



Lautoka City, Fiji

California settlement

COMMUNITY-BASED VULNERABILITY ASSESSMENT AND ACTION PLAN



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

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Coordinators:

Bernhard Barth, Inga Korte.

Authors:

Begoña Peiró, Sara Vargues.

Contributors:

Kolora Qativi, Kamsin Raju, Geeta Singh, Sunishma Singh, Lydia Ogden.

Design and Layout:

Lydia Ogden, Marion Reinoso, Begoña Peiro

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Piped water in California settlement
UN-Habitat/Begoña Peiro

1 INTRODUCTION

The California Settlement (Fiji) 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.

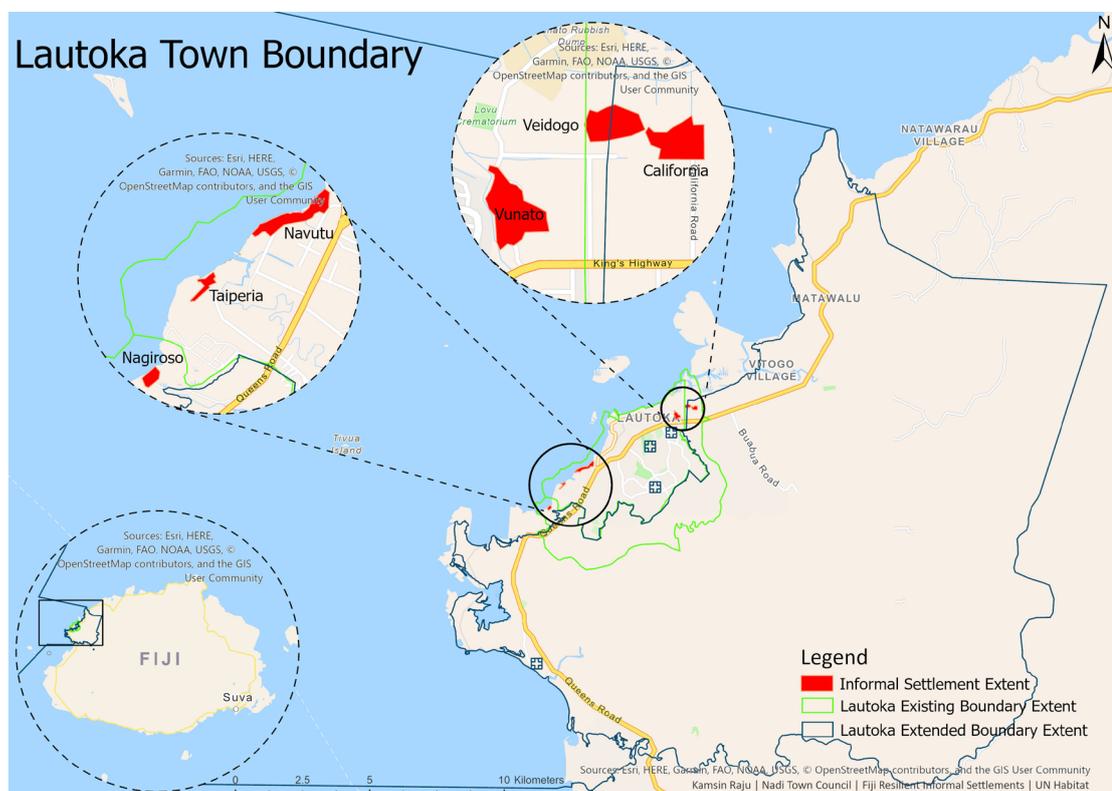
The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

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

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.

Figure 1 Informal settlements that are part of the FRIS program in Lautoka City, including California¹



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 nationally². Fiji's total population is 884,887 people, approximately 55.9 per cent of whom reside in urban areas³.

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 storms, flooding, landslide, drought and extreme temperature, earthquakes, and tsunamis. The country is also vulnerable to rising sea levels, and more frequent and intense rainfall caused by climate change.

Although Fiji is recognized as being one of the most developed economies in the Pacific⁶, signs of socio-economic inequality are rising, particularly with the expansion of informal settlements⁷. 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 care⁸. However, natural hazards and climate change represent a major obstacle to the achievement of these objectives.

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.

California settlement is located approximately 3.6 km west of the center of Lautoka City (Figure 1), inside of the city boundary. Lautoka City is a coastal city located in the west coast of Viti Levu, approximately 24 kilometers North of Nadi Town. It has a total area of 3,200 hectares and a total population of 71,573⁹. As compared to urban population growth in Fiji, Lautoka's urban population growth has been exponentially higher, with a 3.2 per cent per year¹⁰. However, most of this growth can be attributed to the expansion of the city's boundaries¹¹. California settlement covers an area of approximately 27,000 square meters (2.7 hectares), and measures approximately 178 meters in length between its longest points and 185 meters in width.

