



Lautoka City, Fiji

Veidogo settlement

COMMUNITY-BASED VULNERABILITY ASSESSMENT AND ACTION PLAN



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

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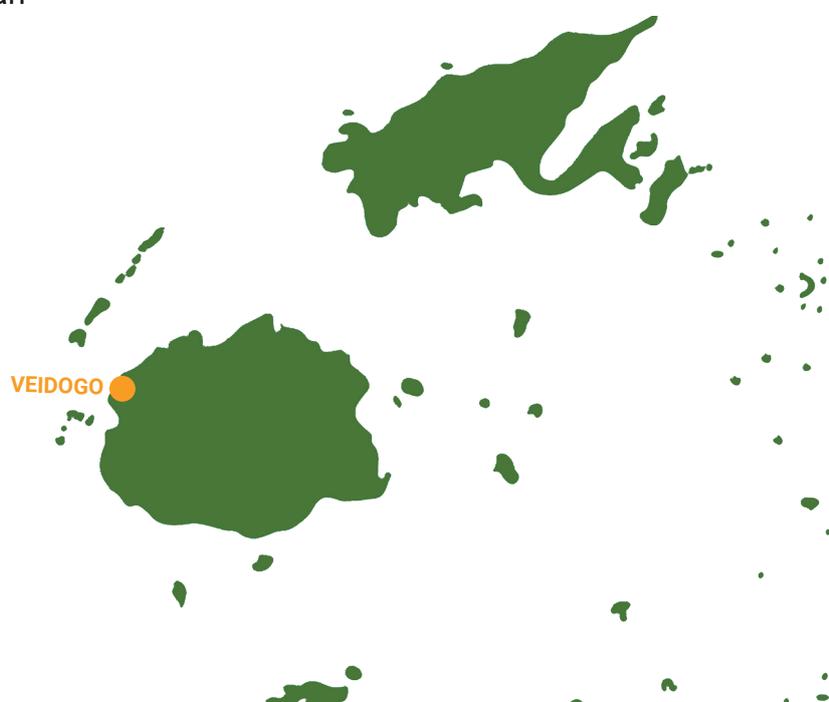
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1 INTRODUCTION

The Veidogo 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.

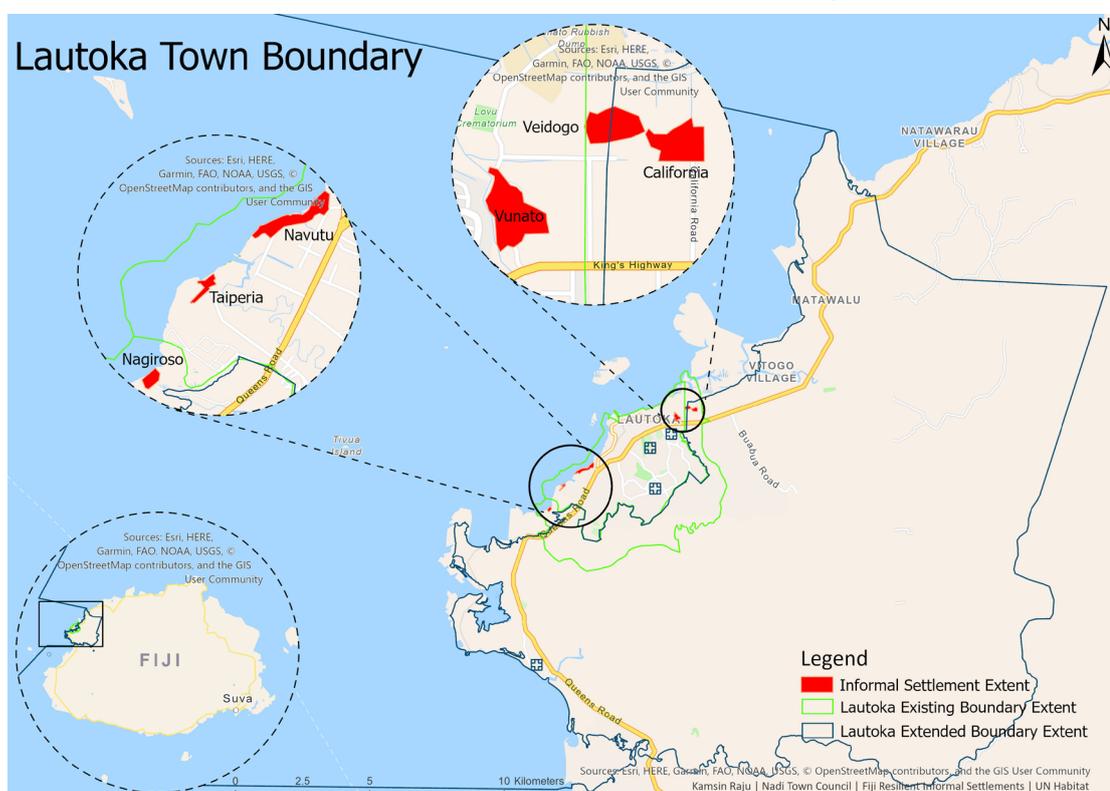
The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

