Emergency Services helped with the tree cutting and the latter continued to assist with cleaning houses until mid-January (Press Secretariat Government of Samoa, 2013a). Despite these assistance efforts some media reports suggested that little seemed to have been done in some areas such as the Magiagi village (ONE News, 2013b).

Apart from this direct assistance, the government also provided USD 5 million in housing assistance in the form of a loan scheme at the end of February. The loan was provided interest-free during the first year with a subsequent interest rate of 3 per cent. Mortgage loans could amount to USD 30,000 and personal loans to USD 15,000. The money is part of a USD 24 million package whose remainder was given to the Development Bank of Samoa to help the business community. It is lent to the Samoa Housing Corporation by the Central Bank. The CEO of the corporation stated that they were "barely making enough to cover our administration costs" (Samoa Observer, 2013b). While the low interest rate is attractive, it has to be pointed out that on the one hand some families require more money which would have to be loaned at the normal interest rate of 17 per cent (Tupufia, 2013b). On the other hand, few households took loans to cope with their recovery needs (Government of Samoa, 2013:115). Additionally, rumours emerged that only government employees were eligible for the scheme (Esera, 2013a). Even though these rumours were promptly dismissed by officials, the controversy nevertheless illustrates problems with the loan scheme approach (Samoa Observer, 2013b). Its main problem, however, is that while the scheme might be well-intended it does not actually help those most severely impacted by Evan, namely low-income families and poor subsistence farmers in rural areas. It also highlights a government dilemma that also applies to other developing countries faced with a disaster, namely limited financial resources. This problem was highlighted by the Prime Minister (ONE News, 2013a), who also pointed out that a lot of aid received from donors is earmarked and cannot simply be used for other purposes by the government (Hazelman-Siona, 2013). The Prime Minister also defended the government's prioritization: "In regards to housing not the entire country was affected or had their houses destroyed – only a small number due to strong winds and flooding but the entire island of Upolu was affected when the power went out" (ibid.)

This line was subsequently promoted by the Finance Minister as well (ABC Radio Australia, 2013c). This contrasts the 2009 tsunami response because there were a lot of overseas donations making the hand-out of rebuilding grants possible after the tsunami, but the government could not afford such an approach following Cyclone Evan as the international aid levels were different (ONE News, 2013b). In such a situation, non-governmental assistance becomes more important. With respect to rebuilding after Evan, examples of this include the OIL group who handed out cheques to assist employees with reparation (Samoa Observer, 2013c) and the Fellowship of Ministers Samoa New Zealand who provided vouchers for the purchase of building materials (Ta'ateo, 2013). Finally, remittances from family members abroad, which are important for many households' incomes in Samoa, have been identified as important for rebuilding as well (Government of Samoa, 2013; Esera, 2013b; Samoa Observer, 2013d).

Rebuilding faces many challenges and notable financial constraints, making recovery particularly difficult for low-income households. This is problematic as they are among the most vulnerable of the population. Therefore it is also questionable whether high expectations to build back better and in a resilient way will be widely met.

The complexity of relocation

One motivation to leave one's home could be the loss of livelihoods. It has been observed that seasonal employment schemes in New Zealand and Australia have attracted farmers to leave Samoa for job opportunities with higher incomes (Esera, 2013c). Though no rural household interviewed for the PDNA indicated the intention to change their livelihoods (Government of Samoa, 2013:114) these potential migration trends might be initiated by the effects of Cyclone Evan.[2] Another motivation could be the changed course of the Vaisigano River, that causes continued flooding of some houses especially in the Magiagi Valley whenever there is heavy, constant rain (ONE News, 2013a; Samoa Observer, 2013e).

