

Community Resilience against Natural Hazards: Case Studies from the Pacific Islands

[Eberhard Weber¹, Othniel Yila², Andreas Neef³]

[¹The University of the South Pacific; ²Stockholm Environment Institute, Africa Centre Nairobi; ³University of Auckland]

[\[Email: weber_e@usp.ac.fj\]](mailto:weber_e@usp.ac.fj)

[Abstract]

Disaster Risk Reduction policies have made good progress on national and regional levels in the Pacific Island Region. However, in most countries the connection between the national level and community levels has been insufficiently addressed to date. The integration of local level disaster risk reduction and climate change adaptation into development planning is essential. Here additional efforts are required to reduce disaster risk and enhance effective recovery following major disasters. This paper synthesizes lessons learnt on community resilience in Pacific Island Countries. It discusses case studies of several disaster events from a grass-root level perspective. We find that local-level institutions and networks, both formal and informal, play an important role in people's agency and interaction. Research at the local level provides insights into how people's lives are affected by natural hazards. It also considers how these hazards add to other challenges people are facing, such as poverty and tenure insecurity. It highlights the importance of social capital for disaster risk reduction as well as disaster recovery and rehabilitation. It also reflects on the importance of people's own skills and capacities that help them deal with adverse situations. Our findings suggest that in assessing community resilience and devising disaster risk reduction strategies particular attention needs to be given to local land tenure systems, ethnic differentiation, remittances, and safety networks. In conclusion, the paper calls for integrated approaches that link national and local level interventions and that take into consideration that people's capacities to face the various aspects of climate change and natural hazards may become overstretched when they have to deal with too many and/or too severe challenges at the same time.

Keywords: *Disaster risk, climate change, Pacific Islands, community resilience, social capital*

1 Introduction

Like in other tropical regions Small Island Developing States in the Pacific Island region are exposed to a wide range of natural hazards. It is the small size of their territories and their particular topography that make them especially vulnerable to such hazards. These hazards often cause great damage to entire countries, put pressure on people's lives and livelihoods, and strain governments' resources. The Pacific Island region is situated in the centre of the Pacific Ring of Fire where continental plates subside. Geological hazards, such as earthquakes, volcanic eruptions and tsunamis occur more often than anywhere else. In addition, climate change puts meteorological hazards in the focus of attention, such as flooding, tropical storms, drought, and heat waves (IPCC 2012). While hazards with geological background tend to occur in a sudden and unforeseeable manner and release huge amounts of energy in a short period of time, sea-level rise is a slow-onset, low-intensity hazard that takes decades to build up. In the end, however, it leaves islands uninhabitable by first destroying the freshwater resources and finally submerging land areas.

Holland (2008:1) highlights that “it is a long accepted fact that the Pacific is one of the most natural disaster-prone regions on the world”. However, a look at the disaster statistics suggests that it is necessary to highlight the very particular characteristics of natural hazards in the Pacific Islands. Compared with other sub-regions of Asia, Oceania had the lowest number of disaster events, the lowest number of victims and the lowest number of people affected in the period between 1980 and 2009 (United Nations 2010; see also World Bank 2006). Not absolute numbers but relative impacts make natural hazards in small Pacific Island countries a looming threat to their societies and economies: indeed disasters have very high economic and social consequences which are closely connected to the small physical size of countries, their populations, economies, and capacities of governments and people to cope with such furious events. The relative impacts caused by individual events are among the severest disaster events in history and have the potential to threaten the very existence of countries.

One illustrative example is Samoa, where in one of the worst disasters in recent Pacific Island history a tsunami killed 143 people in September 2009. If one takes the number of casualties as share of Samoa’s population the huge dimension of this event becomes more evident. In Samoa the death toll per 1000 people was higher than for all the countries affected by the 2004 Indian Ocean Tsunami except Sri Lanka. The argument therefore is not that the Samoan tsunami was a bigger disaster in absolute terms, but it affected a bigger share of the Samoan population and also exceeded the capacities of the Samoan society and its government to cope with the damages caused by this event.

Another example is Niue, a tiny island-nation of 260 square-kilometres and less than 2,000 inhabitants, which has been suffering from cyclones more than once in the past few decades (Barker, 2000). At times damages were so heavy that many people left the country for New Zealand and suggestions were even made to evacuate the entire population. In 1990 a cyclone had transformed the island from a food-exporting to a food-dependent country. 14 years later it was devastated by an even stronger tropical storm (Wade 2005). Samoa’s economy suffered damages by a cyclone in 1991 which amounted to 230 percent of the country’s real GDP. In Fiji in a disaster year more than 10 per cent of the population have been affected on average by hazards between 1950 and 2004 causing damages of almost 8 percent of Fiji’s GDP on average in disaster years (World Bank 2006).