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 Guide. 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>

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>

11. Fiji Bureau of Statistics. (2017). Population and Housing Census: Administration Report.

The sugar cane production industry, historically vital to the national economy, is centered in Lautoka. The city contains the country's largest sugar mill as well as a number of pine chip yards which have played an important role in the city's economic development. However, the sugar industry has been in decline for the past 15 years¹². There has also been significant investment through the *Improvement of Key Services to Agriculture Project* to support sugar cane farmers in diversifying to horticultural crops¹³. The Lautoka market provides an important venue to farmers to sell their produce as it serves northern parts of Fiji, as well as the Yasawa Islands¹⁴.

Girls drawing during the participatory workshop
UN-Habitat/Sara Vargues



¹² UN-Habitat. (2012). Fiji: Lautoka City Urban Profile. Retrieved from: https://fukuoka.unhabitat.org/projects/fiji/pdf/Fiji_Lautoka_Urban_Profile.pdf

¹³ Pacific Community (SPC). Retrieved from: <https://www.spc.int/special-projects/sugar-projects/improvement-key-services-agriculture-iksa-project>

¹⁴ UN Women (2009). Fiji Markets Profiles.

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

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 California, 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.

Participatory workshop
UN-Habitat/Sara Vargues



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**.

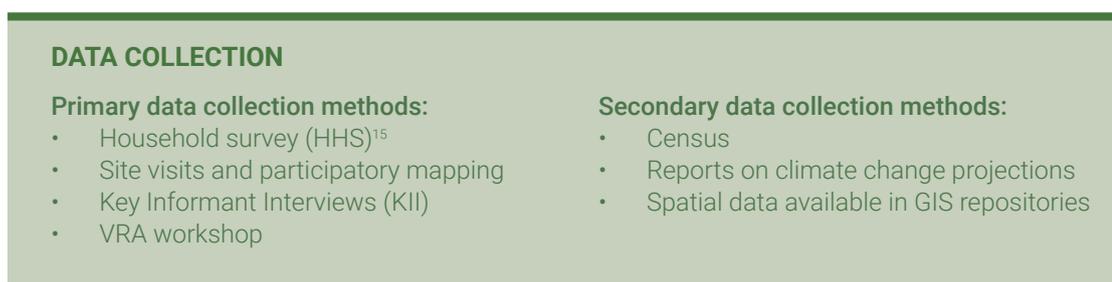
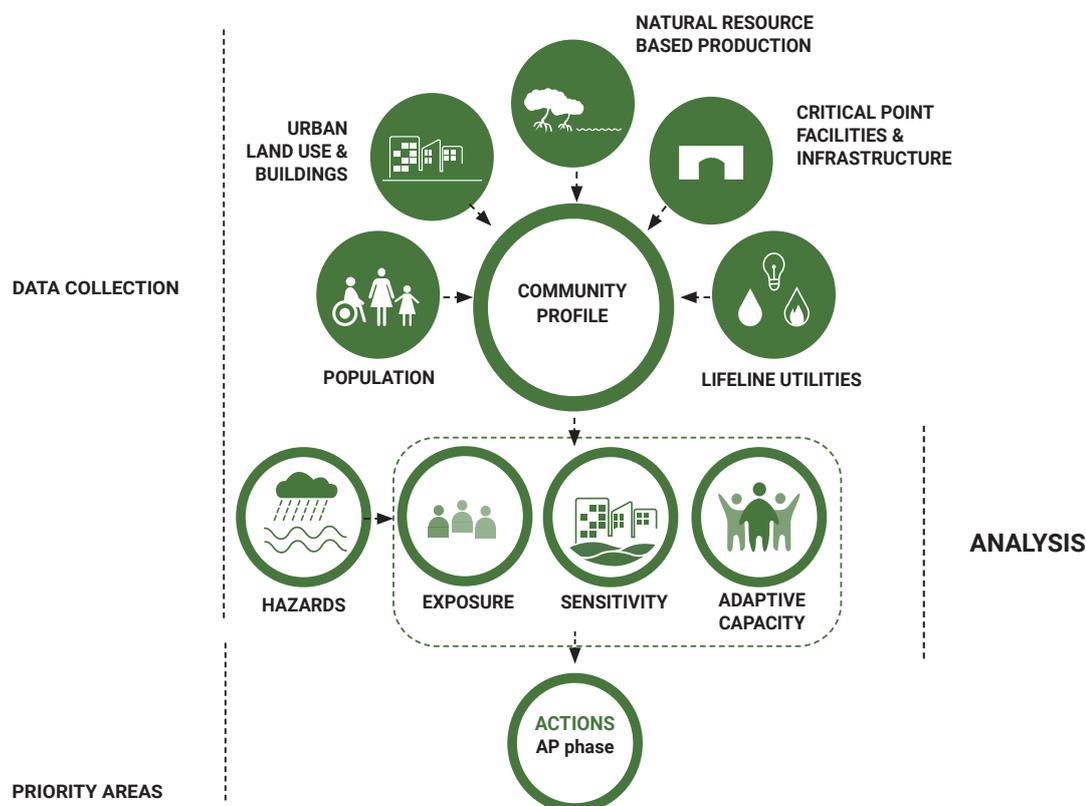


