FRIS
Fiji Resilient Informal Settlements

Lautoka city, Fiji

Vunato settlement

COMMUNITY-BASED VULNERABILITY ASSESSMENT AND ACTION PLAN

UN HABITAT
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ADAPTATION FUND

Vunato Settlement (Fiji) Community-Based Vulnerability Assessment and Climate Action Plan (Abridged Version)

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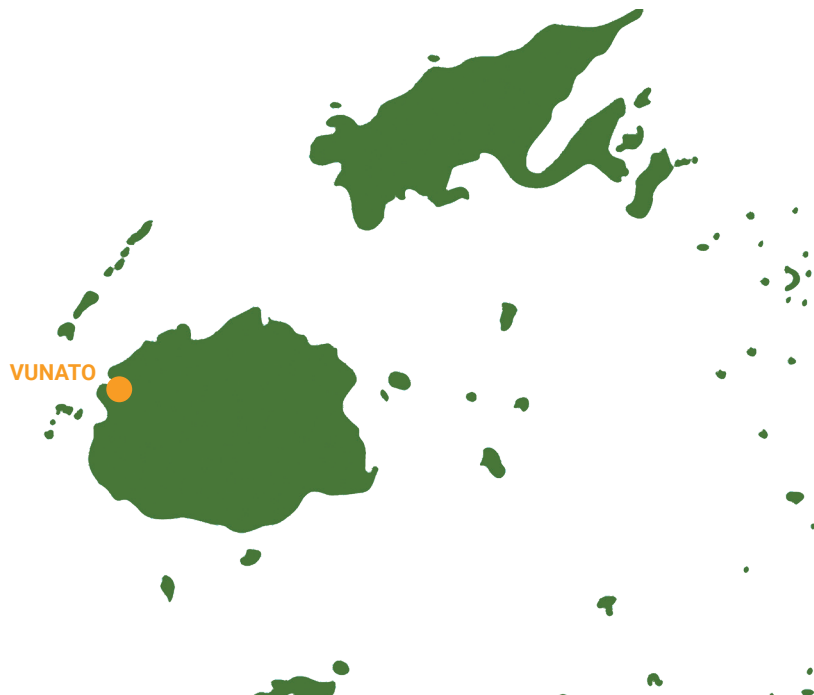


Vunato Settlement
UN-Habitat/Bernhard Barth

1 INTRODUCTION

The Vunato Settlement Community-Based Vulnerability Assessment (VA) and Climate Action Plan (CAP) has been developed under the Fiji Resilient Informal Settlements (FRIS) project financed by the Adaptation Fund. This document is an abridged version of a comprehensive report, finalized in 2020. FRIS works in 16 informal urban settlements that are highly vulnerable to climate change and disaster risks, in four urban areas as part of a project implemented by UN-Habitat and executed by the Ministry of Housing and Community Development and the Ministry of Local Government.

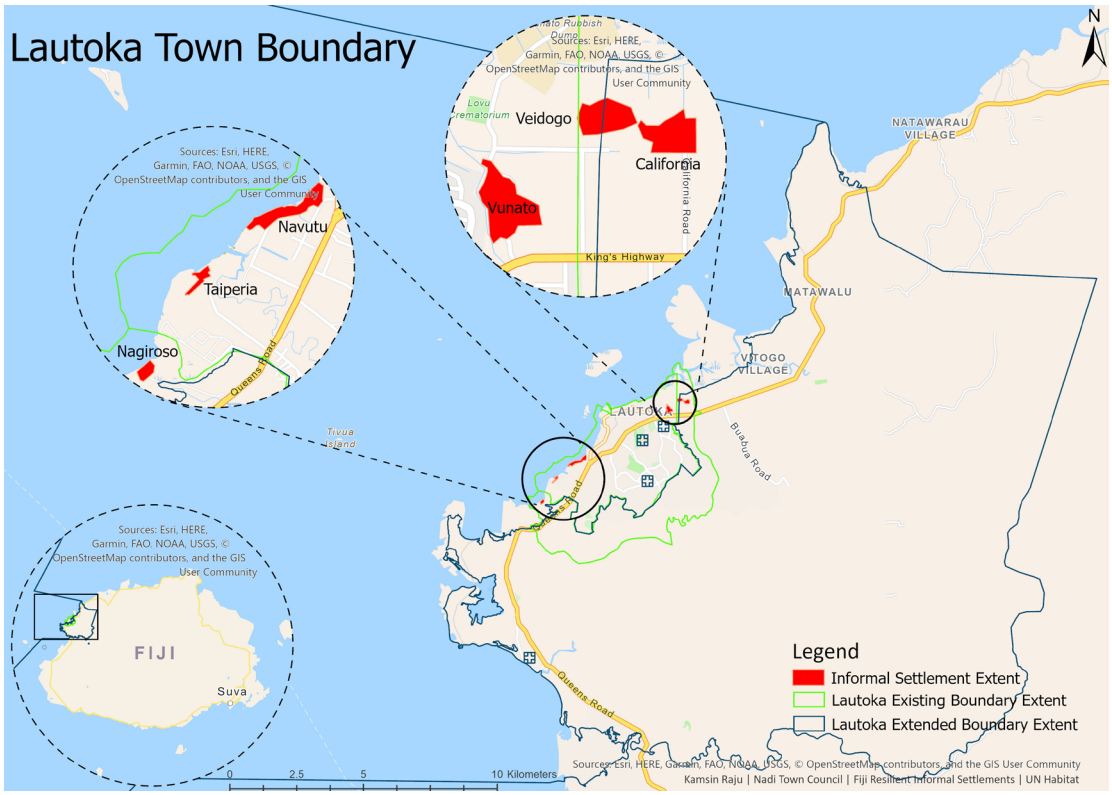
The overall objective of the project is to increase the resilience of informal settlements communities in Fiji that are highly vulnerable to climate change and disaster risks. To achieve this, the project has four components:

1. **Institutional strengthening for enhanced local climate response**
2. **Local (community/informal settlement) resilience strengthening**
3. **Enhancing resilience of community level physical, natural and socioeconomic assets and ecosystems**
4. **Awareness raising, knowledge management and communication.**

The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

The VA and CAP guides the implementation of projects under component 3 of the FRIS project (Enhancing resilience of community level physical, natural and socio-economic assets and ecosystems).