2 Community resilience to natural hazards

Over the past couple of years the authors have conducted research in various communities of Fiji, the Solomon Islands, and Samoa to gain more insights into individual households and communities resilience to natural hazards. The paper reports results from research in the Solomon Islands (related to the tsunami in the Western and Choiseul Provinces of April 2007), Samoa (related to the Tsunami of September 2009), and Fiji (related to flooding events in Ba in 2012). Two of the research activities (Tsunami in Samoa and flooding in Fiji) took place immediately after hazard events, while the third field research was conducted with a considerable time lapse, i.e. some five years after the actual hazard (Tsunami in the Solomon Islands of 2007). The paper discusses local exposure to and impact of the hazard, and local capacities to cope and recover from these adverse events. Particular emphasis is placed on the role of social capital and state intervention and the interconnectedness between both. The paper analyses rural and urban communities and looks in particular at issues of resilience in rural compared to urban contexts.

Although the disasters and challenges of each of the case studies have their own individual backgrounds and contexts, a number of common features were evident in all three studies: the importance of social capital, local initiative and knowledge to mitigate the impacts of hazards, and the need to successfully coordinate relief and rehabilitation during and immediately after a disaster.

2.1 Tsunami in the Western Province of the Solomon Islands, April 2007

On April 2, 2007 an earthquake with a magnitude of 8.1 occurred off the Solomon Islands triggering a tsunami which damaged many coastal villages of Choiseul, New Georgia, and nearby islands. Worst affected had been the southern coast of Ghizo Island including Gizo town. According to official

figures, 52¹ people were killed, 33 of them on Ghizo Island (Fisher et al. 2007). The earthquake happened at 7.39 am local time and about 3-10 minutes later two or three subsequent tsunami waves “came in as rapidly-rising tides rather than turbulent bores” (McAdoo et al. 2009, 76).

The Micronesian² population of Ghizo Island, in particular, had been severely exposed to the impacts of the tsunami. Having a share of less than ten per cent of Ghizo Island’s population 31 of the 33 people killed by the tsunami belonged to the Micronesian community. The death toll was highest amongst children under the age of ten years with 21 children who died on Ghizo Island. All of them belonged to the Micronesian community (Tsunami Newsletter April-June 2007). Some authors (McAdoo 2009, Fritz and Kalligeris 2008) attributed this concentration on one particular ethnic group to the differences between Melanesian and Micronesian ethnic groups in terms of their indigenous knowledge systems. Hagen (2013) and Schuermann (2013) provide a more complex interpretation of the fact that almost all the victims of the tsunami on Ghizo Island belonged to the Micronesian community.

In December/January 2011-2 and in January 2013 the lead author conducted research in two affected coastal settlements, one with a Melanesian and one with a Micronesian population, on Ghizo Island. The objectives of the study were to assess how communities had recovered from the impacts of the tsunami, who had supported people in the process of recovery and in which shape people’s infrastructure and livelihoods were some five years after the event. Included in the research had also been settlements some two to three kilometres inland from the coast where many residents of affected coastal villages had evacuated to straight after the tsunami and where they have been living since then. Members of 75 different households had been interviewed, wherever possible the heads of these households or other adult household members.

Almost five years after the tsunami hit Ghizo Island the scars of the event were still visible everywhere. Empty spaces between buildings, often with remaining fundamentals of the original buildings and damaged, uninhabited houses were the main signs, but also tilted concrete water tanks and damaged canoes were frequent sights. Nevertheless people were following their daily routines and most of them seemed to have adjusted to the impacts of the disaster that came fast and unexpected almost five years earlier.

Direct relief support after the tsunami

Tsunami victims had received substantial support by many organizations, including government agencies. Even those who had moved to the hilly areas inland had not been forgotten, at least not initially. In the months following the tsunami “humanitarian organizations” provided the most important support³ to the largest number of households whose members had been interviewed: 84 per cent of all participants in the interviews reported about such support; in the inland settlements the respective percentage was even as high as 92.3 per cent, with 100 per cent in the resettled Melanesian communities and 87.5 per cent in the resettled Micronesian communities. In second place came “churches”: overall 68 per cent of the respondents reported support from church organizations. Support from “churches” was reported higher in resettled communities (71.8 per cent) compared to those who remained in the coastal area (63.9 per cent), and it was recorded higher by members of the Melanesian (75.7 per cent) compared to the Micronesian community (60.5), where support from “churches” was in third place behind “family support within the Solomon Islands” (73.7 per cent). Overall in third place came support from family members who lived within the Solomon Islands (64 per cent), but for the Melanesian respondents the support from the Solomon Island Government was reported as being more

¹ Two people were killed by a landslide caused by the earthquake and 50 as a direct impact of the subsequent tsunami (McAdoo et al. 2009).

² In the 1950s the colonial government had resettled the population of the Phoenix Islands (today’s Kiribati) to the Western Province of today’s Solomon Islands as they were facing extreme drought situations. The same population had been brought from the southern Gilbert Islands to the Phoenix Islands in 1938, officially to mitigate overpopulation in the southern Gilbert Islands.

³ Participants in the interview had been asked to rank the three most important sources for support right after the tsunami. Categories provided were “Family in the Solomon Island”, “Family overseas”, “Solomon Island Government”, “Overseas Government”, “Humanitarian Organizations”, “Church”, “Neighbors”, and “others”. In this summary of findings the ranking aspect is not taken into consideration.

important (54.1 and 59.5 per cent respectively). Those who lived in Micronesian settlements along the coast put support from family members on first positions (78.6 per cent).