The VA and CAP 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).

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 Veidogo¹



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 percent of the total land area and are also the most populous areas nationally². Fiji's total population is 884,887 people, approximately 55.9 percent 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 storm, flooding, landslide, drought and extreme temperature, earthquake, and tsunami. 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.

Veidogo 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 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 year. However, most of this growth can be attributed to the expansion of the city's boundaries¹⁰. Veidogo settlement is located approximately 3 kilometres west of the centre of Lautoka City, outside of the city boundary (Figure 1). It covers an area of approximately 27,750 square meters (2.775 hectares), and measures approximately 250 meters in length between its longest points and 145 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>

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 years¹¹. There has also been significant investment through the *Improvement of Key Services to Agriculture Project* to support sugar cane farmers in diversifying to horticultural crops¹². 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 Islands¹³.

House on stilts in Veidogo settlement
UN-Habitat/Begoña Peiro



11. Nadroga-Navosa Provincial Council, Sustainability Research Center at the University of the Sunshine Coast. (2017). The Human Face of the Sigatoka River Estuary. https://issuu.com/ecrg/docs/human_face_sigatoka_river_estuary

12. Food and Agriculture Organization of the United Nations (FAO). (2016). Country Profile – Fiji. <http://www.fao.org/3/ca0385en/CA0385EN.pdf>

13. 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 Veidogo, 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.

Sanitation pipe
UN-Habitat/Begoña Peiro



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.

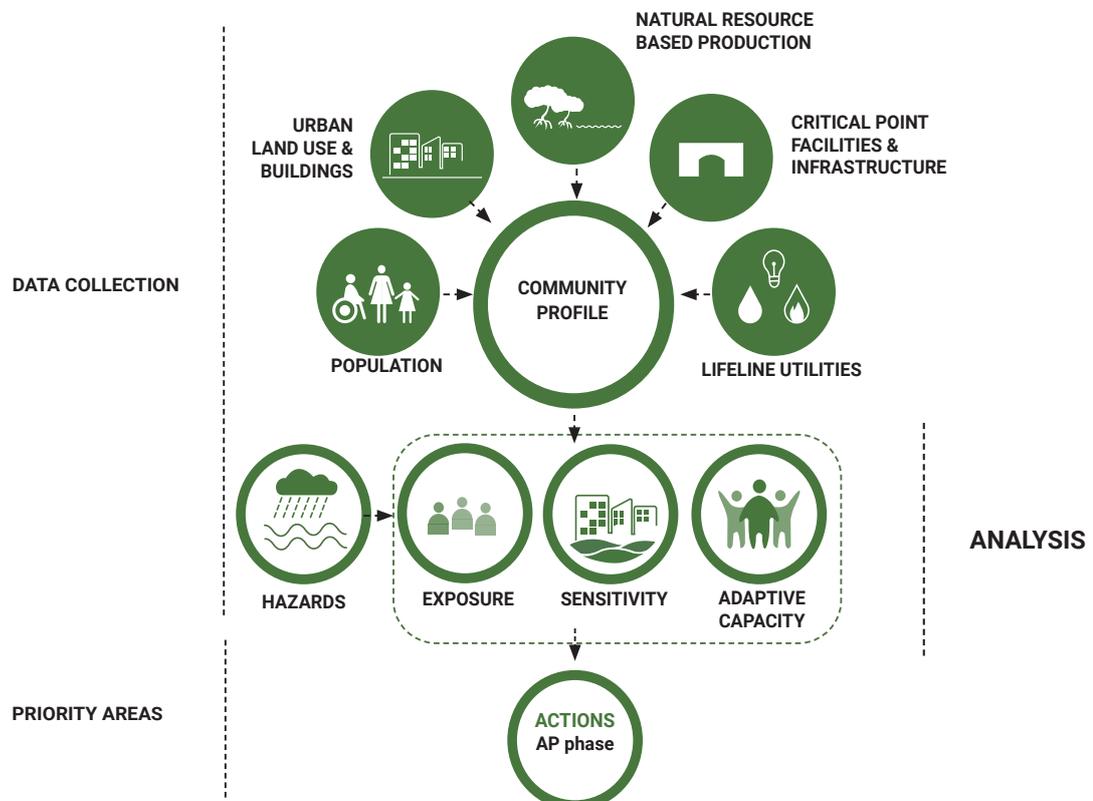
Community level data was collected around five key components: (i) **Population**; (ii) **Urban use**; (iii) **Natural resource-based production**, (iv) **Critical point facilities**; and (v) **Lifeline utilities**.

