



Lautoka City, Fiji

Naqiroso settlement

COMMUNITY-BASED VULNERABILITY ASSESSMENT AND ACTION PLAN



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

Copyright © United Nations Human Settlements Programme (UN-Habitat), Government of Fiji.

Coordinators:

Bernhard Barth, Inga Korte.

Authors:

Begoña Peiró, Sara Vargues.

Contributors:

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

Design and Layout:

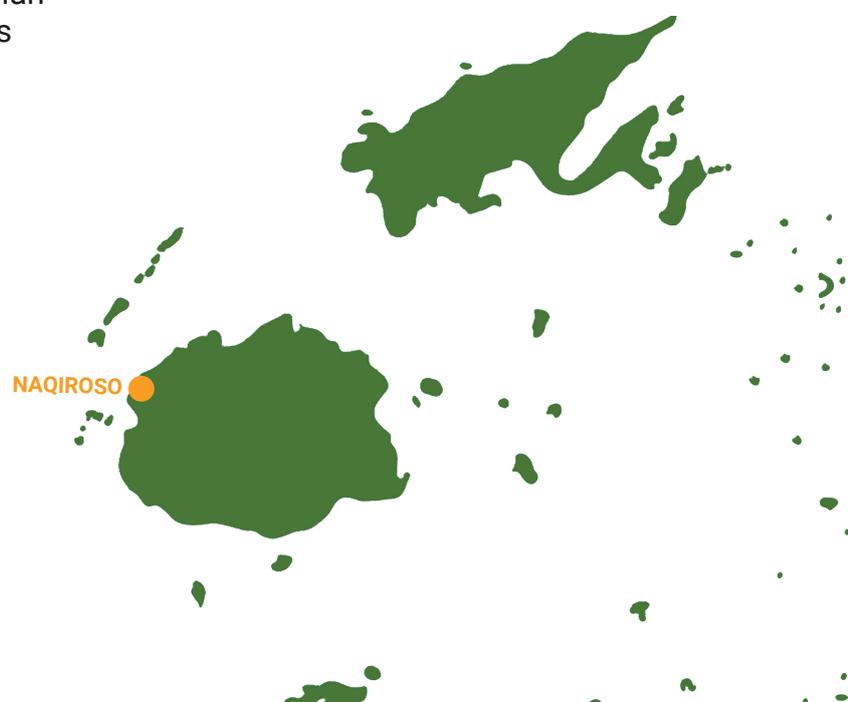
Lydia Ogden, Marion Reinoso, Begoña Peiro

Citation:

Peiró, B.; Vargues, S.: Naqiroso Settlement (Fiji) Community-Based Vulnerability Assessment and Climate Action Plan (Abridged Version). UN-Habitat, Government of Fiji, 2022.

CONTENTS

1. Introduction	Page 5
1.1 Location and Physical Details	
1.2 Purpose of the Vulnerability Assessment and Action Plan	
2. Methodology	Page 8
3. Naqiroso Settlement	Page 9
4. Climate Hazards and Perceptions	Page 11
4.1 Climatic features and hazards	
4.2 Community perceptions of key impacts	
5. Climate Change and Future Risks	Page 12
5.1 Climate Change Projections	
5.2 Extreme climate events future risk	
6. Vulnerability	Page 15
6.1 Vulnerable groups: women, youth, elderly, people with disabilities	
6.2 Exposure	
6.3 Sensitivity	
6.4 Adaptative capacity	
7. Climate Action Planning	Page 22
7.1 Climate Resilience & The SDGs	
7.2 Alignment to Fiji's National Plan	
7.3 Prioritized shortlisted actions	





Workshop in Naqiroso
UN-Habitat/Sara Vargues

1 INTRODUCTION

The Naqiroso 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.