The research did not find any indication that there was a distinct preferential treatment of the Melanesian population by the Solomon Island Government (SIG) as suggested by Schuermann (2013). Participants of the Melanesian community reported that around 60 per cent received support from the SIG, while for the Micronesian community the respective figure was much lower: 39.5 per cent. However, as interviews revealed there seemed to be a considerable overlap between “family” and “government” support in the case of participants from the Melanesian community. It is expected that this phenomenon has lesser relevance in the case of the Micronesian community. In a number of cases “government” support to Melanesians could be identified as a case of support of members of the same kinship group (*wantok*) and could be interpreted as “family support”. In neutral wording this could be seen as linking social capital, the hierarchical connection of the people in affected communities with their *wantok* in Gizo and/or in the capital Honiara working for sections of the government. Micronesians only occasionally have members in influential government positions, and the vertical dimension of social capital plays a much smaller role than the horizontal dimension, i.e. the bonding capital, connecting people with similar social status and power within the same social network. There is no doubt that such situations will then lead to an ethnically discriminatory and unequal distribution of relief and rehabilitation funds and goods, which should be avoided under ethically informed disaster relief efforts.

During the informal interviews with residents it also could be established that private companies provided much needed support in the immediate aftermath of the tsunami. The support of a foreign dive operator was particularly highlighted, but other companies also distributed food, building materials and tools for free and also allowed people to take special credit for their reconstruction needs.

Satisfaction with the location

As mentioned above many residents of coastal villages had evacuated to higher ground and started building permanent houses. Initially, they had lived for a couple of days under the open sky and subsequently in tents distributed by various relief organizations in which they stayed until house construction had been completed. This usually lasted several months, but in a few cases people reported that they had lived in tents for more than a year. Since the tsunami event, a few people also have returned to the coast, either because they could not tolerate the difficult conditions in the new settlements, had their sources of livelihood at the coast, or had children attending schools there. Despite a number of severe challenges that dominated life almost five years after the tsunami, most of the interviewed people were happy with their current physical location: those in the coastal settlements firmly stated that they did not want to leave and move to inland settlements and those who lived further inland did not want to move down to the coast again. Only a few households had split up, meaning that some members returned to the coast, while others had accommodated themselves inland.

Asked how happy they were in their location at the time of the interview, 42.7 per cent of the 75 persons interviewed answered “very happy”, while only 17.3 per cent felt “very unhappy”⁴. The highest degree of satisfaction had been in the 39 resettled households, where 53.8 per cent expressed that they were “very happy” compared to 30.6 per cent in the 36 households that had not been resettled. Amongst members of the 37 Melanesian households these figures were higher than in the 38 Micronesian households: 51.4 per cent expressed that they were “very happy” compared to 34.2 per cent of members in Micronesian households. People interviewed in resettled households scored considerably higher than those in non-resettled households in both ethnic groups: in the 15 resettled Melanesian households 80 per cent of the participants in the interviews expressed to be “very happy” with the place they were living at the time of the interview, while the respective percentage had been 37.5 per cent in

⁴ Interviews were conducted in a conversational style, but the questionnaire also had a number of set questions and ranking exercises. For some information that tried to assess attitudes, experiences, awareness, and perceptions Likert-type or ranking scales were used. The question about satisfaction in the present place people were asked to provide the most matching reply to a Likert-type scale with the categories “very happy”, “Happy”, “about the same”, “A bit unhappy” and “very unhappy”. For the purpose of this paper only the two extremes “very happy” and “very unhappy” are reported.

the 24 resettled Micronesian households. 11.3 per cent of the members in the 36 households that had not been resettled stated that they were “very unhappy”. Here members of Micronesian households in particular stand out: 28.6 per cent of the 14 Micronesian households that had not been resettled felt “very unhappy” with where they were living five years after the tsunami, while in the 22 Melanesian households that had not been resettled none reported to be “very unhappy”.

Urgent needs some five years after the tsunami

Almost five years after the tsunami many people were still considerably affected by the event and subsequent, incomplete rehabilitation efforts. The most visible sign was that construction timber was piled up around many half-finished houses; the lack of construction tools given as the main reason by respondents (see Table 1).

Place Table 1 about here

Overall, the needs differed with respect to ethnicity and settlement status; for instance, lack of employment was mentioned as a major concern in Melanesian households, particularly among the non-resettled ones. Proper roads are of particular concern for the resettled Micronesian households. Most people in the inland settlements suffer severely from the unacceptable water situation. As most of the widely dispersed houses have been built along a dirt track that follows the ridge of the hills gravitational water supply is not possible. Some people managed to buy PVC water tanks to collect rain water, yet most need to walk long distances downhill to reach small creeks, complete their baths and dish washing and bring water to their houses in buckets. In drier spells water flow is minimal and at times the water sources even dry up entirely. Another big challenge is the dirt road leading down a steep slope to Gizo town. The road is deeply eroded and even a four-wheel drive car would have great difficulties to master this “road” not to speak of normal cars, trucks or mini-buses.