Figure 1 Informal settlements that are part of the FRIS program in Lautoka City, including Vunato[1]



1. Prepared by: Kamsin Raju, Nadi Town Council

1.1 LOCATION AND PHYSICAL DETAILS

Fiji is located in the western South Pacific. It has a total of 322 islands located between 177°E–178°W and 16°S–20°S and a total land area of 18,333 square kilometers. Viti Levu and Vanua Levu are the two largest islands. These two islands form up to 87 per cent of the total land area and are also the most populous areas nationally[2]. Fiji's total population is 884,887 people, approximately 55.9 percent of whom reside in urban areas[3]. Fiji is among the countries with the highest disaster risk, ranking number ten according to the World Risk Index (2018)[4]. Located in the Pacific Ocean's tropical cyclone belt, cyclones are the most frequent hazards to affect the country (with around two to three cyclones occurring every year)[5]. Additionally, the country has a high exposure to other environmental hazards, such as storm surge, severe storm, flooding, landslide, drought and extreme temperature, earthquake, and tsunami. The country is also vulnerable to rising sea levels, increasingly severe cyclones, and more frequent and intense rainfall caused by climate change.

Environmental hazards have far reaching negative impacts across a number of sectors in Fiji, including agriculture, housing, transport infrastructure, basic service provision, tourism and primary industries, among other. The majority of the country's cities and towns are located on the coast and along rivers, particularly exposed to seaborne and riverine natural hazards, cyclones, storm surges, coastal and riverine erosion, landslides, floods and already occurring sea level rise due to climate change. Moreover, mangrove deforestation and coral reef extraction for urban development are reducing the mitigating benefits of mangroves and coral reefs in providing a barrier against storm surges and cyclones. Given the increasing trends in urbanization and concentration of development along the coast, costs related to natural hazard-induced disasters are expected to increase with time.

Although Fiji is recognized as being one of the most developed economies in the Pacific[6], signs of socioeconomic inequality are rising, particularly with the expansion of informal settlements[7]. The 5-year and 20-year National Development Plan was prepared by the government in order to address development challenges. The plan's objectives include a doubling of the real gross domestic product (GDP) per capita by 2036 and to provide universal access to all services, including housing, electricity, clean and safe water and sanitation, high-quality education, and health care[8]. However, natural hazards and climate change represent a major obstacle to the achievement of these objectives.

Vunato settlement, which is one of the informal settlements under the FRIS project, is located in the peri-urban area of Lautoka City, on the Western coast of Viti Levu. Lautoka City, located in the west coast of Viti Levu, is the second largest city in the country with a total population of 71,573[9]. As compared to urban population growth in Fiji, Lautoka's urban population growth has been exponentially higher, with a 3.2% per year. However, most of this growth can be attributed to the expansion of the city's boundaries[10].

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2. Fiji's First National Communication under the UNFCCC, 2005; Fiji's Pacific Adaptation to Climate Change, 2009
3. Fiji Bureau of Statistics. (2017). Population and Housing Census: Administration Report.
4. Heintze, H., Kirch, L., Küppers, B., Mann, H., Mischo, F., Mucke, P., Pazdzierny, T., Prütz, R., Radtke, K., Strube, F., Weller, D. (2018). World Risk Report 2018. (p. 7). Retrieved from: https://reliefweb.int/sites/reliefweb.int/files/resources/WorldRiskReport-2018.pdf
5. NDMO. (n.d.). Tropical Cyclones – Action Gide. Retrieved from: http://www.ndmo.gov.fj/images/Hazards/Tropical_Cyclone.pdf
6. Asian Development Bank (ADB). (2019). Pacific Finance Sector Briefs – Fiji. Retrieved from: https://www.adb.org/sites/default/files/publication/529841/pacific-finance-sector-fiji.pdf 6.
7. World Bank (WB). (2017). Systematic Country Diagnostic 2017. Republic of Fiji. Retrieved from: http://documents.worldbank.org/curated/en/529271512123603244/pdf/116491-revised-PUBLIC-ACS.pdf
8. Ministry of Economy Republic of Fiji. (2017). 5-Year & 20-Year National Development Plan. Transforming Fiji. Retrieved from: https://www.fiji.gov.fj/getattachment/15b0ba03-825e-47f7-bf69-094ad33004dd/5-Year---20-Year-NATIONAL-DEVELOPMENT-PLAN.aspx
9. Fiji Bureau of Statistics. (2017). Population and Housing Census: Administration Report.
10. City population, Fiji. http://www.citypopulation.de/Fiji.html

1.2 PURPOSE OF THE COMMUNITY-BASED VULNERABILITY ASSESSMENT AND CLIMATE ACTION PLAN

The community-based VA and CAP aims to inform the wider planning processes at the town and national levels, by providing an in-depth assessment on settlement level vulnerability, in addition to providing recommendations for action. This document presents a summary of the report developed under the project for dissemination. The original report includes additional information and a more in-depth analysis.

The VA aims to understand the level of vulnerability of systems in Vunato, by following a multi-scale approach. The VA has the following sub-objectives:

1. **Identify the underlying causes of vulnerability.**
2. **Understand the perceptions on climate change and disaster risk from the residents living in the settlement.**
3. **Analyse the spatial dimension of exposed assets.**
4. **Identify the sources of livelihoods that may be vulnerable to the impacts of climate change.**

Based on the findings of the VA, a CAP was developed to identify and prioritize potential community-level interventions. This aims to identify and prioritize climate change adaptation options that will enhance the resilience of physical, natural and socio-economic assets and ecosystems at the community level.

Children during the visit of the President of the United Nations General Assembly
UN-Habitat/Kamsin Raju

2 METHODOLOGY

Several data gathering methods have been employed in order to collect both the primary and secondary data needed to conduct the analyses. The methodology is designed to support local and national governments in identifying current and future drivers of vulnerability and to identify priorities for climate change adaptation.

Community level data was collected around five key components: **(i) Population; (ii) Urban use; (iii) Natural resource-based production, (iv) Critical point facilities; and (v) Lifeline utilities.** The data collected from both primary and secondary sources provide information on climate hazards and variability and support three main analyses: **(1) Hazard exposure analysis; (2) Sensitivity analysis; and (3) Adaptive capacity analysis.**