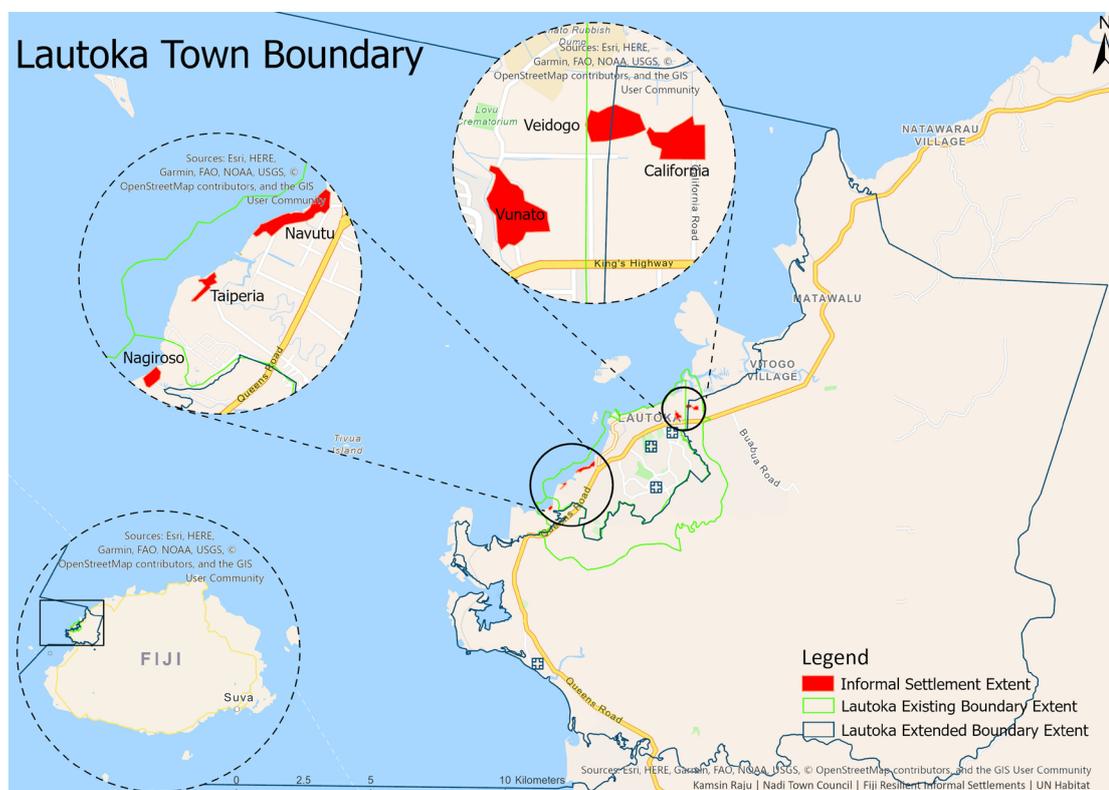
The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

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 Naqiroso¹



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.

Naqiroso settlement is located approximately 5.5 km south-east of the centre of Lautoka City, outside of the city boundary. Lautoka City is a coastal city located in the west coast of Viti Levu, at 24 kilometers north from 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 year¹⁰. However, most of this growth can be attributed to the expansion of the city's boundaries¹¹.

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/TropicalCyclone.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. Retrieved from: <http://www.citypopulation.de/Fiji.html>

11. Fiji Bureau of Statistics (2018) 2017 Population and Housing Census, Release 1

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 Naqiroso, 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.

House in Naqiroso settlement
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**.