People living in settlements inland face great hardship and uncertainty. Many people are afraid of being forced to return back to the coast. People from Melanesian as well as Micronesian settlements indicated that authorities want them to move back to the coast as they are now living on government land and are considered as squatters. This is seen as a reason why the government hesitates to provide basic infrastructure and services: apparently it does not want to encourage people to stay in these locations.

Despite great hardship and uncertainty experienced in the new location many expressed that it was the right decision to move to “their” new land and stay there. In particular members of the Micronesian communities managed to diversify the sources of their livelihoods: some are still going regularly down to the coast for fishing, but they also have taken up agriculture as a complementary livelihood option. Compared to the coastal zone they have access to much better soils and almost every family manages at least one home-garden with a great variety of crops. Some even started selling part of their produce at the Gizo fruit and vegetable market, although the very poor road condition constrain these opportunities. Yet for many their situation has improved to such an extent that some respondents were even saying that the tsunami that brought them to “their” new land was a ‘blessing in disguise’. They only hope that they are not forced back to their settlements at the coast.

2.2 Tsunami in Samoa, September 2009

On September 29, 2009 at 6.48 am local time an earthquake with a magnitude of 8.1 struck south of Samoa, followed by a tsunami that caused widespread damage in coastal areas of American Samoa, Samoa, and Niuaotupapu Island of northern Tonga. In Samoa there were 143 reported deaths, about half of them children, and 5,274 people had been made homeless (World Bank 2009). The southwestern and eastern coast of Upolu Island was predominantly affected. The tsunami destroyed critical infrastructure for transport, water, energy and damaged the tourism industry, which provided employment and income to rural communities, and accounted for more than 65 per cent of the country’s foreign exchange earnings (World Bank 2009). Prior to the tsunami, Samoa’s tourism industry had been concentrated in the region that bore the brunt of the disaster: 56 beach *fale* operations and 5 resorts were destroyed or heavily damaged (Government of Samoa 2011).

A social assessment of the impacts of the tsunami had been carried out from 14-21 October 2009 (UNESCO-IOC International Tsunami Survey Team Samoa 2009), identifying the most urgent needs some two weeks after the disaster and assessing how the event had affected the long term livelihoods of those affected. Right after the tsunami, needs were manifold, as people had lost almost everything, most of their houses had been destroyed and many had lost family members. Desperation and fear of the sea were common psychological aspects researchers had to sensitively deal with.

Various sections of the Government of Samoa, with support from local, national and international NGOs and relief organizations were working almost around the clock to satisfy the most pressing needs of the people affected; most had been uprooted from the places where they had lived before the disaster. When the Social Impacts Assessment Team arrived some two weeks after the disaster heavy machinery had almost completed their task of building roads to a number of new settlements some two to five kilometres inland. In these settlements almost everybody was busy and working hard to construct permanent houses. A few houses had already been completed, but the majority of people were still living in tents which relief organizations had provided. During this time it was very common to meet Samoans who had emigrated. Many relatives and friends of victims came all the way from New Zealand (and to a lesser extent from the USA and Australia) after they had learnt about the disaster to help in reconstruction and rehabilitation work. It is also interesting to note that in the last quarter of 2009 Samoa received the by then highest inflows of remittances from New Zealand, worth 47 million Samoan Tala (ST), compared to the second quarter of 2009, when it was around ST30 million, or around ST9 million higher than for the last quarter 2008 (Gibson, 2010). This amount is surely even under-reported as many of those who came in person to support rehabilitation work obviously also brought cash with them for construction works.

A visit to the disaster area in February 2014, some four and a half years after the disaster, revealed that the new settlements were in a very good shape, and in no way comparable to the settlements in the Solomon Islands about the same time after the disaster had happened. Many people were still living in these settlements, while some had moved back to the coast once tourism infrastructure had been re-established providing people with work and thus economic livelihoods. The beach *fales* at Lolomanu that had been entirely wiped out in September 2009 were much bigger and more numerous. An owner told us that looking back at the past couple of years it almost appeared that the tsunami had been a “blessing in disguise”, very similar to the sentiments that had been expressed during fieldwork on Ghizo Island some five years after the tsunami (see subsection 2.1). This should surely not belittle the tragedy and human suffering such events cause, but it should help to understand that such tragedies can also offer new opportunities for socio-economic transformation.

A notable difference to the situation on Ghizo Island is that most of the families have resettled on their own land. The Polynesian land tenure system in most cases assures that families have access to land resources at the coast as well as in the hilly terrain further inland. Conflicts over land tenure are therefore not as frequent and sharp as it is the case on Ghizo. Various sections of the Government of Samoa therefore were concerned to fulfil the needs of resettled communities as quickly and as best as possible right from the beginning throughout the rehabilitation process.