Figure 2 Analytical Framework



¹⁵ 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 90 per cent of the households in California settlement. 18 households were surveyed, out of a total of 20 households that were identified in the settlement at the time when the HHS was carried out.

3 CALIFORNIA SETTLEMENT

California is a small settlement, with twenty households. It is located next to Veidogo and close to Vunato, which are also part of the FRIS project. Being located on a low-lying area close to the coast, California's social, economic and natural systems are exposed to multiple hazards.

The total population based on the household survey conducted in California amounts to 103 people¹⁶, from which 56 are male and 47 are female. The total estimated population is 113 people¹⁷. In terms of age distribution, persons aged from 0 to 24 years old comprise over half of the population (54 per cent). The youth age group (15-24) accounts for 30 per cent and 24 per cent of the population in the settlement is under 14 years old. There are no people aged over 75 in the settlement, and only one person within the 70-74 age range. 68 per cent of the households reported having lived over 50 years in the settlement, 17 per cent between 41 to 50 years and only 11 per cent 21 to 30 years. Although the size of a household in California averages 4.9 persons, household sizes range from 2 to 10 people amongst those households surveyed.

¹⁶. 18 out of 20 households were surveyed.

¹⁷. For those households that were not surveyed the average size of household is used.

21	Total number of houses	30.970 m²	Total area within boundary
20	Total number of households	1.923 m²	Residential buildings area
1	Uninhabited buildings	540 m²	Civic buildings area
113	estimated people living in the settlement	28.507 m²	Open space area



House in California settlement
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 climate¹⁸. There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October¹⁹.

Regarding climate variability, the major features driving climate in Fiji are²⁰:

- **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 country²¹.
- **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

Located near the coast, California's social, economic and natural systems are exposed to multiple hazards. Based on primary data collected on the perceptions of climate change, residents face key challenges due to a number of climate-related hazards, including cyclones, heavy rainfalls, river floods, flash floods, extreme heat, vector-borne diseases, and water-borne diseases.



Flash floods and floods associated with the nearby creeks were highlighted as being among the main issues in the settlement. During the FGDs, community representatives said that there was a major flash flood event in 2016 during TC Winston. According to community members, flood levels can reach up to 1.1 meters during cyclone events. California is located approximately 800 meters from the Namoli creek and 250 meters from a second creek located on the Eastern side of the settlement. During the FGDs, community members mentioned that flash floods and floods from these creeks affect them especially during heavy rainfalls. As reported by the community, the combination of heavy rainfall and Spring tide affects the settlement. The flood level reported was from 0.5 to 1 meter during floods caused by heavy rainfalls, the nearby creeks and Spring tide. Community representatives also mentioned that with heavy rainfalls and floods there is an increase in the number of mosquitoes. Moreover, cyclones were also raised as being particularly problematic. They highlighted that TC Winston, which made a landfall in Viti Levu on the 20th of February 2016, had severely impacted the community in several ways. Among the impacts mentioned were damage to property, damage to crops and livestock. TC Evan and TC Harold were also raised as cyclones that had recently impacted the community.

18. 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

19. 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.

20. Government of Fiji. (2018). Climate Vulnerability Assessment – Making Fiji Climate Resilient.

21. Ibid

5 CLIMATE CHANGE AND FUTURE RISKS

5.1 CLIMATE CHANGE PROJECTIONS²²



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.