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

| | |
|---|--|
| <p>Primary data collection methods:</p> <ul style="list-style-type: none"> • Household survey (HHS)¹⁴ • Site visits and participatory mapping • Key Informant Interviews (KII) • VRA workshop | <p>Secondary data collection methods:</p> <ul style="list-style-type: none"> • Census • Reports on climate change projections • Spatial data available in GIS repositories |
|---|--|

Figure 2 Analytical Framework



14. 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 85 per cent of the households in Veidogo settlement. 28 households were surveyed, out of a total of 33 households that were identified in the settlement at the time when the HHS was carried out.

3 VEIDOGO SETTLEMENT

Veidogo settlement is located in the peri-urban area of Lautoka City, on the Western coast of Viti Levu. It is located next to California settlement and near to Vunato settlement, which are also part of the FRIS project. It is in a low-lying area close to the coast, and less than a kilometer away from Lautoka's landfill.

The total population based on the household survey conducted in Veidogo amounts to 175 people¹⁵, from which 87 are male and 88 are female. The total estimated population is 207 people¹⁶. In terms of age distribution, persons aged from 0 to 24 years old comprise over half of the population (60%). The youth age group (15-24) accounts for 18% and 42% of the population in the settlement is under 14 years old. Based on the data collected, there are no people aged over 65 in the settlement, and only one person within the 60-64 age range. Although the size of a household in Veidogo averages 6.3 persons, household sizes range from 3 to 12 people amongst those households surveyed.

¹⁵. 28 out of 33 households were surveyed.

¹⁶. For those households that were not surveyed the average size of household is used.

| | | | |
|------------|---|------------------------------|----------------------------|
| 35 | Total number of houses | 27.750 m ² | Total area within boundary |
| 33 | Total number of households | 2.310 m ² | Residential buildings area |
| 5 | Uninhabited buildings | 0 m ² | Civic buildings area |
| 207 | estimated people living in the settlement | 25.440 m ² | Open space area |



4 CLIMATIC FEATURES, HAZARDS, PERCEPTIONS

4.1 CLIMATIC FEATURES AND HAZARDS

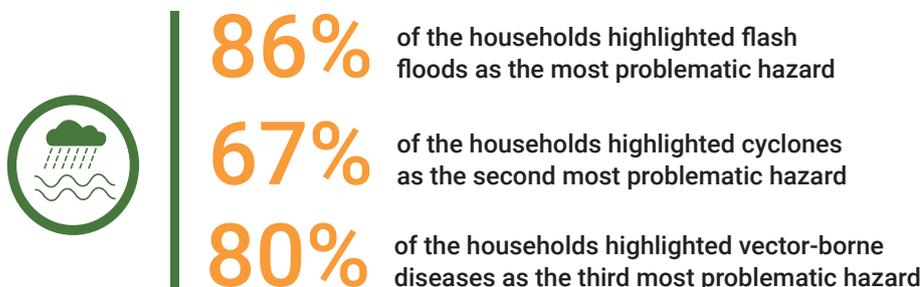
Fiji is generally considered to be an oceanic tropical marine climate¹⁷. There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October¹⁸.

Regarding climate variability, the major features driving climate in Fiji are¹⁹:

- **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 country²⁰.
- **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

Being located on a low-lying area near the coast, Veidogo's social, economic and natural systems are exposed to multiple hazards. Based on primary data collected on community, residents face key challenges due to a number of climate-related hazards, including cyclones, flash floods, extreme heat, vector-borne diseases, and water-borne diseases.