2.3 Flooding in Ba District, Fiji in 2012⁵

Floods are the most severe and frequent hazards in the Western Division of Fiji, often causing displacements and death, and putting thousands at risk of sliding into poverty. Yeo et al. (2007) chronicled a 100-year historical series (1892–2002) of flooding. The records confirm that the frequency of floods has increased in recent decades (Yeo et al., 2007; see also SOPAC, 2009; Duaibe, 2008). Using the 2009 and 2012 floods this section examines how social capital helps in post-disaster recovery in five selected villages in the Ba District of western Viti Levu. Results of the study indicate that residents of the Ba District used four approaches to create and deploy social capital to facilitate recovery, namely (1) search and rescue, (2) information dissemination, (3) mutual assistance, and (4) socio-commercial cooperation.

⁵ This subsection draws on Yila, O., E. Weber and A. Neef (2013); for the complete case study, please refer to the following DOI: 10.1108/S2040-7262(2013)0000014010.

Ba district is located on the north western side of Fiji’s main island of Viti Levu. The district is known for its severe problems of flooding. The floods of January 2009 and January 2012 brought much misery to many people of western Viti Levu. During the 2012 floods the national government declared ‘a state of natural disaster emergency’ in the region. Governmental, non-governmental (NGO) and faith-based (FBO) organizations and relief agencies all responded with flood disaster operations. Military personnel were also deployed through much of the affected areas. Rescue, evacuation and recovery activities far exceeding those required for any previous natural disasters in the country.

As in earlier floods the January 2009 and January 2012 events affected the most vulnerable groups most severely, especially women and children. Farming communities sustained large economic losses due to the inundation of farm land and erosion. More than 75 per cent of the households reported a considerable part of their livelihood lost to the two floods. Although they were by no means the only floods in recent history, the short time gap between both events, combined with their magnitude, made the 2009 and 2012 floods critical to people’s livelihoods. Discussions and interviews with many residents in the study areas showed that they very well remembered the two floods and their impacts on people. The sudden onset of the flooding led to loss of life (11 people lost their lives in the 2009 floods and six in the January 2012 floods), erosion of farmland, and disruption to transport and communications infrastructure, and also affected people directly in their homes.

All 97 households surveyed in the five villages had been severely exposed to the floods in 2009 and January 2012. 36 per cent and 24 per cent of the households were forced to evacuate their homes respectively. More than 85 per cent of these households reported having taken shelter with extended families, neighbours and friends who provided a spare bedroom or cleaned out unoccupied space. People preferred such arrangements to seeking shelter in camps set up by government and relief agencies. Although assistance from external agencies was helpful, as reported by participants in the interviews, it was limited, compelling households to rely mainly on their own resources for rehabilitation. Reciprocal assistance from neighbours and friends was prominent at the onset of the floods and for a considerable time after flood waters had subsided.

House damage was the most fundamental impact of the floods. A much longer-lasting consequence, however, has been the impact on agricultural land, as it compromised livelihood generation of many farmers. In the Ba district, farmland is situated along the river banks and within the Upper Ba Watershed. A large proportion of sugar cane production was lost during the floods. Of the households surveyed 25 per cent had lost land in the past five years as a result of flooding. Some households lost their entire land. Others suffered substantial reductions: one of the few small-scale commercial farmers in Votua had his plot reduced almost by half, from five hectares to three. The loss of land also meant the loss of standing crops at the time of the flood reducing income from the respective sugar cane seasons.

Search and rescue

Already at the onset of the floods, the existence of strong bonding and bridging social capital became evident. Respondents expressed how villagers themselves helped to evacuate people, and organized patrol teams to guard and look after belongings against theft. Once the water receded, villagers and households worked together to repair community infrastructure, such as canals, water gates and culverts. Most of this rehabilitation work was initiated by villagers and later supported by external agencies. The findings of the study revealed that a high percentage of victims were rescued and then supported by friends and neighbours. Only a few respondents reported that they had been rescued by government and other agencies.

Participants in the interviews spoke highly of the efforts of the wider Ba district community in the aftermath of the flood, praising the helpfulness of villagers in search and rescue. Thus, even when the Fiji military, Red Cross and experts arrived to fill gaps and meet needs, the local population still made up the large majority for search and rescue operations.

Information dissemination

A major strength of social networks is the facilitation of information flow. The survey confirmed the crucial role of social networks in facilitating information flow in flood affected areas. In 2009 and 2012

57 and 61 per cent of respondents respectively reported that they learnt about the areas set up for victims to get relief assistance through friends, relatives, neighbours and other social ties.

Another interesting aspect is the way some people were using social media to extend information, awareness and support. In Fiji the use of social and mobile media picked up substantially in the two flooding events of 2009 and January 2012. Those who took shelter with relatives, friends or in the camps for example were keen to learn whether their neighbours had already returned to the village. Many did not want to be the only ones in their village neighbourhood, as they had the fear of becoming isolated and as a result exposed to a number of risks (including crime).