DATA COLLECTION

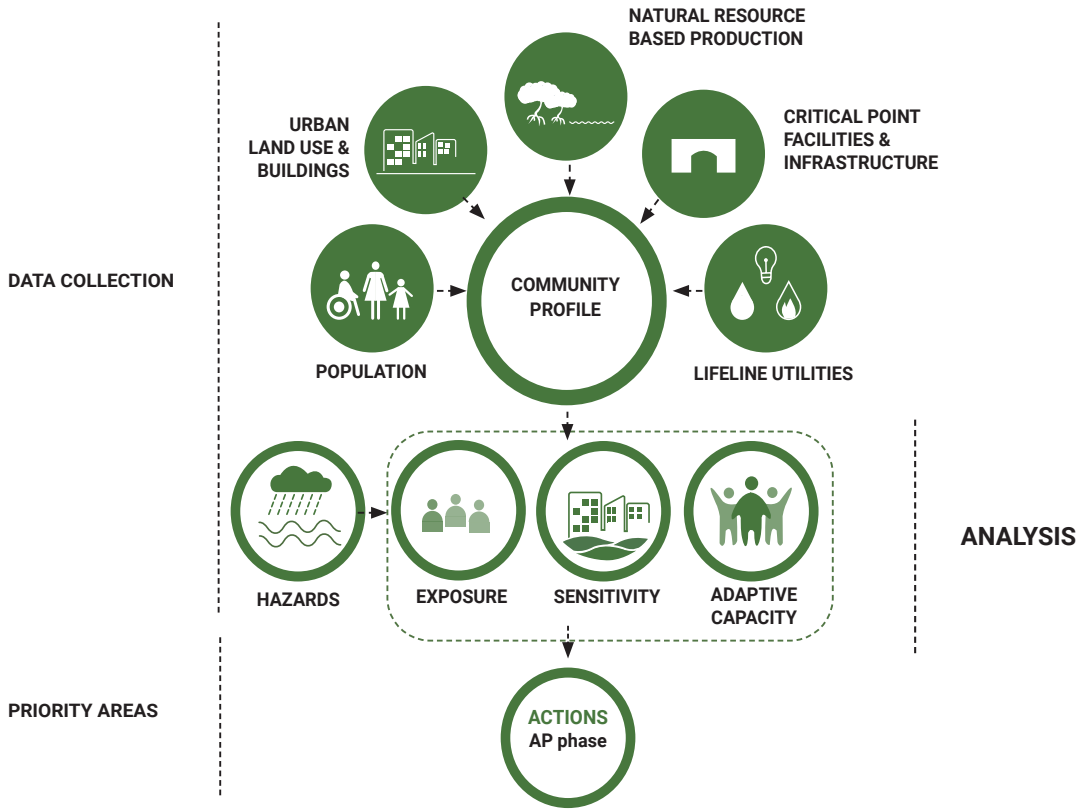
Primary data collection methods:

- Household survey (HHS)[11]
- Site visits and participatory mapping
- Key Informant Interviews (KII)
- VRA workshop

Secondary data collection methods:

- Census
- Reports on climate change projections
- Spatial data available in GIS repositories

Figure 2 Analytical Framework



11. The HHS provides predominantly quantitative data on the household unit, and the community unit once aggregated. The assessment makes a distinction between household and house. Household refers to the family unit living in a same dwelling, and house refers to the physical structure. When providing information regarding the HHS, the unit considered is the household. The household survey covered 88 per cent of the households in Vunato settlement. 89 households were surveyed, out of a total of 101 households that were identified in the settlement at the time when the HHS was carried out.

Participatory workshop
UN-Habitat/Begoña Peiro

3 VUNATO SETTLEMENT

Vunato settlement, is located in the peri-urban area of Lautoka City, two kilometres east of the city centre. Located within the town boundary, Vunato is consequently under the jurisdiction of the Lautoka City Council. As such, the community has access to certain services provided such as garbage collection, public transport services, etc. It is located approximately 500 meters away from the Lautoka Landfill, and many of its residents are waste pickers.

Vunato has 101 households and the total population surveyed in Vunato is 476 people[12], from which 235 are male and 241 are female. The total estimated population of 532 people[13]. The settlement measures approximately 325 meters in length between its longest points (N-S) and 200 meters at its widest points (W-E).

In terms of age distribution, persons aged from 0 to 14 years old represent a large proportion of the total population (34 percent). The youth age group (15-24) on the other hand, accounts for a smaller proportion (17 percent). There is a total of five people aged over 75 in the settlement, and only seven within the 70-74 age range.

12. 89 out of 101 households were surveyed.
13. For those households that were not surveyed the average size of household is used.

79	Total number of houses	43.564 m^2	Total area within boundary
101	Total number of households	7.305 m^2	Residential buildings area
3	Uninhabited buildings	277 m^2	Civic buildings area
532	estimated people living in the settlement	35.982 m^2	Open space area

Vunato settlement after a rainfall
UN-Habitat/Begoña Peiro

4 CLIMATIC FEATURES, HAZARDS, PERCEPTIONS

4.1 CLIMATIC FEATURES AND HAZARDS

Fiji is generally considered to be an oceanic tropical marine climate[14]. There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October[15].

Regarding climate variability, the major features driving climate in Fiji are[16]:

- **The El Niño Southern Oscillation (ENSO) phenomenon**, which occurs every two to seven years, four years on average. It is the most important influence on inter-annual climate variations in the country. It strongly influences rainfall, temperature and tropical cyclones. Dry seasons during El Niño event tend to be drier and cooler, with droughts being associated to these periods. On the contrary, La Niña events are associated with floods, depressions and tropical cyclones.

- **The South Pacific Convergence Zone** strongly influences the seasonal cycle, which is most intense during the wet season and closer to the country[17].

- **The trade winds** bring orographic rainfall to the eastern parts of the country. Around 70% of the national annual average rainfall occurred during the wet season (over the period from 1961 to 2010).

4.2 COMMUNITY PERCEPTIONS OF KEY IMPACTS

Based on primary data collected, residents face key challenges due to a number of climate-related hazards, including cyclones, floods, extreme heat, and vector-borne diseases.

66% **of households highlighted flash flooding as the most problematic hazard.**

33% **of households highlighted creek flooding as the second most problematic hazard**

41% **of households highlighted extreme heat as the most problematic hazard.**

All Vunato households reported having issues related to floods, namely flash floods and floods from the nearby creek (which are tidally influenced). Other hazards highlighted as the most problematic include: cyclones, extreme heat and vector-borne diseases.

14. Government of Fiji. (2019). National Climate Change Policy. Retrieved from: https://www.pacificclimatechange.net/sites/default/files/documents/National-Climate-Change-Policy-2018---2030_0.pdf
15. Pacific-Australia Climate Change Science and Adaptation Planning Program (PACCSAP). (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.
16. Government of Fiji. (2018). Climate Vulnerability Assessment – Making Fiji Climate Resilient.
17. Ibid

KEY FINDINGS:
Vunato residents reported being impacted in different ways by the recurrence of climate-hazards.

89% of respondents **identified damage to housing stock as a major concern**

88% of respondents were **concerned about their ability to provide food**

82% of respondents were **concerned with the impact on their ability to earn an income**

36% of respondents were **concerned with the impact on crops, fishing or livestock**

5% of respondents were **concerned with the possible temporary relocation**

5 CLIMATE CHANGE AND FUTURE RISKS

5.1 CLIMATE CHANGE PROJECTIONS[18]

2090 Extreme rainfall events are expected to increase, becoming more frequent and intense.

2090 The total number of storms is likely to decrease over time, however. The proportion of Category 4 and 5 tropical cyclones is likely to increase.