Flash floods were highlighted by all the households as being among the main issues in the settlement. Veidogo is located adjacent to California settlement, and 300 meters away from Vunato. All the households reported flash floods among as being among the top three hazards that affect them. Floods are associated with heavy rainfalls, coastal flooding and floods from the nearby creeks. It is the combination of heavy rainfall and Spring tide that community members highlighted as being most problematic, as well as floods during cyclone events. Community members reported that there was a major flood event in 2016 during TC Winston. Regarding flood levels, they said that these can go up to 1.3 meters during cyclones and up to approximately 1 meter when heavy rainfall is combined with Spring tide.

Participants identified TC Evan (2012), TC Winston (2016), and TC Harold (2020) as having impacted their community over the last years. 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. They mentioned that all the households in the community were affected by the cyclone.

17. 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

18. 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.

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

20. Ibid

5 CLIMATE CHANGE AND FUTURE RISKS

5.1 CLIMATE CHANGE PROJECTIONS²¹



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.



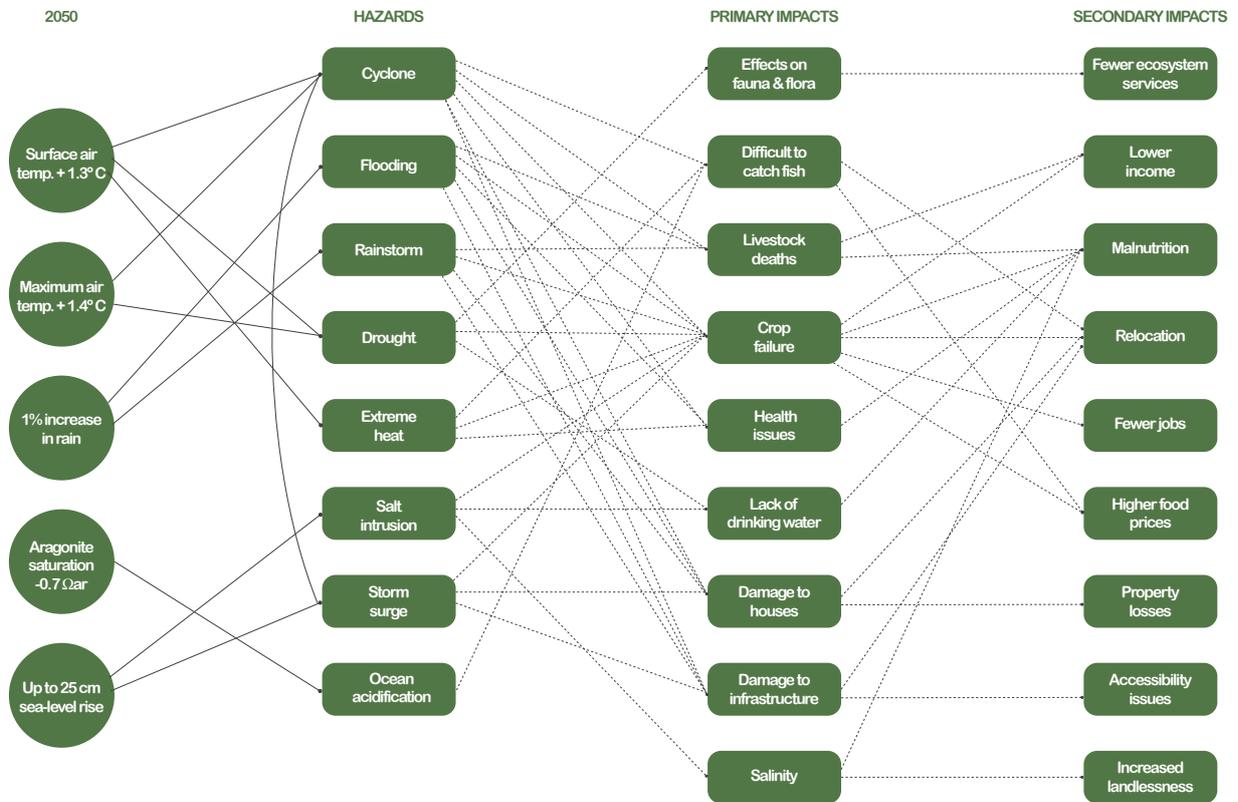
2090

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

²¹. 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 Veidogo settlement and primary and secondary impacts^{22,23}



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

23. 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)²⁴.

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

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

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.

²⁴. PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.