Mutual assistance

Mutual assistance was one of the most important aspects of social capital. Whereas charitable support is one-way, mutual assistance – short-term loans, free housing and shelter, tools and equipment, child care assistance, exchange of labour – constitutes a major strategy people deployed to provide support to one another. Such support has a reciprocal character and binds individuals and social groups together, thereby increasing cohesion of communities. Mutual assistance initiated and guided collective action in various ways. It served as a source of material support. It signalled that neighbours, friends and relatives are indissolubly committed as partners in the recovery process. It also served in restoring the fabric of social networks that had been torn apart by flooding and its temporary relocation of people and the disruption of community life in affected villages.

As we observed in the affected areas many people were unable to master the physical demands of clearing out debris in their homes and properties. Neighbours and friends were willing to offer support in these physically challenging tasks. This support helped many households to move back to their houses sooner than if they had needed to wait for support from relief agencies. Considering the extent of flood damages it was often difficult for people to return to devastated homes and start rebuilding immediately except with clear assurance and signs that others were also planning to do so. Mutual assistance gave indispensable signals and affirmation to move towards recovery and restoration of the disrupted community life.

Socio-commercial cooperation

Discussions about social capital often fail to consider market activity. Our study clearly shows that commercial activities played a crucial role in post-flood recovery. Commercial cooperation serves a function similar to that of mutual assistance; through the provision of essential material support, it builds confidence about rebuilding of community, and impetus for redeployment of place-based social capital. Businesses were willing to make advance payment to their workers and extend credit to customers even in the knowledge that payment may be significantly delayed. The immediate re-opening of commercial enterprises served as an effective signal that the Ba community was rebounding towards recovery.

In sum, many residents expressed the opinion that the flood has enhanced the feeling of togetherness, mutual support and trust. They stated overwhelmingly that the flood affected everyone in some way and consequently had a unifying effect. Differences of ethnicity and wealth blurred and norms regulating interaction eased – it became acceptable to just strike up a conversation with anyone if it began by concentrating on the flood. Through these casual but purposeful conversations, social networks grew and the sense of togetherness in Ba increased. Yet, in some instances, we also learned that some Indo-Fijian communities felt that they were bypassed by external assistance, as they were deemed less affected by the flood disaster than their indigenous Fijian counterparts.

In all three communities studied formal capacities are often weak. This is often balanced by life experience and local knowledge about the immediate environment. Here people are experts. There are a lot of possible synergies, if people’s knowledge and scientific knowledge find ways to overcome conceptual and communication challenges.

3 Synthesis and Conclusion

In synthesizing the three case studies, we can draw a number of important lessons for disaster risk reduction strategies and post-disaster recovery and rehabilitation processes.

1. Functioning social institutions along with the capabilities and capacities of actors/communities are important for limiting the damaging impacts of natural hazards at the local level. Social networks and the social capital derived from them enable communities to effectively face hazards and help reduce disaster risks (Yila et al. 2013). Functioning social networks facilitate the flow of information and can be effectively used in planning disaster risk reduction measures as well as in the long-term recovery and rehabilitation process.
2. Repeated disasters (e.g. the flood events in Fiji) and sudden disasters of great magnitude (e.g. tsunami disasters on the Solomon Islands and Samoa) may weaken the coping mechanisms of local communities, reduce their resilience, and make them more reliant on external support (cf. Weber 2012, 2014). Such support from outside needs to be well coordinated with local disaster relief and rehabilitation efforts to become effective. Socio-commercial cooperation and public-private partnerships can complement the interventions of government agencies, NGOs and aid organizations, as demonstrated in the case of Fiji.
3. Particular attention needs to be paid to the specific socio-cultural context, such as ethnic differentiation in the case of the Solomon Islands (indigenous Melanesian vs. immigrant Micronesian) and Fiji (indigenous Fijians vs. Indo-Fijians). Different ethnic groups may have different knowledge, skills and needs in terms of disaster risk management and post-disaster recovery. Remittances and individual support from overseas relatives in the Pacific diaspora, as evidenced in the case of Samoa, can prove crucial for sustaining the recovery from natural hazards.
4. The locality of disasters and accessibility play a crucial role in disaster risk reduction and post-disaster recovery. In the cases of the flooding in Fiji and the tsunami in Samoa, the location of the disaster was easily accessible; by contrast, disaster victims on Ghizo Island, which is in the periphery of the Solomon Islands and hundreds of kilometres away from the major centres, were difficult to reach by external relief agencies, stressing the importance of building community resilience in remote locations.
5. Where temporary relocation or permanent resettlement of affected disaster victims is inevitable, the land tenure situation needs to be carefully assessed. While in the case of Samoa the land tenure system was supportive of a smooth resettlement process and enhanced effective rehabilitation efforts, tenure insecurity and land conflicts on the Solomon Islands constituted an important constraint to the delivery of public services and basic infrastructure to people displaced by the tsunami disaster.
6. It is a weakness of social capital that it does not create formalized safety nets. In all three communities protection is informal and a result of cohesion and solidarity in the communities. Social capital in cohesive societies is very strong and reliability on it is high. Modernization, globalization and other processes can undermine the strengths of social capital. If no formal mechanisms are introduced when traditional support structures erode damages can be big. Such transition periods are often the biggest challenges that come up. The collapse of traditional structures and social safety and security functions they were holding is a serious threat to people’s well-being and resilience. To counter-balance such trends active awareness building on community levels should also address issues of the value of social capital and threats to it.