Finally, moving can be motivated in anticipation of future impacts. Related to flooding and going beyond it the Prime Minister stated that "the valuable lesson following this cyclone is that we need to warn people that are living close to rivers that they ought to shift, as well as those who live very close to the coastal areas, that they need to shift" (ABC Radio Australia, 2013a). This call was reiterated by

2. This illustrates the blurry distinctions between different types of migration. While the seasonal employment schemes could be seen as economic/work migration some of it might in fact be motivated by the environmental impacts of the storm on the livelihoods of the migrants and their relatives who stay behind.

the Acting Chief Executive Officer of the Meteorology Office in light of mid-January floods caused by a subsequent tropical depression (Tupufia, 2013a). New Zealand engineers carried out a survey of the flooded area of the Vaisigano River. They recommended relocation aside reinforcing riverbanks and forcing buffer zones (ONE News, 2013a). Some people have already moved to higher ground (ONE News, 2013a). With approximately 70 per cent of the population living within one kilometre of the coast and critical infrastructure being primarily located in coastal areas (Government of Samoa, 2013:87), Samoa is highly vulnerable not only to flooding but also to tsunamis and eventually sea-level rise. Therefore it is understandable that relocation was highlighted by communities and the government as a key issue in the PDNA (ibid.:123).[3]

With respect to infrastructure, the assessment recommended the inland relocation of some health facilities (ibid.:47), the reconstruction of schools while ensuring that they are not – as was previously the case in Vaimauga West – located on an ancient riverbed or in a floodplain (ibid.:53) and the relocation of damaged water and sanitation stations from vulnerable to safer locations (ibid.:79). Additionally it was proposed that livestock be moved to higher ground and away from rivers and watershed areas (ibid.:25).

With respect to those recommendations, the feasibility of relocation appears as one of the main challenge. First, the availability of land – especially inland (ibid.:120) – is limited in Samoa and where available, its purchase requires substantial financial and time resources (ibid.:59 & 120). The land on higher grounds is particularly expensive and has oftentimes already been bought up by well-off people (Lesa, 2013). This makes it difficult, if not impossible, for low-income families, the most adversely affected by the cyclone, to relocate (Government of Samoa, 2013:59). Second, inheritance is a problem. On the one hand people do not necessarily want to leave what they inherited from their ancestors (Lesa, 2013). On the other hand, in Samoa customary land cannot be sold. This poses problems for affected families in vulnerable rural settings who have houses on their own land and would not necessarily find alternatives (Government of Samoa, 2013:59). Furthermore disaster threats often exist for entire villages so that moving within the village would not reduce the level of risk. This hints at a third constraint, especially for rural environments, namely the ties not only between a family and its ancestral land (and links to current livelihoods) but also within communities. These community ties would make it extremely difficult to live in a village one does not belong to (ibid.:120).

Therefore different attitudes towards relocation can be identified among the population of Samoa. Simply speaking some people want to stay while others want to move (Esera, 2013b). But a more nuanced evaluation can be made: there are indeed some, notably from rural areas, that do not want to relocate due to their attachment to their land and community and prefer rebuilding in a way that would be more resilient (Government of Samoa, 2013:120).[4] A second group has already moved to higher ground (ONE News, 2013a). A third group indicates an interest in relocating but is unable to do so mostly due to financial constraints (Government of Samoa, 2013:120). Thus the remark in the PDNA that most of the households seem to favour local reconstruction as the easiest and most affordable option (ibid.:59) obscures the fact that "easy" and "affordable" do not always equal "preferred". Finally, a fourth group of people interviewed for the PDNA was struggling with their daily survival or still reeling psychologically after the disaster so that they had not thought about relocation (ibid.:120). This means that proportions of those who do not want to leave, those who actually leave and those who would like to leave but cannot, might shift over time.

While the PDNA highlights the important point that "relocation cannot be imposed" (ibid.:123) the situation in Samoa post-Evan therefore illustrates the relationship between migration (relocation) and adaptation. Each individual should have the possibility to choose its adaptation strategy, that means between staying (and rebuilding in more disaster-resilient ways) or leaving. Both policies should be supported by government policies. This case study indicates that government actions favour rebuilding locally over relocation. The recommendation of the PDNA to "conduct a broad-based community consultation process for relocation that includes community wishes and needs as well as government considerations for change" (ibid.:123) does not seem to reflect the current situation but is a step in the right direction.