Sanitation facilities in Veidogo
UN-Habitat/Kolora Qativi



6 VULNERABILITY

Veidogo's vulnerability was assessed through three lenses:



6.1 VULNERABLE GROUPS

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 efforts²⁵. 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 centers²⁶. Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities²⁷. 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. Due to these social norms, the full potential of women to contribute to increasing the capacity of their communities to manage climate and disaster risk is often not reached.

In Veidogo settlement, just like in California settlement and other nearby settlements, 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, children under 6 have limited access to early childhood facilities, as these are located outside of the settlement. Only four children under 6 were reported as being involved in education. This means that members of families with children under 6 often assume the role of caretakers. Often, female members of the household take this role.

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

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

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

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 affected²⁸.

Veidogo occupies an approximate total area of 2.775 hectares and is located 130 meters 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 based on their perceptions. Participants explained how the settlement is affected by heavy precipitation and that the combination of heavy precipitation with Spring Tide often leads to greater issues. They distinguished between three different areas. The area marked in light yellow is affected by heavy precipitation, and flood levels in the past have reached up to 0.3 meters approximately. The area marked in yellow was identified as being affected by the combination of heavy precipitation and Spring Tide, with flood levels having reached approximately 0.7 meters in the past. Lastly, the area marked in orange was identified as the area that is affected the most by floods. Based on their inputs, flood levels have reached up to a meter.

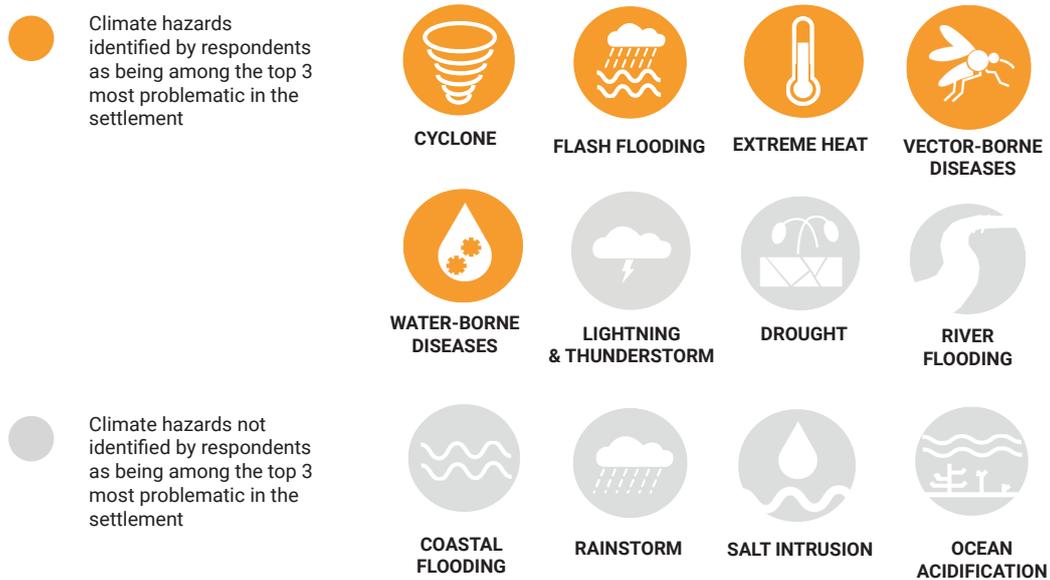
Figure 3 Hazard exposure map developed in participatory workshops



Figure 4 shows the hazards that were highlighted by respondents as being amongst the three most problematic hazards for their household. While these 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.

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

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 change²⁹.

(i) Population

The dependency ratio in the settlement is 71.5, which is higher than the national dependency ratio of 54³⁰. Young dependents make 100 per cent of the total dependents, as there are no people in the settlement aged over 65. Most of the households (79 per cent) reported their main household income comes from wages. The rest mentioned sale of products (e.g., fish, handicrafts, crops, etc.) (7 per cent), and own business (14 per cent).

(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 only residential buildings in the settlement. Most of the houses are one storey high and are located on relatively flat terrain. All the buildings have been constructed with light materials (e.g. metal, wood, etc.), which are often reused and already in poor conditions when the houses are assembled.

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

69%

of the houses have been built after 1990

95%

of houses have metal roofs. 33% were ranked as being in below average conditions.

85%

of houses are built with metal exterior walls, 9% of wood and 3% of concrete blocks.

76%

Most houses are on stilts, with most being built of wood.