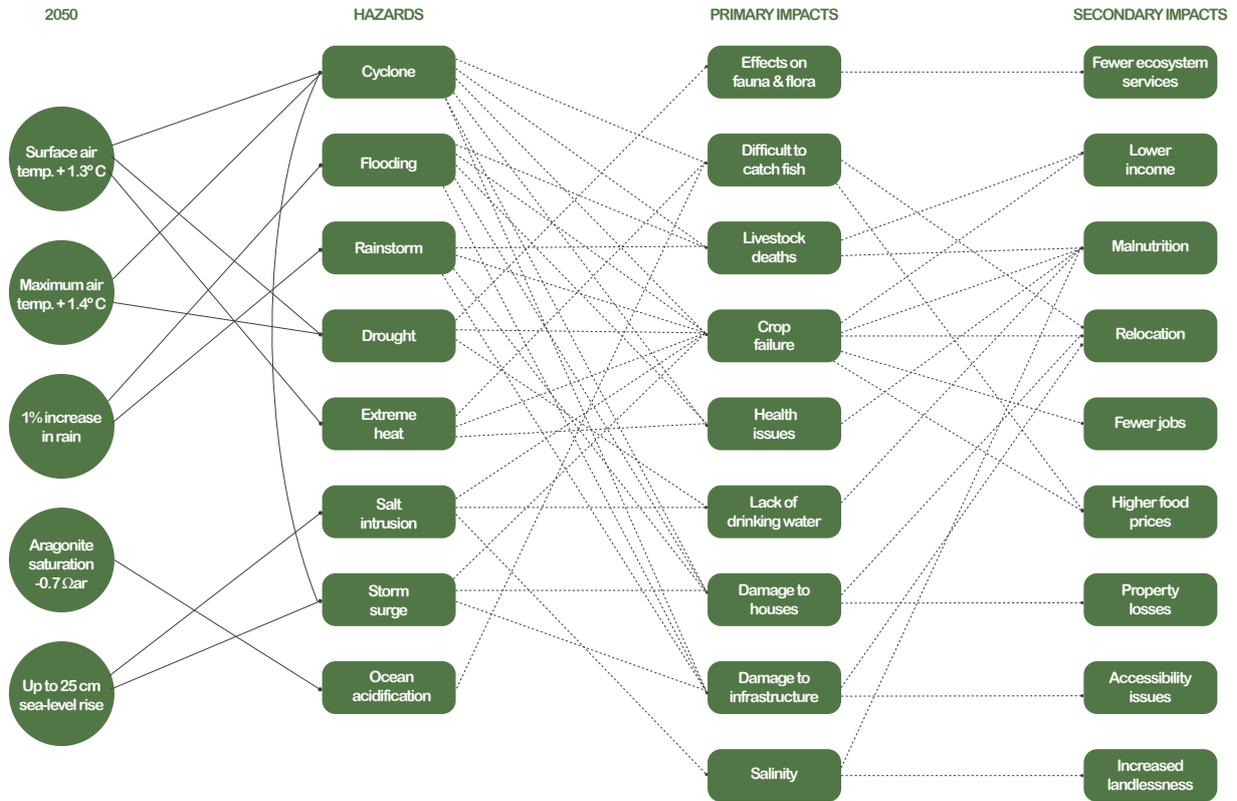
2090

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

²². Based on: PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.



Figure 3 Main hazards that affect California settlement and primary and secondary impacts^{23,24}



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

24. 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.



California settlement
UN-Habitat/Begoña Peiro

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)²⁵.

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:

Projections a wide range of change in annual rainfall, from increase to a decrease and with little change on the model average. Findings show that the effect of climate change on average rainfall may not be obvious in the short or medium term, due to natural variability, with year-to-year rainfall variability being generally larger than the projected change (except for models in the highest emission scenario by 2090).

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.

²⁵. PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.



The Western side of Viti Levu is the leeward region but now it has sudden heavy fall and cold season supposedly happen only in cyclone season.

Viliame, California resident
[No real names are used in this report]

Climate Change is an eye opener topic with my youth group in California settlement. We have seen drastic changes in the seasons in the leeward region of the country and we all do agree that we are mostly affected and more vulnerable to climate change. Occurrence of flash floods from cyclones and heavy rainfall in the settlement for the past 5 years has shown differ in weather and seasonal patterns and have many contributing factors affecting the people in the settlement. Now we get unexpected heavy rainfalls and flood height increases yearly and damages cost to the property also increases. Also, people who have employment get affected due to movement difficulties from their homes to the road as well for children missing out on school. Youths often share opinions in providing the safest environment for our settlement and get any opportunity as possible to enlighten us young minds in management and action plans in protecting lives and properties in the settlement. Recently, the youths came together in clearing up existing drains and digging up new ones to lessen the flood impacts in the settlement. This approach has definitely moved California youths to become activist for their settlement and bring more changes and developments in their livelihoods for a safer California settlement.