In conclusion, external interventions in disaster risk reduction and post-disaster recovery in Pacific Island Countries need to pay more attention to local contexts, capacities and constraints and should be designed in a complementary way that strengthens local populations’ agency and resilience.

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Table 1: Needs expressed by people affected by the 2007 tsunami on Ghizo Island, Solomon Islands

**The “State of DRR at the Local Level”
A 2015 Report on the Patterns of Disaster Risk Reduction Actions at Local Level**

| Needs expressed | | Housing | Water | Sanitation | Employment | Food | Medicine | Blanket | Construction Tools | Agricultural Tools | Water tank | proper road | outboard engine | Truck | lights | Canoe | land |
|--------------------------|----|---------|-------|------------|------------|------|----------|---------|--------------------|--------------------|------------|-------------|-----------------|-------|--------|-------|------|
| All | 75 | 22 | 46 | 23 | 23 | 6 | 4 | 5 | 50 | 31 | 6 | 33 | 19 | 7 | 12 | 7 | 6 |
| % | % | 29.3 | 61.3 | 30.7 | 30.7 | 8.0 | 5.3 | 6.7 | 66.7 | 41.3 | 8.0 | 44.0 | 25.3 | 9.3 | 16.0 | 9.3 | 8.0 |
| Resettled | 39 | 1 | 37 | 12 | 4 | 3 | 1 | 5 | 24 | 19 | 6 | 33 | 3 | 7 | 1 | 0 | 0 |
| % | % | 2.6 | 94.9 | 30.8 | 10.3 | 7.7 | 2.6 | 12.8 | 61.5 | 48.7 | 15.4 | 84.6 | 7.7 | 17.9 | 2.6 | 0.0 | 0.0 |
| Not Resettled | 36 | 21 | 9 | 11 | 19 | 3 | 3 | 0 | 26 | 12 | 0 | 0 | 16 | 0 | 11 | 7 | 6 |
| % | % | 58.3 | 25.0 | 30.6 | 52.8 | 8.3 | 8.3 | 0.0 | 72.2 | 33.3 | 0.0 | 0.0 | 44.4 | 0.0 | 30.6 | 19.4 | 16.7 |
| Melanesian | 37 | 11 | 13 | 8 | 18 | 5 | 3 | 5 | 26 | 17 | 5 | 11 | 10 | 0 | 9 | 7 | 0 |
| % | % | 29.7 | 35.1 | 21.6 | 48.6 | 13.5 | 8.1 | 13.5 | 70.3 | 45.9 | 13.5 | 29.7 | 27.0 | 0.0 | 24.3 | 18.9 | 0.0 |
| Melanesian resettled | 15 | 0 | 13 | 0 | 4 | 2 | 0 | 5 | 9 | 8 | 5 | 11 | 3 | 0 | 0 | 0 | 0 |
| % | % | 0.0 | 86.7 | 0.0 | 26.7 | 13.3 | 0.0 | 33.3 | 60.0 | 53.3 | 33.3 | 73.3 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Melanesian not resettled | 22 | 11 | 0 | 8 | 14 | 3 | 3 | 0 | 17 | 9 | 0 | 0 | 7 | 0 | 9 | 7 | 0 |
| % | % | 50.0 | 0.0 | 36.4 | 63.6 | 13.6 | 13.6 | 0.0 | 77.3 | 40.9 | 0.0 | 0.0 | 31.8 | 0.0 | 40.9 | 31.8 | 0.0 |
| Micronesia | 38 | 11 | 33 | 15 | 5 | 1 | 1 | 0 | 24 | 14 | 1 | 22 | 9 | 7 | 3 | 0 | 6 |
| % | % | 28.9 | 86.8 | 39.5 | 13.2 | 2.6 | 2.6 | 0.0 | 63.2 | 36.8 | 2.6 | 57.9 | 23.7 | 18.4 | 7.9 | 0.0 | 15.8 |
| Micronesia resettled | 24 | 1 | 24 | 12 | 0 | 1 | 1 | 0 | 15 | 11 | 1 | 22 | 0 | 7 | 1 | 0 | 0 |
| % | % | 4.2 | 100.0 | 50.0 | 0.0 | 4.2 | 4.2 | 0.0 | 62.5 | 45.8 | 4.2 | 91.7 | 0.0 | 29.2 | 4.2 | 0.0 | 0.0 |
| Micronesia not resettled | 14 | 10 | 9 | 3 | 5 | 0 | 0 | 0 | 9 | 3 | 0 | 0 | 9 | 0 | 2 | 0 | 6 |
| % | % | 71.4 | 64.3 | 21.4 | 35.7 | 0.0 | 0.0 | 0.0 | 64.3 | 21.4 | 0.0 | 0.0 | 64.3 | 0.0 | 14.3 | 0.0 | 42.9 |

Communication with publisher (UNISDR) that the paper has been accepted for publication

From: Eberhard Weber
Sent: Wednesday, November 04, 2015 4:17 PM
To: 'Chathu Jayakody'
Cc: 'Andreas Neef'; 'othnielyila@gmail.com'
Subject: RE: Reviews : UNISDR call for input papers on 'State of DRR at the Local Level'

Dear Chathu Jayakody,
Please find attached the revised paper, taking into consideration the comments from the reviewers.