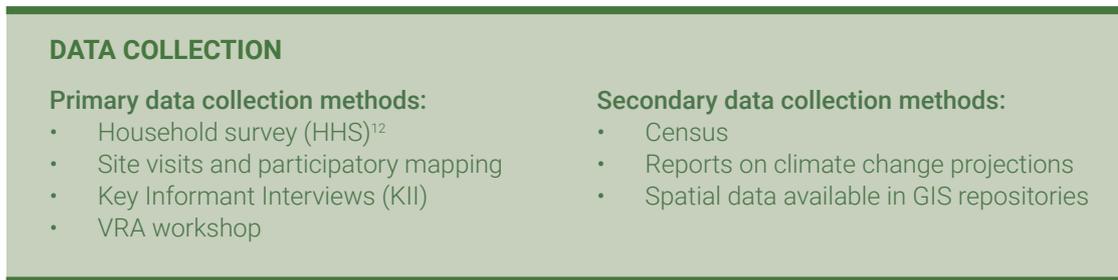
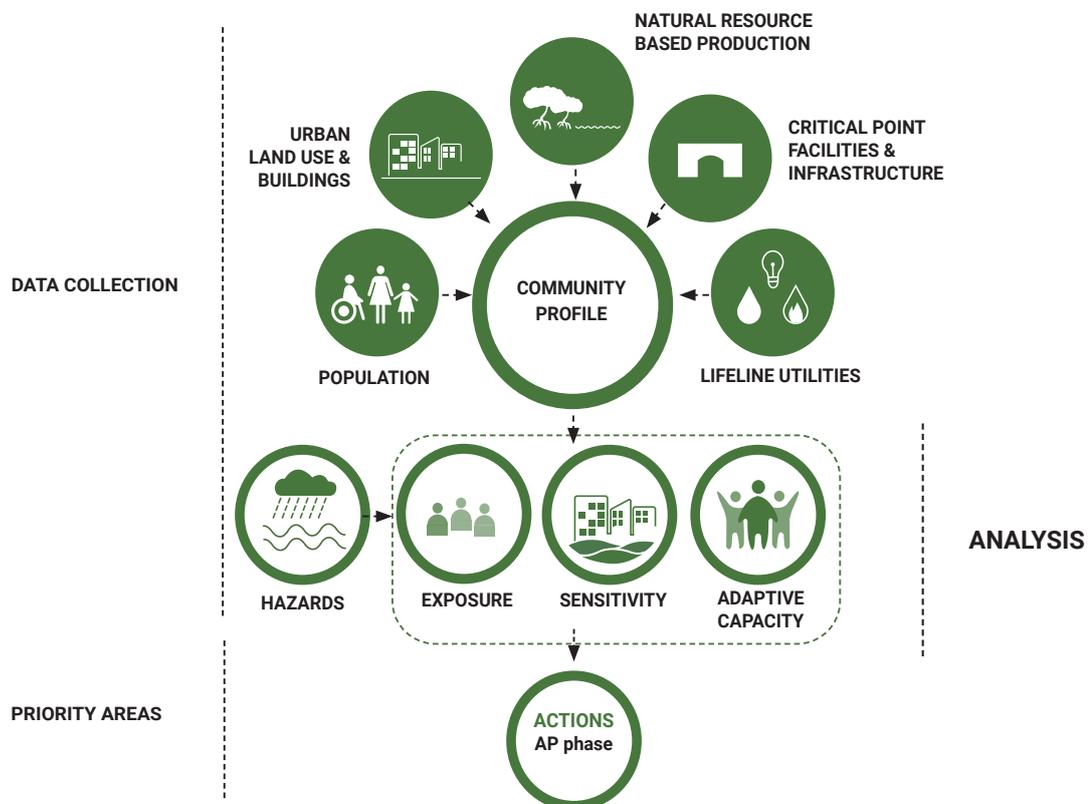


Figure 2 Analytical Framework



12. 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 93 per cent of the households in Naqiroso settlement. A total of 14 households were identified in the settlement at the time when the HHS was carried out, and 13 of these were surveyed

3 NAQIROSO SETTLEMENT

Naqiroso is a small settlement with 14 households, which is located along the coast in a mangrove area and between two creeks. Naqiroso settlement covers an area of approximately 5 hectares. It measures approximately 405 meters in length between its longest points and 180 meters in width. The settlement is located approximately one kilometer away from Queen's road, and is connected through an unpaved road. Residents in Naqiroso have no formal land tenure arrangements, very limited access to water supply, no access to electricity, poor sanitation and housing conditions, and limited access to risk-reducing infrastructure.

The total surveyed population amounts to 91 people, from which 48 are male and 43 are female¹³. The total population in Naqiroso is estimated at 99 people¹⁴. In terms of age distribution, persons aged from 0 to 24 years old represent more than half (52 per cent) of the total population. The youth age group (15-24) accounts 18 per cent of the total population and 34 per cent of the population in the settlement is under 14 years old. There is a total of four people aged over 75, and another two within the 70-74 age range. 55 per cent of the surveyed households reported having lived between 31 and 40 years in the settlement and 9 per cent less than a year. The average size of household in Naqiroso is 7 persons, however this ranges from 3 to 12 people amongst those households surveyed.