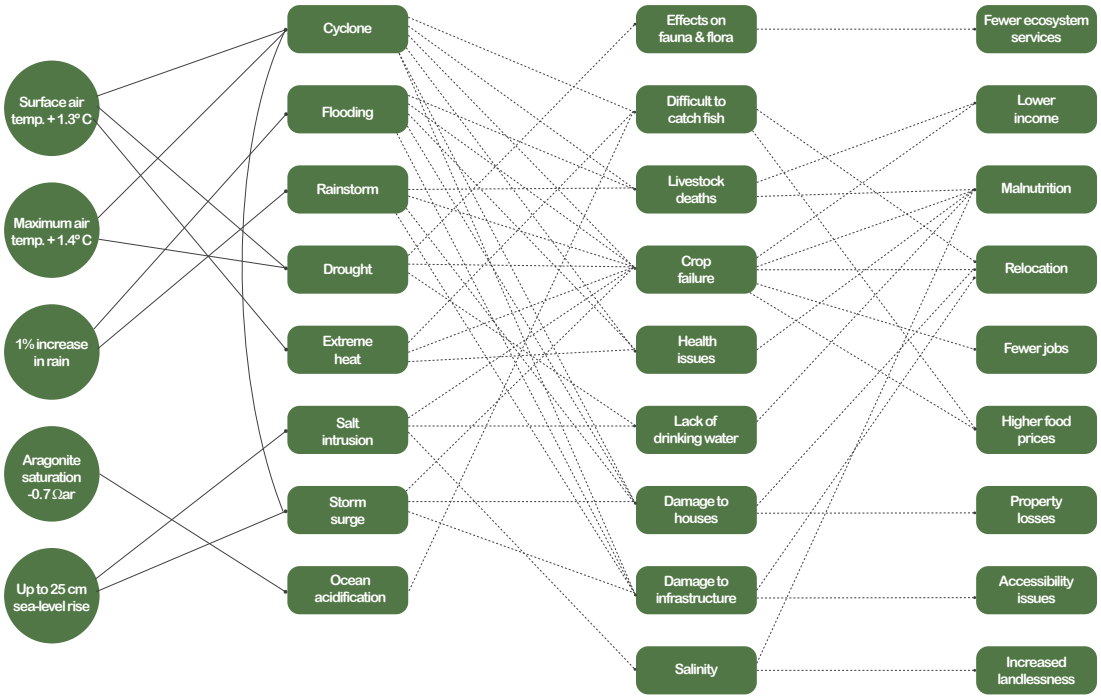
2090 Temperatures are expected to increase as well as temperature on extreme hot days.

2090 Mean sea level will continue to rise, with projected increases of 38–87 cm by 2090 under the RCP8.5

2090 Ocean acidification is expected to continue increasing, leading to coral reef bleaching and destruction.

2090 Landslides represent a significant risk that can increase in response to heavier rainfall.

Figure 3 shows the main hazards that affect Vunato settlement and primary and secondary impacts that were reported by community members during participatory workshops[19 20]



18. Climate projections based on: PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.
19. Ibid
20. Surface air temperatures in the Pacific are closely related to sea-surface temperatures (SST), so the projected changes to air temperature can be used as a guide to the expected changes to SST.

5.2 EXTREME CLIMATE EVENTS FUTURE RISK

The assessment carried out relies on existing sets of climate change projections that are available and were produced by the Pacific-Australia Climate Change Science Program (PACCSAP)[21].

Cyclones:

Despite projections that tropical cyclogenesis will decrease, the intensity of cyclone events is expected to increase. Increase in strong winds is expected to result in damage to housing stock and critical infrastructure. Cyclones will impact livelihoods through damage to land and crops, livestock and by increasing difficulty in catching fish. Increased intensity of cyclones will impact on people's mobility and has the potential to displace vulnerable communities, both temporarily and permanently.

Extreme Temperatures:

Projected increase in temperature, in particular on extremely hot days, is expected to have significant impacts on local health. Higher temperatures lead to lower water availability during the dry season. Higher temperatures also increase the incidence of mosquitos, the risk of crop failure, and livestock health impacts. This has a socioeconomic impact on communities by reducing income reliability and increasing food insecurity due to increased food prices.

Rainfall:

The frequency and intensity of extreme rainfall events are projected to increase. This is expected to damage crops and cause livestock deaths. Food security will increase due to crop loss. Despite increased water availability, rainwater is difficult to capture without proper infrastructure, and flooding is likely. Flooding will cause accessibility issues and damage housing stock.

21. PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.

Education has not always been a priority in my community, which is why there are high rates of unemployment. But I do not want to be a statistic, I want to be a doctor. I want to help my family and my community live a better life.

Ratu, youth representative
[No real names are used in this report]

"Growing up in such a community [Vunato Settlement], I have witnessed the different challenges that our youths go through. (...) Most of the time, students in school tend to ask me this question which bothers me a lot: 'Why do you like living in that area?' And I tell them: because my family lives there, where else am I supposed to go? The truth is that I have chosen to live in this settlement because I have cherised all the moments that I have spent here in my community and I can feel the love and compassion that we share, despite the fact that we are not really related. Everyone gets the chance to socialize and interact with others, which seems to be an important virtue to build a healthy relationship in a community.

After the devastation caused by TC Winston in the year 2016 I was very impressed by the youths and how involved they were in rebuilding our community to get back to its original state. Some of the things that the youths of Vunato have been engaged in is cleaning up the roads, cleaning the river banks and rebuilding temporary houses for those who were affected the most by the cyclone. One of the positive outcomes that I have witnessed despite the destruction of the cyclone is that our community's relationships were strengthened due to the fact that everyone was helping out in improving the Vunato community. Youths have also come up with ideas in order for the community to adapt to the changing climate that we are going through. Some of these changes are houses with higher stilts and rebuilding some of the houses that were in flood-prone areas in safe areas."

Livai Saravi with children from Vunato Settlement
UN-Habitat/ ©Begoña Peiro

6 VULNERABILITY

Vunato's vulnerability was assessed through three lenses:

6.1 VULNERABLE GROUPS: WOMEN, YOUTH, ELDERLY, PEOPLE WITH DISABILITES

Gender inequality in Fiji is a key driver of vulnerability to climate change with several studies demonstrating that women and girls are highly vulnerable to the impacts of climate-related disasters. The increase of Gender Based Violence (GBV) and violence against children after disasters has been widely documented by humanitarian agencies coordinating emergency response efforts[22]. Evidence indicated that violence against children increased after TC Winston as a result of heightened stress and vulnerability from caregivers. Incidents of sexual violence were also reported after the two tropical cyclones hit the Western division of Fiji in 2012 by women living in relief centres[23]. Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities[24].