With all best wishes

Eberhard

From: Chathu Jayakody [<mailto:chathu85j@gmail.com>]
Sent: Friday, October 30, 2015 6:52 AM
To: Eberhard Weber
Subject: Re: Reviews : UNISDR call for input papers on 'State of DRR at the Local Level'
Dear Eberhard Weber,

I'm sending the review form here with to you again.
Please note that your paper has been accepted with minor changes and it got only one page.
You have got two comments under the reviewer's comments box.

Thank You

Kind Regards
Chathu

On Tue, Oct 27, 2015 at 7:33 PM, Eberhard Weber <eberhard.weber@usp.ac.fj> wrote:
Dear Chathu Jayakody,
I kindly ask you to send me the reviewers comments so that I can work on them. The next two days I still have UNISDR and UNOCHA meetings here in Suva, and then I have three days with few activities, before I go to do field-work for a week and then go on leave for two weeks. I therefore appreciate to get the reviewers' comments urgently, or at least a response from your side.

With all best wishes and looking forward to hearing from you soon.

Eberhard Weber

From: Eberhard Weber
Sent: Monday, October 19, 2015 5:22 PM
To: Chathu Jayakody
Subject: RE: Reviews : UNISDR call for input papers on 'State of DRR at the Local Level'

The "State of DRR at the Local Level"
A 2015 Report on the Patterns of Disaster Risk Reduction Actions at Local Level

Dear Chathu Jayakody,

Thank you very much for your earlier message, but the attachment you had sent contains only one page, which says that the paper has been accepted with minor changes, but the changes to be made are not addressed.

With all best wishes

Eberhard Weber

From: Chathu Jayakody [<mailto:chathu85j@gmail.com>]
Sent: Tuesday, September 08, 2015 11:29 PM
To: Eberhard Weber
Subject: Re: Reviews : UNISDR call for input papers on 'State of DRR at the Local Level'

Dear Author,

We are pleased to inform you that your paper ID 70 has been accepted for the 'The State of DRR at the Local Level - A Report on the Patterns of Disaster Risk Reduction Actions at Local Level', subject to some amendments. The comments of the Editorial Committee on the paper are attached herewith.

Please send your revised version of your final camera-ready paper by 30th of September 2015. Please ensure that your paper adheres to the UN formatting guidelines.

Best Wishes,
Chathu Jayakody

Academic Network for Disaster Resilience to Optimise educational Development (ANDROID)
Centre for Disaster Resilience
Maxwell Building (Room 346)
The University of Salford
Salford M5 4WT, UK

On Sat, Sep 5, 2015 at 11:02 AM, Chathu Jayakody <chathu85j@gmail.com> wrote:
Dear Eberhard,

Apologies for any inconvenience in this regards.

Your paper (Paper ID 70) has been sent to the reviewers for comments. I will forward you the decision as soon as I receive it.

We are really sorry for the delay in getting back to you.

Please contact me directly for any future correspondence in this regards.

Thank you

Kind Regards
Chathu

On Sat, Sep 5, 2015 at 6:31 AM, Nirooja Thurairajah <niroojaun@gmail.com> wrote:
Dear Eberhard,

Thanks for your mails. I forwarded your earlier mail to Ms. Chathu who is handling the papers now. She will get back to you on this (copying her in this mail).

Chathu - Hope you are doing well. Can you please see to Eberhard's below mails.

Best regards,
Nirooja

On Tue, Sep 1, 2015 at 2:25 AM, Eberhard Weber <eberhard.weber@usp.ac.fj> wrote:
Dear Nirooja Thurairajah,
You might have overlooked my message from July. Do you have any idea what happened to our contribution?

With all best wishes

Eberhard

From: Eberhard Weber
Sent: Wednesday, July 15, 2015 12:40 PM
To: 'Nirooja Thurairajah'
Subject: RE: Reviews on abstract: UNISDR call for input papers on 'State of DRR at the Local Level'

Dear Nirooja Thurairajah,
After some longer time I am writing to you to get some information of what happened to our input paper on 'State of DRR at the Local Level'.

After we had submitted the paper in March last year no further communication reached me, which I find strange. Kindly ask for an update.

With all best wishes

Eberhard Weber

From: Eberhard Weber
Sent: Wednesday, March 26, 2014 8:39 AM
To: Nirooja Thurairajah
Subject: RE: Reviews on abstract: UNISDR call for input papers on 'State of DRR at the Local Level'

Dear Nirooja,
Attached the revised draft. Compared to the earlier text only the table has been changed. The rest of the text remains the same. Attached I also send again the table as excel-file.

With kind regards

Eberhard