71%

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. Veidogo settlement is located just 130 meters away from a mangrove area. Mangroves not only provide coastal protection from waves and storm surges and prevent coastal erosion but are also an important source of food and wood. Additionally, mangroves are also used for firewood, dyes and medicines.

Being in an area with available open space for agricultural practices, the proportion of households that grow crops is high (71 per cent). Most of the households grow crops for subsistence purposes (85 per cent). Community representatives highlighted floods and salt intrusion as the main hazards impacting their crops. Only 21 per cent of the households rear livestock, mostly for semi-commercial purposes (83 per cent), with a lower percentage of households (17 per cent) rearing livestock for subsistence purposes. During the FGDs, community members mentioned that the community only owns pigs.

36 per cent of the households in Veidogo reported fishing regularly. 90 per cent fish for subsistence and the other 10 per cent for semi-commercial purposes (partly subsistence and partly for sale). During the FGDs, community members said that they fish both in the ocean and in the nearby creek next to Vunato settlement (Namoli creek), although they fish more often in the creek than in the ocean. The main fishing techniques used are the line, using nets, spear fishing and free diving (at night). Four fishing boats are owned by community members.

(iv) Critical Point Facilities & Infrastructure

The settlement is located close to King's Road and the access is relatively good given that the distance is short (560 meters). The last 140 meters of the road are unpaved, making it harder to reach the settlement at times of heavy precipitation. Footpaths in the settlement are not continuous and are in very poor conditions. As mentioned, flooding associated with heavy precipitation and Spring Tide is among the key issues mentioned by community members. The lack of adequate footpaths combined with these floods and standing water are highly concerning in Veidogo. Although community members have tried to find solutions such as using tires to form footpaths (Figure 63), these do not provide adequate accessibility (particularly to vulnerable groups).

(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. However, 82 per cent of the households are sharing these facilities with members from other households. With regards to wastewater, there is no network present in the settlement, but there is a network at the city level. Only 18 per cent of the facilities are connected to a septic tank. Those households that are not connected to a septic tank, are mostly connected to pits (62 per cent) or drums (38 per cent). 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 particularly concerning in Veidogo settlement, where sanitation facilities are in very poor conditions.

There is no garbage collection service provided by the city council in Veidogo. Most households (54 per cent) reported burning their household waste and the rest dumping it in the nearby surroundings. Veidogo is located less than a kilometer away from Lautoka's landfill. Many residents in Veidogo, similarly to California and Vunato settlements, 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. During floods the waste spreads around the settlement with the consequent risks, and also damaging the environment.

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 consequences³¹.

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' adaptation³². 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 Veidogo.

The Department of Social Welfare, under the Ministry of Women, Children and Poverty Alleviation (MWCOPA) 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. Many respondents indicated that they have access to information on climate change, either through technology (including radio, television, etc.) (16 households), or through social media (3 households). Only one household mentioned having been involved in trainings. However, 12 households said that they do not have any access to information.

With regards to disaster preparedness, most of the households reported having access to early warning systems (EWS). 24 households (86 per cent) mentioned access through the radio, 17 households (61 per cent) through SMS alerts and one household (4 per cent) through community notification systems. Only one household (4 per cent) responded that they have an evacuation plan. None of the households reported being connected to a formal DRR network, and three households said that they do not have access to any of the above.

31. 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

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

57%

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

11%

of the households reported access to the food voucher program, and 7% to the poverty benefit scheme

0%

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 institutions³³.

Information on the collective capacity at the settlement level was collected from workshops organized with community members and through the household survey.

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). However, the community is not connected to a formal DRR network and there are no formal evacuation plans in place. The evacuation center assigned to Veidogo is the Lautoka Primary School. During FGDs, participants expressed some concerns related to the evacuation center, including that there is no transportation nor food provided.

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. Nevertheless, the distance to King's Road is relatively short. 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. According to the surveys, the main concerns regarding disaster impacts are related to the loss of property. The improvement of the housing stock and retrofitting to make it climate-resilient to hazards such as floods and cyclones could greatly benefit community members and help minimize property losses.

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.

(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)³⁴.

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.

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

³⁴. 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 Veidogo 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.

Sanitation facilities in Veidogo
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 SDGs³⁵. 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 Plan³⁶ (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).

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

³⁵. Ministry of Economy, Republic of Fiji, (2019). National Climate Change Policy 2018-2030.

³⁶. 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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