In Vunato settlement, recurrent flood events have impacts on residents' health, with large cumulative impacts on children who can be deprived of access to school. As a consequence, many adult women (given their primary role as caregivers) also miss work in order to take care of their children. Furthermore, these cultural norms with regards to women's role are also perceived during and after disaster events, as teenagers, mostly girls, are given the responsibility of taking care of their younger siblings. As a consequence, girls' access to education may be compromised for a prolonged period of time, as it is not perceived as a priority.

22. UN Women. (2014). *Climate change, Disaster and Gender-Based Violence in the Pacific.*
23. UN Women. (2013). *The 2012 Fiji Floods: Gender Sensitivity in Disaster Management.*
24. Government of The Republic of Fiji (GoF). (2017). *Climate Vulnerability Assessment.* Washington, D.C.: The World Bank Group.

Participatory workshop.
UN-Habitat/ ©Begoña Peiro

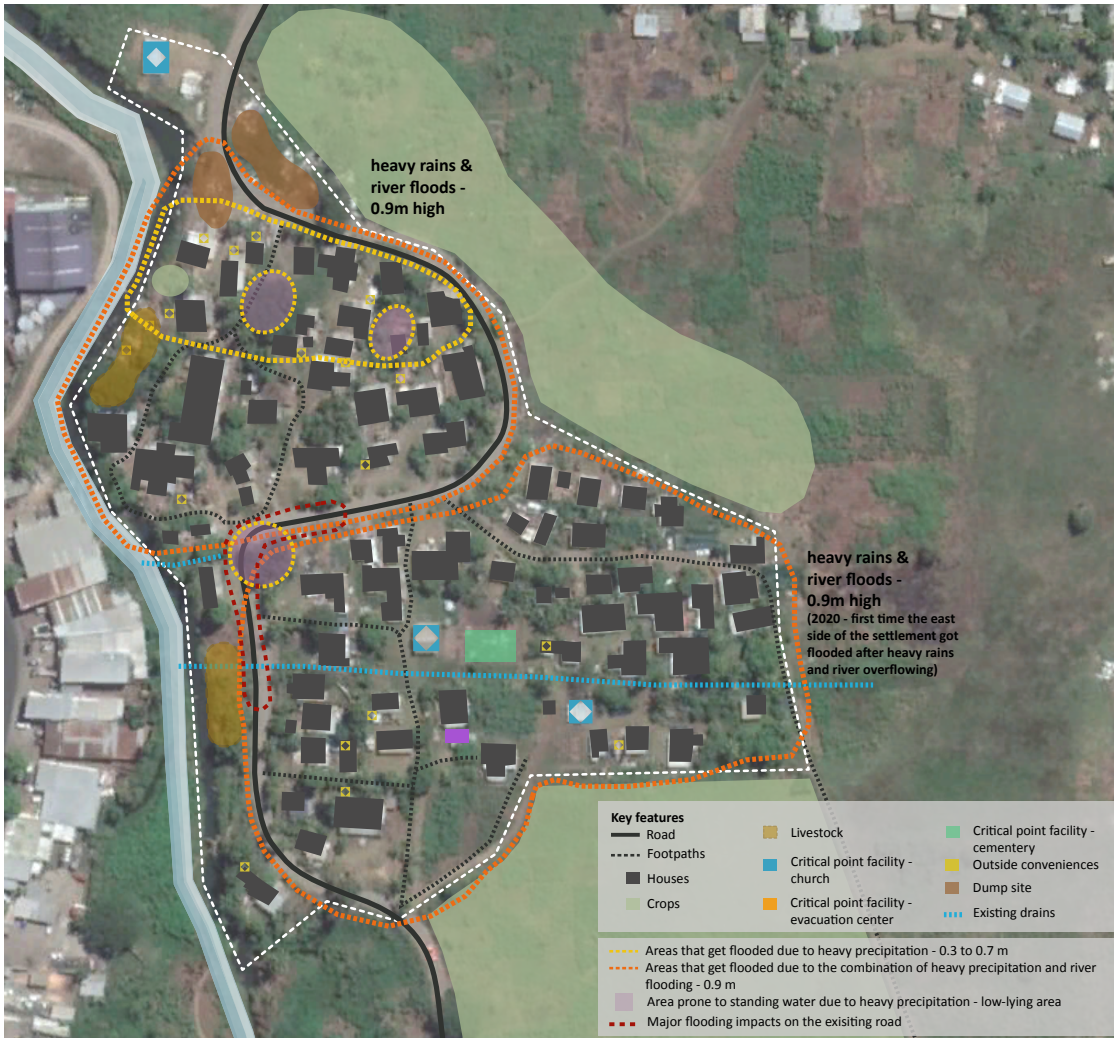
6.2 EXPOSURE

Exposure is defined as the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected[25].

Vunato occupies an approximate total area of 4.4 hectares. Being located along a creek, near an industrial area and 500 meters' distance from the Lautoka landfill site, its social, economic and natural systems are exposed to multiple hazards.

During the participatory workshop, community-members identified key locations, infrastructure and assets. Participants schematically demarcated the areas that are exposed to the main climate-related hazards that affect their community and discussed key impacts (see Figure 3).

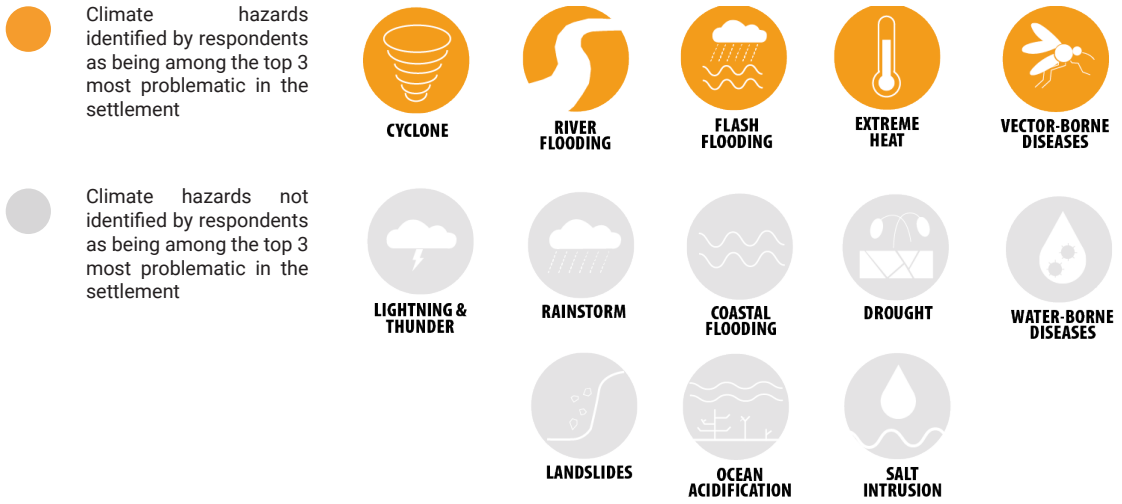
Figure 3 Hazard exposure map developed in participatory workshops



25. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland

Figure 4 shows the hazards that were highlighted by respondents as being amongst the three most problematic hazards for their household. While these are the hazards that residents perceive as being problematic based on their experiences, it does not mean that other hazards do not pose risks in the settlement.