6 VULNERABILITY

California's vulnerability was assessed through three lenses:



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

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 efforts²⁶. 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 centers²⁷. Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities²⁸. Additionally, unequal participation in governance and political processes also limits women's ability to influence important processes and decision-making in areas relevant to climate and disaster risk management.

In California 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. Although all of the individuals aged 6 to 16 (corresponding to the age ranges between education years 1-12, compulsory in the country) have been reported as being involved in education programs, only two children under 6 were reported as being involved in education.

26. UN Women. (2014). *Climate change, Disaster and Gender-Based Violence in the Pacific*.

27. UN Women. (2013). *The 2012 Fiji Floods: Gender Sensitivity in Disaster Management*.

28. Government of The Republic of Fiji (GoF). (2017). *Climate Vulnerability Assessment*. Washington, D.C.: The World Bank Group.



Training in California settlement
UN-Habitat/Kamsin Raju

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 affected²⁹.

California occupies an approximate total area of 2.7 hectares and is located 200 m from a mangrove area along the coast. Its social, economic and natural systems are exposed to multiple hazards. Figure 3 shows the key elements and main hazards identified by community members during participatory workshops.

The areas marked in orange were reported as being affected by floods during disaster events such as TC Winston, TC Evan and TC Harold. Flood levels reached approximately one meter high. The areas marked in yellow were highlighted as being flooded regularly, when there is a combination of heavy precipitation and Spring tide. Water levels reach approximately 0.5 meters.

Figure 3 Hazard exposure map developed in participatory workshops

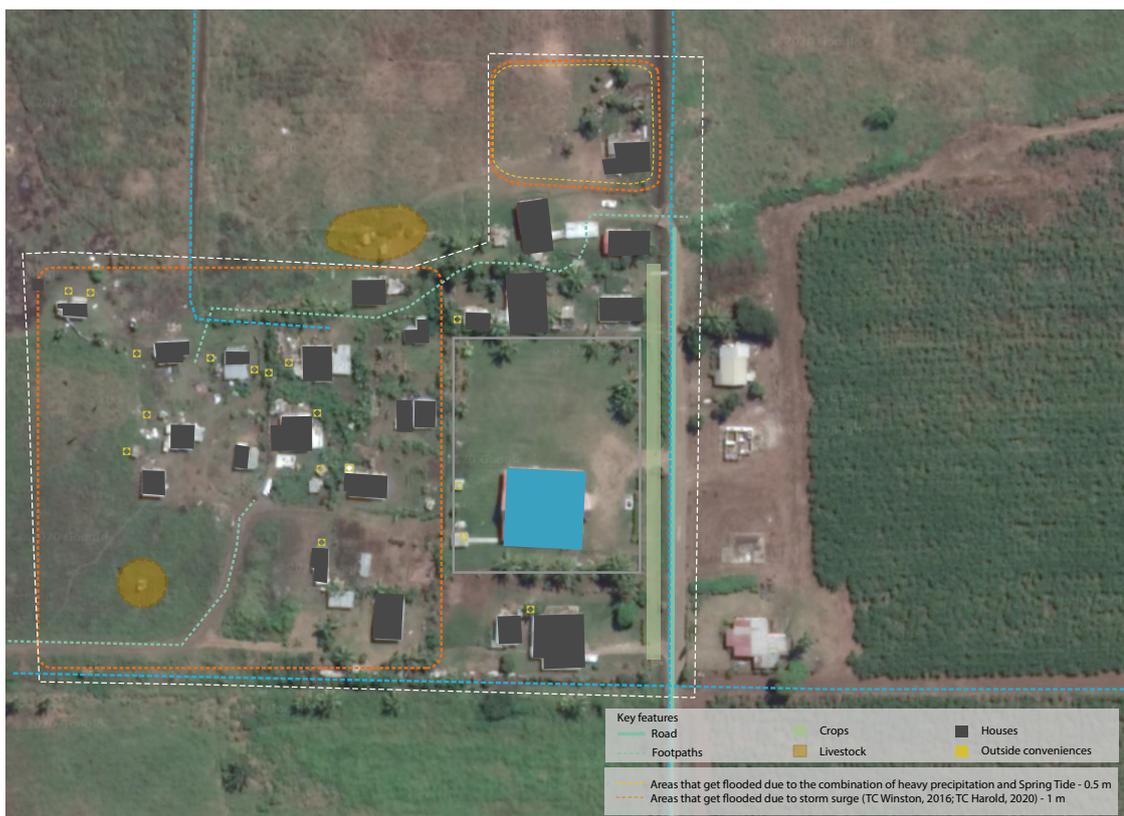
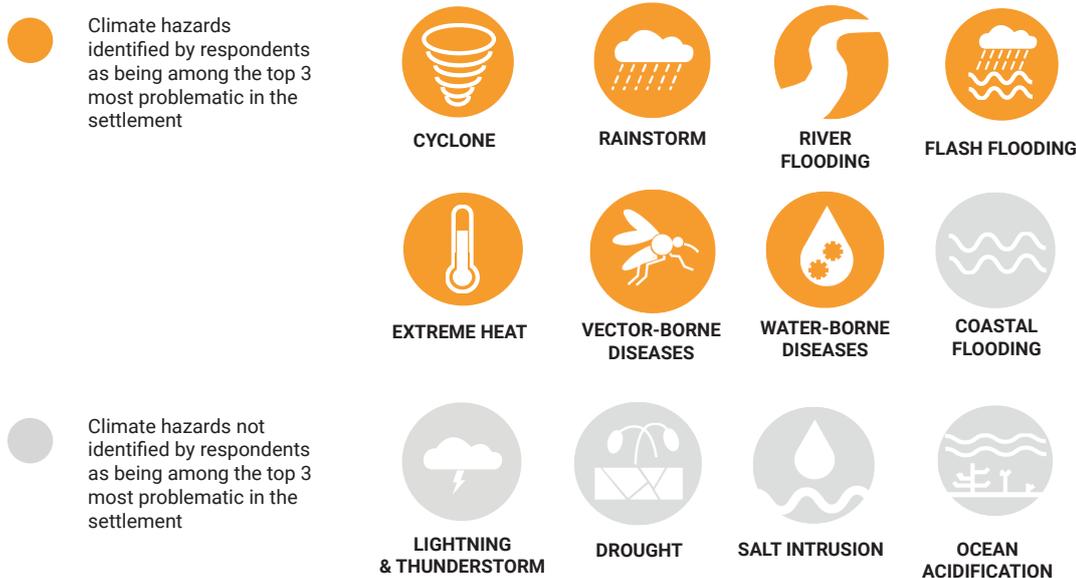