¹³. 13 out of 14 households were surveyed.

¹⁴. For the household that was not surveyed the average size of household is used.

14	Total number of houses	49.871 m ²	Total area within boundary
14	Total number of households	1.058 m ²	Residential buildings area
0	Uninhabited buildings	540 m ²	Civic buildings area
98	estimated people living in the settlement	28.507 m ²	Open space area





ACCESS TO THE SETTLEMENT



UNPAVED ROAD



SANITATION FACILITIES



HOUSING



HOUSING



COOKING FACILITIES

4 CLIMATIC FEATURES, HAZARDS, PERCEPTIONS

4.1 CLIMATIC FEATURES AND HAZARDS

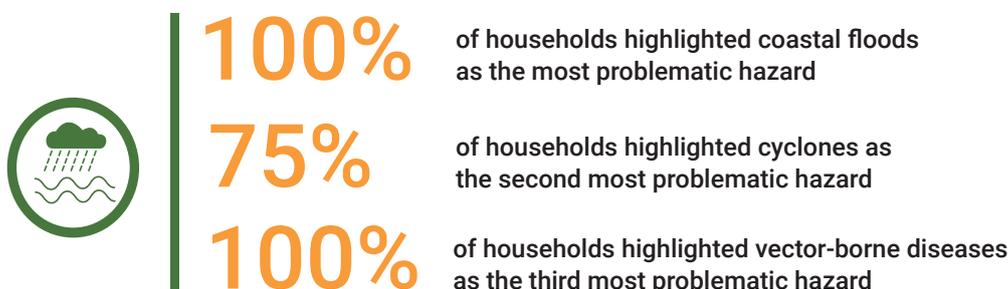
Fiji is generally considered to be an oceanic tropical marine climate¹⁵. There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October¹⁶.

Regarding climate variability, the major features driving climate in Fiji are¹⁷:

- **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 country¹⁸.
- **The trade winds** bring orographic rainfall to the eastern parts of the country. Around 70% of the national annual average rainfall occurred during the wet season (over the period from 1961 to 2010).

4.2 COMMUNITY PERCEPTIONS OF KEY IMPACTS

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



Floods are among the hazards with the highest impacts in the country. The main concerns expressed by community representatives of during the Focal Group Discussions (FGDs) were related to coastal and river floods. They mentioned that the combination of Spring tide and heavy precipitation affects the settlement, leading to floods of approximately half a meter high. Based on their perception, land has already been lost due to sea level rise and they are concerned that coastal flooding will become more severe.

During the FGDs, community representatives identified the main cyclones that affected them in the past, these include: TC Evan (2012), TC Winston (2016) and TC Harold (2020), of which the latter was the most severe. Participants highlighted the storm surge during TC Harold caused flooding of up to one meter high, damaged all houses and resulted in the loss of all crops and livestock. Also during the other identified cyclones damage to houses and loss of crops and livestock was observed. Community members also expressed concerns about prolonged periods without rain becoming longer, which is particularly problematic for them given the limited access to water supply. Moreover, the increase in temperatures and in number of extremely hot days during the dry season was also raised as an issue.

15. 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

16. 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.

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

18. Ibid

5 CLIMATE CHANGE AND FUTURE RISKS

5.1 CLIMATE CHANGE PROJECTIONS¹⁸



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.