Figure 4 The most problematic hazards identified by respondents in the settlement



6.3 SENSITIVITY

Sensitivity is defined as the degree to which a system or species is affected, either adversely or beneficially, by climate variability or change[26].

(i) Population

Residents of Vunato do not have formal land tenure arrangements. However, all the household survey respondents reported feeling secure on land tenure due to informal arrangements with the landowner. The dependency ratio in the settlement is 53, close to the national dependency ratio of 54[27]. Young dependents make 99 per cent of the total dependents, whilst elderly people (aged over 65) make up the remaining 1 percent.

Left:
House in Vunato Settlement.
UN-Habitat/Kamsin Raju

Right:
House in Vunato Settlement.
UN-Habitat/Kamsin Raju

26. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland
27. World Bank. (2019). Retrieved from: https://data.worldbank.org/indicator/SP.POP.DPND?locations=FJ

(ii) Urban Land Use & Buildings

The settlement is located in an industrial area, and these industries act as significant sources of pollution (including water pollution). The town council is responsible for ensuring that buildings are compliant with the building code. However, often, compliance is not checked in informal settlements. All houses are one storey high and are located on relatively flat terrain. All houses have been built with metal roofs, only 16 percent of which were ranked as being in a good condition. 78 percent of houses are built with metal exterior walls, 20 percent in wood and the remaining 2 per cent in tarp. Most houses are on stilts (90 per cent), 88 per cent of which are made of wood, 1 perc ent are concrete. Most of the houses on stilts (63 per cent) have stilts less than half a meter off the ground. The condition of the wooden stilts in most cases is very poor.

(iii) Natural Resource-based Production

Residents in Vunato depend on natural resources for food and livelihoods, particularly on crops. However, when compared to other settlements, Vunato presents a lower dependency on crops which is mainly related to the lack of land availability. The portion of land in the settlement used for crops is limited as most of the area within and immediately outside the settlement's boundaries is frequently flooded. 51 per cent of the households indicated growing crops mainly for own consumption. Only 13 per cent of the households raise livestock.

Although being located along a river and close to the coast, only 16 per cent of the households said they fish regularly. The main fishing techniques being practiced include using a long line with a hook during low tide and net. The community mentioned that the fish being caught are enough for own consumption, despite observing a decreasing trend in the amount of fish available mainly influenced by weather conditions. The community does not own any fishing boats, and thus fishing in the ocean is limited. Community representatives expressed concerns about the river being contaminated by the frequent disposal of solid waste and wastewater from inadequate sanitation facilities as well as from the nearby industry.

59% of houses in Vunato were ranked as either poor or fair in condition

90% of houses in Vunato are on stilts

76% of houses in Vunato were built after 1980

100% of houses in Vunato have metal roofs

Left: House in Vunato Settlement.
UN-Habitat/ Kamsin Raju

Right: Cemetery Road.
UN-Habitat/ Kamsin Raju

(iv) Critical Point Facilities & Infrastructure

The Cemetery Road is unpaved for its entire length and occurrences of flooding are frequently experienced by the community during heavy rains. Figures 59 and 60 show images of the conditions of the road after heavy rainfalls. Furthermore, being the main access to the landfill, this road receives a high level of traffic of transfer trucks on a daily basis which directly affects road conditions and also poses risks to both environment and community members' health.

Furthermore, existing footpaths are unpaved and have been constructed by residents. During rainstorms and floods all footpaths get very muddy during which affects their accessibility across the settlement. According to the information provided by community representatives during the validation workshop, water reaches approximately 0.6 to 0.9 meters when there is a combination of heavy rains and river overflowing.

There are three existing churches within Vunato's boundaries. One of these churches, built in 2019, also serves at times as a community hall and evacuation centre. Two of the churches were identified as being in particularly poor conditions, and unsuitable during disaster events. There is also a kindergarden in the settlement, which has been built with the support of NGOs and private donors.

(v) Lifeline Utilities

The settlement has access to several services provided by entities in Fiji (e.g., water, electricity, etc.). The majority of the households (93 per cent) in the settlement reported having access to water supply provided by the Fiji Water Authority (FWA). However, connections to the water supply have often been built informally and tapping points to the network are in some cases damaged. This not only leads to leakages but can also lead to cross contamination.

With regards to sanitation, all of the households reported having access to a facility, however, 71 per cent of the households are sharing these facilities with other neighbours. With regards to wastewater, there is no network present at the town level. Flood events can cause excreta to rise back up and overflow (particularly in those cases where there are pit latrines), failing to hygienically separate human excreta from human contact, and heightening the risk for water contamination and water-borne diseases. This is a particularly concerning issue, as the settlement experiences regular floods. 81 per cent of the households in Vunato reported being connected to the electricity supply network.

Waste management is an issue in the settlement, despite having access to rubbish collection services provided by the city council. Being located close to the landfill, there is a relatively high proportion of the households in Vunato that rely on waste picking as main source of income (the image below shows how waste is being stored in the settlement). This situation also increases the volume of rubbish that is brought to the settlement in order to be cleaned and prepared for selling. The lack of adequate containers to lodge these waste in the settlement is an issue. Hence, during the interviews, some households identified the lack of waste management, pollution and constant bad odour as one of the main challenges of living in Vunato.


Waste sorting.
UN-Habitat/ Sara Vargues

71% **of respondents share sanitation facilities with another household**

29% of respondents **have access to a basic sanitation facility used solely by their household,** where excreta are disposed of in situ or treated off-site

6.4 ADAPTIVE CAPACITY

Adaptive capacity is the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences[28].

Three different levels of adaptive capacity are analysed:

(i) Independent Capacity,
(ii) Collective Capacity,
(iii) Institutional Capacity.

(i) Independent Capacity

Independent capacity is how individuals or families are able to respond and adapt to climate hazards without assistance from the larger community or local government. Also referred to as 'autonomous' adaptation[29]. In this report the unit considered for the analysis is the household.

The limited financial resources at the household level combined with the low access to financial assistance and social protection services indicate that the level of economic wealth and financial capital at the household level is low in Vunato. The Department of Social Welfare, under the Ministry of Women, Children and Poverty Alleviation (MWCPA) is the lead agency for social assistance in Fiji and administers the core social protection programs, which are: the Poverty Benefit Scheme (PBS), Care and Protection Allowance (CPA), and Social Pension Scheme (SPS), Food Voucher Program and the Free Bus Fare Program.