Figure 4 shows the hazards that were highlighted by respondents as being amongst the three most problematic hazards for their household. While these represent the hazards that residents perceive as being problematic based on their experiences, it does not mean that other hazards do not pose risks in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

²⁹. 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 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 change³⁰.

(i) Population

The dependency ratio in the settlement is 35.5, which is lower than the national dependency ratio of 54³¹. Young dependents make 93 per cent of the total dependents, while elderly people (aged over 65) make the other 7 per cent. There is only one person with disabilities living in California according to the information collected through the household survey

(ii) Urban Land Use & buildings

The town council is responsible for ensuring that buildings are compliant with the building code. However, often, compliance is not checked in informal settlements. There are residential buildings in the settlement and one church, although it is not being used by residents of California. Most buildings have been constructed in light materials. Although some constructions show that residents have awareness of certain construction techniques that can reduce their risk to disasters (e.g., use of cyclone straps), the building conditions are overall poor making them highly vulnerable to disasters.

³⁰. 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
³¹. World Bank. (2019). Retrieved from: <https://data.worldbank.org/indicator/SP.POP.DPND?locations=FJ>

84%	94%	78%	83%	93%
of the houses have been built after 1990	of the houses have metal roofs. 39% were ranked as being in below average conditions.	of the houses are built with metal exterior walls, 11% of wood and 11% of tarp.	of the houses are on stilts, with most being built of wood.	of the stilts are less than 1m off the ground.

(iii) Natural Resource-based Production

Communities often depend on crops, fish, prawns, crabs and shellfish for their livelihoods. In California, 61 per cent of the surveyed households indicated that they grew crops, mainly for subsistence purposes. Only 17 per cent of the households rear livestock (e.g., chicken, pigs, ducks), mostly for commercial purposes (67 per cent), with a lower percentage of households (33 per cent) rearing livestock for subsistence purposes. Lastly, there is a small proportion of the households (11 per cent) that fish.