3. It has however been highlighted that major ongoing infrastructural projects such as the Apia Waterfront Redevelopment or a new government building were continuing (Press Secretariat Government of Samoa 2013b) while they might better be shifted inland (Lesa 2013).

4. This does not only refer to the reconstructed houses but also the livelihoods. One of the main lessons from cyclone Evan according to the Prime Minister was for example the need to place more emphasis on root crops that resist better to storms and could therefore limit food shortage as well as negative impacts on the livelihoods of (subsistence) farmers (ABC Radio Australia 2013a; Government of Samoa 2013:26).

CONCLUSION: THE STATE OF ENVIRONMENTAL MIGRATION IN SAMOA AFTER EVAN

Evan was the most damaging natural disaster to hit Samoa in recent years. It left 606 houses in need of reconstruction, caused an estimated value of USD 206 million of post-disaster financial requirements and displaced 7,500 people to evacuation centres at peak displacement periods (Government of Samoa, 2013:xiv) This highlights a couple of aspects of the state of environmental migration in 2012.

On the one hand this case study underscores the challenges faced by private households and the diversity of individuals' situations and needs. Some are stuck in temporary structures next to their destroyed houses because they cannot afford to rebuild. But even if reconstruction is affordable, this might not be what individuals actually want. The analysis of relocation attitudes suggests that some Samoans would prefer to relocate to less disaster-prone places but are unable to do so because of high relocation costs and no viable alternative destinations. They could, therefore, be considered as being forced to stay and policies should ideally facilitate out-migration. But at the same time many Samoans affected by the cyclone want to stay. For them, adaptation to disaster risks means building back better, adopting more resilient livelihoods and increasing disaster preparedness. In this context, the fact that none of the communities visited for the PDNA had a general disaster preparedness plan is worrying (Government of Samoa, 2013:108). Similar to post-tsunami disaster-preparedness education initiatives (Nemerever, 2012) cyclones need to be addressed by awareness-raising projects especially as they present the biggest hazard for the country. Government policies can support all of these elements through well-enforced and strict building codes or disaster preparedness campaigns. With respect to changing livelihoods, Samoa already has in place a stimulus package to incentivise farmers to plant traditional crops (Esera, 2013c). This could be modified to particularly encourage root crop farming.

Beyond this, this case study shows the need for nuanced policies. The coping strategy of individuals with respect to natural disasters, such as Cyclone Evan, varies largely, which can result from personal choice. Following Evan and with respect to relocation these were returning/staying and leaving. Ideally policies take this into account. Yet, this case study shows that government strategies are not always capable of doing so. With respect to Cyclone Evan, the problem was particularly financial constraints. International assistance was often earmarked to particular humanitarian or recovery objectives and the government did not have the financial resources to fund large rebuilding or even relocation projects. This was highlighted by the IMF, who suggested government caution against external loans and prioritization of grants as the public debt is high and the fiscal deficit would be increased by loans (Samoa Observer, 2013f). In turn, this implies that if no grant is provided the government faces the choice between increasing public debt or limiting disaster response measures. Therefore, much hope is placed in an insurance pilot launched by the World Bank in January 2013. Samoa, the Marshall Islands, the Solomon Islands, Tonga and Vanuatu participate in the Pacific Catastrophe Risk Insurance Pilot that will test whether a risk transfer arrangement modelled on an insurance plan can help small-island nations cope with the financial effects of natural disasters (The World Bank, 2013). For Samoa, the pilot programme would be particularly valuable since the government has indicated that it does not plan to request a postponement of Samoa's graduation from LDC (Least Developed Country) status scheduled for 2014 (Press Secretariat Government of Samoa, 2013b). As many developed countries set aside financial support particularly for LDCs, graduation could intensify public budget constraints of the Samoan government and therefore make it more difficult for the country to deal with future disasters.

For the future, Samoa must find resources to adapt to environmental challenges. With total economic loss and damage amounting to USD 203.9 million (Government of Samoa, 2013:xiii) and thus 18.1% of the country's GDP (CIA, 2013), cyclone Evan demonstrated that financial constraints are a main explanatory factor for response or rather non-response measures in Samoa.

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