Half of the respondents reported having access to information on climate change, either through technology (including radio, television, etc.) (most common), or through social media (second most common). 50 per cent of the households mentioned not having access to any type of information regarding climate change and disasters.

With regards to disaster preparedness, all the households reported having access to early warning systems (through SMS alerts and radio), 88 households reported having an evacuation plan (all except one household), and all households said that they are connected to a formal DRR network.

28. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland
29. UN-Habitat, 2014. Planning for Climate Change

33% households reported not having access to any social protection programs

32% households reported that at least one member had access to the free bus fare program

13% household reported access to the food voucher program, and 21% to the poverty benefit scheme.

2% households mentioned having access to the social pension scheme

(ii) Collective Capacity

Collective capacity is how well are communities, neighbourhoods or other groups able to respond and adapt to climate hazards without assistance from government or other agencies and institutions[30].

The lack of collective savings groups or systems in place at the settlement level indicates a low level of financial capacity. Each individual household relies on their own resources to address impacts, and as already mentioned, these are limited. Moreover, there is a lack of awareness and robust mechanisms of early warning systems, evacuation routes and disaster management committees in the settlement. Despite individual households reporting having access to early warning systems (either through radio or SMS), the community is not connected to a formal DRR network nor has a formal evacuation plan. There is some degree of coordination, as indicated by the relatively high number of households that are aware of the evacuation centre available in case of disaster events which is the Lautoka Primary School located less than one kilometre away from the settlement. The only challenge faced by the community with regards to the evacuation centre is the lack of transport available. Informal settlements lack many of the institutional support structures that are available to households with tenure.

There are community leadership structures in place community (e.g., established community leader, community groups, etc.) that have been effective following past disaster events and all community mentioned being well connected to various sources of information. Furthermore, there is a women's group in the settlement which is led by the community leader's wife. These systems present opportunities that can be tapped on in order to strengthen other aspects at the community-level such as stronger mechanisms for disaster preparedness, response and climate change adaptation.

(iii) Institutional Capacity

Institutional capacity is how well an established government is able to, or would be able to, respond and adapt to climate hazards (e.g. organizational systems, policies, regulations, human resources, technological resources)[31].

Fiji's 5 –Year and 20-Year National Development plans lay out the country's development agenda in realizing the Sustainable Development Goals and Nationally Determined Contribution under the Paris Agreement.

Fiji's National Climate Change Policy (NCCP) further articulates Fiji's priorities in reducing present and future climate risks in alignment to the National Development Plans. These Plans envisage 9.3 billion FJD expenditure on climate change adaptations over the next two decades. Despite this, financial capital remains lower than the identified needs.

The NCCP recognizes the important roles local government entities play in delivering the policy's objectives and in providing coordination at the community-level. At the moment, councils do not have a budget dedicated to the implementation of climate adaptation activities but may access funds through specific projects (e.g., mangrove conservation projects in Lami Town Council). The NAP is meant to provide mechanisms and arrangements that will allow to progress local government facilitation, promoting bottom-up approaches at district and community levels.

The National Disaster Management Office carries out activities such as community awareness programs and disaster management trainings. However, informal settlements are often left out of formal systems, networks and programs. For example, activities such as the community awareness programs have been carried out in villages, but not in informal settlements up to the time when the report was developed. Given that informal settlements such as Vunato are often located in highly exposed areas, combined with a high level of sensitivity, the introduction of awareness raising programs and improved disaster preparedness are a priority.

30. Ibid
31. Ibid


POLLUTION FROM NEARBY INDUSTRY &
LACK OF BLACK WATER MANAGEMENT


LACK OF ADEQUATE
DRAINAGE NETWORK


POOR SANITATION
FACILITIES


WASTE


HOUSING STOCK CONDITIONS


INADEQUATE FOOTPATHS

7 CLIMATE ACTION PLAN

The main purpose of the CAP is to empower communities to identify community-level interventions that will strengthen their resilience to climate change while driving development. On the one hand, the prioritized actions resulting from this process will lead to the selection of projects that are financially supported by the FRIS project. On the other hand, the CAP aims to support national and local government decision-making, particularly in relation to upgrading of informal settlements and their enhanced integration into the urban system.

Several community workshops held with local stakeholders (including vulnerable groups such as women, youth, the elderly, and people with disabilities) helped to identify key vulnerabilities, climate risks and identify adaptation options and priorities. Integrating quantitative datasets and community perceptions during the VA phase allow for critical consideration of both community and scientific understanding of climate variability and change.

7.1 CLIMATE RESILIENCE & THE SUSTAINABLE DEVELOPMENT GOALS

As stated in the National Climate Change Policy, vulnerability to climate change in Fiji has the potential to derail and undermine progress against each of the SDGs[32]. Building climate resilience is critical to the implementation of the SDGs. However, existing development deficits exacerbate communities' vulnerability to climate change. As such, the action plan prioritizes a holistic approach through actions that build climate resilience alongside sustainable development co-benefits.

7.2 ALIGNMENT TO FIJI'S NATIONAL PLAN

Fiji´s National Adaptation Plan[33] (NAP) is aligned to international processes such as the SDGs of the 2030 Agenda, the Paris Agreement of the UNFCCC and the Sendai Framework for Disaster Risk Reduction. It contains 160 adaptation measures that are to be prioritized over the five-year period of the NAP, organized across a total of 10 components (five systems components and five sectoral components). The actions included in this report are aligned and respond to the aforementioned focus areas.

OPTION IDENTIFICATION & PRIORITIZATION

During the workshops, key climate-hazards were discussed, linking the options to these hazards and related impacts. Integrating quantitative datasets and community perceptions during the VA phase allow for critical consideration of both community and scientific understanding of climate variability and change. Similarly, the option identification process considered both community inputs, that allowed the team to capture local and traditional knowledge, and technical inputs from experts. The options identified were derived from the findings of the VA and prioritized based on a multi-criteria assessment (i.e. link to hazards, SDG co-benefits, ease of implementation, urgency and cost).

32. Ministry of Economy, Republic of Fiji, (2019). National Climate Change Policy 2018-2030.
33. Government of the Republic of Fiji, (2018). Republic of Fiji. National Adaptation Plan. A pathway towards climate resilience. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Parties/National%20Adaptation%20Plan_Fiji.pdf

7.3 PRIORITIZED SHORTLISTED ACTIONS

During the participatory workshops, potential adaptation options were co-designed and discussed. Some examples include improved sanitation facilities that are resilient to floods, and rainwater harvesting tanks to ensure continous access to water. Based on the long-list of adaptive measures (see Annex A), a short-list was prepared and prioritized. Below is the table that includes the short-listed options and the results from the community ranking. These were also assessed against the following criteria: acceptability, community support and technical feasibility. This work forms the basis for the selection of options that will be implemented as part of the FRIS project. However, it must be noted that the fact that the options have been shortlisted does not mean that all of them will be implemented.