During the FGDs, community representatives highlighted how floods and cyclones impact their crops and fishing. Moreover, they mentioned that they have noticed a decrease in fish stock during the past years. Coral bleaching and ocean acidification represent a threat to the availability of fish and projections show that aragonite saturation has declined since the late 18th century in the region and is projected to progress to marginal conditions around 2030. This would exacerbate the pressure on availability of fishing stock and other marine products. Although the proportion of households relying on livestock for food is small, community representatives mentioned how the lack of access to electricity and food refrigeration options are among the main challenges being faced. Heat stress was highlighted among the climate-related issues affecting livestock during the FGD, as participants reported livestock casualties during heatwaves and extremely hot days.

(iv) Critical Point Facilities & Infrastructure

The settlement is located next 450 meters from King's Road, one of Fiji's major throughways. 94 per cent of the surveyed households highlighted accessibility to the settlement as the most positive aspects of living in California. The bus stop is located on Queen's road next to the access road that leads to Vunato settlement approximately 1.1 kilometers away from California settlement. Among the main issues in California are accessibility across the settlement. There is an access road that reaches the settlement, but vehicles cannot circulate within the settlement. There is not a continuous footpath network that provides adequate pedestrian routes for community members to walk around and reach their houses. During heavy rainfalls and flooding events this is particularly problematic.

There is a church located within the settlement's boundaries although it is not being used by community members. In 2018 a fence was built around it, and community representatives explained that this fence has had impacts on their community because those houses that are located behind the church have more difficulties reaching the road. Despite the church not being used as evacuation center in the last year, the community still has access to an evacuation center (Lautoka Primary School, located 1.7 kilometers away).

(v) Lifeline Utilities

The settlement has access to services provided by several entities in Fiji (e.g., water, electricity, etc.). All the households in the settlement reported having access to water supply provided by the Fiji Water Authority (FWA). With regards to sanitation, all the households reported having access to a facility. 56 per cent of the households are sharing these facilities with members from other households. Although there is a sewerage network at the town level, the settlement is not connected to it. 44 per cent of the households said they are connected to a septic tank. The rest are connected to pits, drums and to a bio digester.

California is located less than a kilometer away from Lautoka's landfill. Many residents are waste pickers and carry waste into the settlement in order to sort it out, store it and sell it. Plastic bottles are among the items that can be sold back to private companies. Residents pile up waste in different areas, but often, the parts that are not sold remain. From plastic bottles, small containers to larger pieces of metal. This does not only pose health risks but is dangerous, particularly for children who walk or play around.

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 consequences³².

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. In this report the unit considered for the analysis is the household³³.

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 California.

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.

The survey collected data related to the access to information on climate change and disasters, with many respondents indicating that they have access to information on climate change. This is often either through technology (including radio, television, etc.) (8 households), or through social media (6 households). However, 7 households (36 per cent) mentioned that they do not have any access to information on climate change and disasters.

With regards to disaster preparedness, most of the households reported having access to early warning systems (EWS). 15 households (78 per cent) mentioned access through the radio, 12 households (63 per cent) through SMS alerts and 8 households (42 per cent) through community notification systems. Nine households (47 per cent) responded that they have an evacuation plan. None of the households reported being connected to a formal DRR network, and two households said that they do not have access to any of the above.

³². 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

³³. UN-Habitat, 2014. Planning for Climate Change.

44%

of the households reported not having access to any social protection programs

36%

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

17%

of the households reported access to the food voucher program, and 36% to the poverty

6%

of the households mentioned having access to the social pension

(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 institutions³⁴.

Information on the collective capacity at the settlement level was collected from workshops organized with community members and through the household survey. There is a lack of financial capital at the community-level, as there are no collective savings groups or systems in place. Each individual household relies on their own resources to address impacts, and as already mentioned above, these are limited.

In terms of early warning systems, evacuation routes and disaster management committees in the settlement, most households reported having access to early warning systems (either through radio or SMS). Over half of the households reported having an evacuation plan. The community is not connected to a formal DRR network. However, the City Council has warned settlers in the past making announcements with hailers while driving through the settlements. The evacuation center that residents from California go to during disaster events is the Lautoka Primary School, located 1.7 kilometers away. Among the concerns expressed by participants during FGDs are the fact that they are not provided transport to go to the evacuation center and that there is no food provided, forcing them to cater for themselves without access to facilities to cook or being able to buy food.

Material resources, infrastructure and access to services are very limited in the settlement. With only one access road leading to the settlement, transportation may easily be disrupted during an extreme event. The lack of access to water is among the most pressing issues, as highlighted by many residents. Additionally, there is a great need for safe construction trainings to improve the skill levels of community residents, as houses are most of the times built by family members.

There are community leadership structures in place community (e.g. established community leader, community groups, etc.) that have been effective following past disaster events. These structures are functioning, and carry out activities such as the organization of regular meetings to discuss community matters, small fund-raising activities, etc. There have been other organizations that have provided support to the community in the past, such as Friends and Punjas.

(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)³⁵.

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.

³⁴. UN-Habitat, 2014. Planning for Climate Change.

³⁵. Ibid

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 date. Given that informal settlements such as Vunikavika 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.



House being built in California settlement
UN-Habitat/Begoña Peiro

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 SDGs³⁶. 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 (NAP)³⁷ 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).

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 continuous 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

³⁶. Ministry of Economy, Republic of Fiji, (2019). National Climate Change Policy 2018-2030.

³⁷. 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

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. The next steps of the project include further developing the priority actions for their implementation. This will be done in a participatory manner and will involve technical experts (e.g., engineers, architects, etc.), representatives from the Ministry of Housing and Community Development as well as from the local government with support from UN-Habitat.

PRIORITIZED OPTIONS	SDG CO-BENEFITS	COMMUNITY RANKING
Interventions in physical, natural and social assets		
Construction of an adequate stormwater drainage network	 	1
Construction of adequate footpaths across the community	 	2
Improved sanitation facilities (resilient to floods)	 	3
Covered meeting space (for California and Veidogo settlement)	 	4
Waste containers (composting bins and waste segregation)	  	5
Trainings and awareness raising		
Training on waste management following a participatory approach that identifies opportunities linked to livelihoods	  	2
Trainings on safe construction for hazard proof shelters for low-income residents	 	3
WASH trainings that target adults and children	 	1
Disaster preparedness and response related activities	 	5
Training on financial literacy and social protection programs	 	4

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.
- Awareness raising and trainings on maintenance requirements of composting bins.

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.

OPTIONS	SDG CO-BENEFITS	EASE OF IMPLEMENTATION	URGENCY	COST	TOTAL
Population key area					
Community involvement in elimination of larval habitats (through clean up campaigns and awareness raising)	 	2	2	3	7
WASH trainings that target adults and children	  	2	3	3	8
Awareness raising campaigns that promote more sustainable options to solid waste management	 	2	3	2	7
Training on waste management following a participatory approach that identifies opportunities linked to livelihood options	  	2	3	3	8
Trainings on safe construction for low-income residents	 	2	3	3	8
Incorporating informal settlement areas to be covered by relevant authorities (including compliance with building codes)	  	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	 	2	2	3	7
Low-cost retrofitting to strengthen existing household structures, especially roofs	 	1	3	1	4
Identify financial support options and promote informal settlements upgrading and regularization of land tenure	 	1	3	2	6
Localized interventions to improve the housing conditions of those structures that are identified as being in the worst conditions	  	2	2	3	7
Set up disaster management committees to discuss disaster preparedness and response regularly	 	3	3	3	9
Plan and define evacuation routes	 	3	3	3	9
Link community level early warning system to formal networks, city-wide disaster response communications technologies and procedures.	 	3	3	3	9
Evacuation drills	 	3	3	3	9
Reinforce existing governance structures at the community-level to ensure project ownership as the process progresses	 	3	3	3	9

- Interventions in physical, natural and social assets
- Trainings and awareness raising
- 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.

OPTIONS	SDG CO-BENEFITS	EASE OF IMPLEMENTATION	URGENCY	COST	TOTAL
Population key area					
Strengthen existing youth community groups and promote their participation project activities	 	3	3	3	9
Diffusion of assessment results to provide insights on the findings and promote further action		3	3	3	9
Urban land use					
Strengthening community engagement and participation in resilience planning processes	 	3	2	3	8
Formalization of land tenure, land subdivision and upgrading		1	2	1	4
Natural resource-based production					
Awareness raising and clean up campaigns to prevent ecosystem degradation	  	3	2	3	8
Provide alternative low-cost cooking technologies that will reduce the dependency on mangrove firewood	 	2	2	2	6
Provide adequate waste management options (including composting), as waste is currently being dumped by the community in the nearby surroundings	  	3	2	3	8
Trainings and awareness raising on sustainable fishing techniques and climate change impacts	  	2	2	3	7
Trainings and awareness raising on sustainable and climate-resilient agriculture techniques and crops	 	2	2	3	7
Critical point facilities					
Improvement of road conditions	 	1	2	2	5
Construction of an evacuation center	 	2	3	3	8
Lifeline utilities					
Rainwater harvesting tanks	  	2	2	3	7
Improved sanitation facilities	  	2	3	3	8
Construction of an adequate drainage network	 	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)



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