PRIORITZED OPTIONS	SDG CO-BENEFITS	COMMUNITY RANKING	EASE OF IMPLE-MENTATION	URGENCY	COST
Interventions in physical, natural and social assets					
Construction of an adequate stormwater drainage network	11, 13	**1**	2	3	3
Construction of adequate footpaths across the community and for specific houses	11, 13	**2**	2	3	3
Rainwater harvesting tanks	6, 3	**3**	2	3	3
Improved sanitation facilities (resilient to floods)	6, 3	**4**	2	3	3
Localized interventions to improve the building conditions of those structures that are identified as being in the worst conditions	11, 13	**5**	2	3	3
Trainings and awareness raising					
Community involvement in elimination of larval habitats (through clean up campaigns and awareness raising)	3, 13	**1**	2	3	3
WASH trainings that target adults and children	6, 3	**2**	2	3	3
Disaster preparedness and response related activities	11, 13	**3**	3	3	3
Trainings on safe construction for hazard proof shelters for low-income residents	11, 13	**4**	2	3	3
Training on waste management following a participatory approach that identifies opportunities linked to livelihoods	11, 12, 14	**5**	2	3	3
Training on financial literacy and social protection programs	1, 5	**6**	3	3	3

The following activities were identified and shortlisted, aiming to supported the project implementation:

- Reinforce existing governance structures at the community-level to ensure project ownership.
- Establish youth community groups and promote their participation in awareness raising and project implementation activities that can increase their skills and capacity.
- Engagement through design process of the retrofitting actions, following a participatory approach.
- Awareness raising and trainings on maintenance requirements of sanitation facilities and drainages.

These activities would be implemented in conjunction with those shortlisted under "physical, natural and social assets".

ANNEX

Long list of climate change adaptation options

- Interventions in physical, natural and social assets
- Trainings and awareness raising activities
- Activities that support the project implementation

These actions were identified as part of the long-list of adaptive measures, and were short-listed for further prioritization.

These actions were identified as part of the long-list of adaptive measures, but were short-listed.

OPTIONS	SDG CO-BENEFITS	EASE OF IMPLEMEN TATION	URGENCY	COST	TOTAL
Population key area					
Community involvement in elimination of larval habitats (through clean up campaigns and awareness raising)	3 GOOD HEALTH AND WELL-BEING; 13 CLIMATE ACTION	2	3	3	**8**
WASH trainings that target adults and children	3 GOOD HEALTH AND WELL-BEING; 6 CLEAN WATER AND SANITATION; 13 CLIMATE ACTION	2	3	3	**8**
Awareness raising campaigns that promote more sustainable options to solid waste management	3 GOOD HEALTH AND WELL-BEING; 6 CLEAN WATER AND SANITATION	2	3	2	**7**
Training on waste management following a participatory approach that identifies opportunities linked to livelihood options	11 SUSTAINABLE CITIES AND COMMUNITIES; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 14 LIFE BELOW WATER	2	3	3	**8**
Trainings on safe construction for low-income residents	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	2	3	3	**8**
Incorporating informal settlement areas to be covered by relevant authorities (including compliance with building codes)	1 NO POVERTY; 11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	1	2	1	**4**
Development of catalogue of hazard proof options for low-income residents that takes into consideration local and affordable materials that are available	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	2	2	3	**7**
Low-cost retrofitting to strengthen existing household structures, especially roofs	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	1	3	1	**4**
Identify financial support options and promote informal settlements upgrading and regularization of land tenure	1 NO POVERTY; 11 SUSTAINABLE CITIES AND COMMUNITIES	1	3	2	**6**
Localized interventions to improve the housing conditions of those structures that are identified as being in the worst conditions	1 NO POVERTY; 11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	2	3	3	**8**
Set up disaster management committees to discuss disaster preparedness and response regularly	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	3	3	3	**9**
Plan and define evacuation routes	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	3	3	3	**9**
Link community level early warning system to formal networks, city-wide disaster response communications technologies and procedures.	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	3	3	3	**9**
Evacuation drills	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION	3	3	3	**9**
Reinforce existing governance structures at the community-level to ensure project ownership as the process progresses	11 SUSTAINABLE CITIES AND COMMUNITIES; 17 PARTNERSHIPS FOR THE GOALS	3	3	3	**9**

Interventions in physical, natural and social assets
Trainings and awareness raising activities
Activities that support the project implementation

These actions were identified as part of the long-list of adaptive measures, and were short-listed for further prioritization.

These actions were identified as part of the long-list of adaptive measures, but were short-listed.

OPTIONS	SDG CO-BENEFITS	EASE OF IMPLEMENTATION	URGENCY	COST	TOTAL
Population key area					
Strengthen existing youth community groups and promote their participation project activities	11, 17	3	3	3	**9**
Diffusion of assessment results to provide insights on the findings and promote further action	17	3	3	3	**9**
Urban land use					
Strengthening community engagement and participation in resilience planning processes	11, 17	3	2	3	**8**
Formalization of land tenure, land subdivision and upgrading	11	1	2	1	**4**
Natural resource-based production					
Awareness raising and clean up campaigns to prevent ecosystem degradation	2, 14, 15	3	2	3	**8**
Provide adequate waste management options, as waste is currently being dumped by the community in the nearby surroundings	12, 14	3	2	3	**8**
Trainings and awareness raising on sustainable fishing techniques and climate change impacts	2, 14, 13	2	2	3	**7**
Trainings and awareness raising on sustainable and climate-resilient agriculture techniques and crops	2, 13	2	2	3	**7**
Critical point facilities					
Improvement of road conditions	11, 13	1	2	2	**5**
Improved footpaths	11, 13	2	3	3	**8**
Lifeline utilities					
Rainwater harvesting tanks (as a complementary measure to piped water supply)	3, 6, 13	2	3	3	**8**
Construction of an adequate drainage network	11, 13	2	3	3	**8**
Improved sanitation facilities (resilient to floods)	3, 6, 13	2	3	3	**8**

The table below shows the criteria and scores used for the prioritization.

Criteria	3	2	1
Urgency	3 = High (action is directly linked to the most pressing issues identified through the VRA)	2 = Medium (action is somewhat linked to the most pressing issues identified through the VRA)	1 = Low (action is derived from the VRA, but not among the highest priorities identified)
Ease of implementation	3 = High (action can be implemented within the project´s timeframe and can be implemented without external support)	2 = Medium (action can be implemented within the project´s timeframe but would require some external support)	1 = Low (action cannot be implemented within the project´s timeframe and would require significant support)
Cost	3 = High (action can be fully covered by the project´s funding)	2 = Medium (action can be mostly covered by the project´s funding but would require some external funding)	1 = Low (action requires significant external funding)

ADAPTATION FUND

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