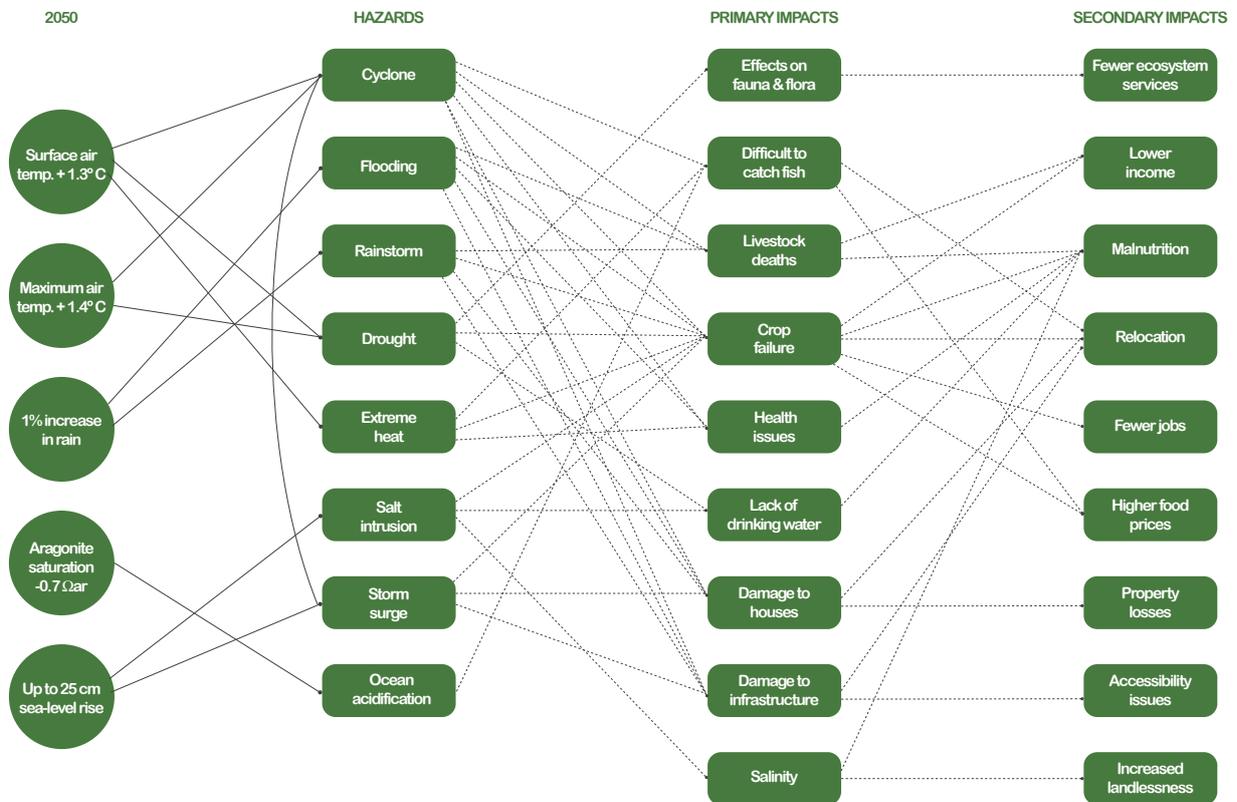
2090

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

¹⁸. 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 Naqiroso settlement and primary and secondary impacts^{19,20}



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

20. Surface air temperatures in the Pacific are closely related to sea-surface temperatures (SST), so the projected changes to air temperature can be used as a guide to the expected changes to SST.



5.2 EXTREME CLIMATE EVENTS FUTURE RISK

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

Cyclones:

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

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.

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



6 VULNERABILITY

Naqiroso'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 efforts²². 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 centers²³. Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities²⁴. 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 Naqiroso, recurrent flood events have impacts on residents' health, with large cumulative impacts on children who can be deprived of access to school. The road that serves as an access to the settlement is unpaved and is flooded on a daily basis, as it is located next to a mangrove area. There are periods when the community does not allow cars to access the settlement. The closest facilities such as primary schools, health centers and evacuation centers are located at distances that vary between three to eight kilometers. This combined with the challenges associated with the access road makes it challenging for children and caretakers to reach these facilities. Moreover, although all individuals aged 6-16 were reported being involved in education programmes, children under the age of 6 have limited access to early childhood facilities. This means that members of families with children under 6 often must assume the role of caretakers, particularly female members.

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

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

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

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 affected²⁵.

Naqiroso occupies an approximate total area of 5 hectares and is located next to 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 map shows the two creeks that are located near the settlement as well as the mangrove areas that surround it. The areas marked in yellow and orange were reported as being affected by floods, with those being marked in yellow reaching water levels of approximately 0.3 meters and those in orange 0.7 meters.

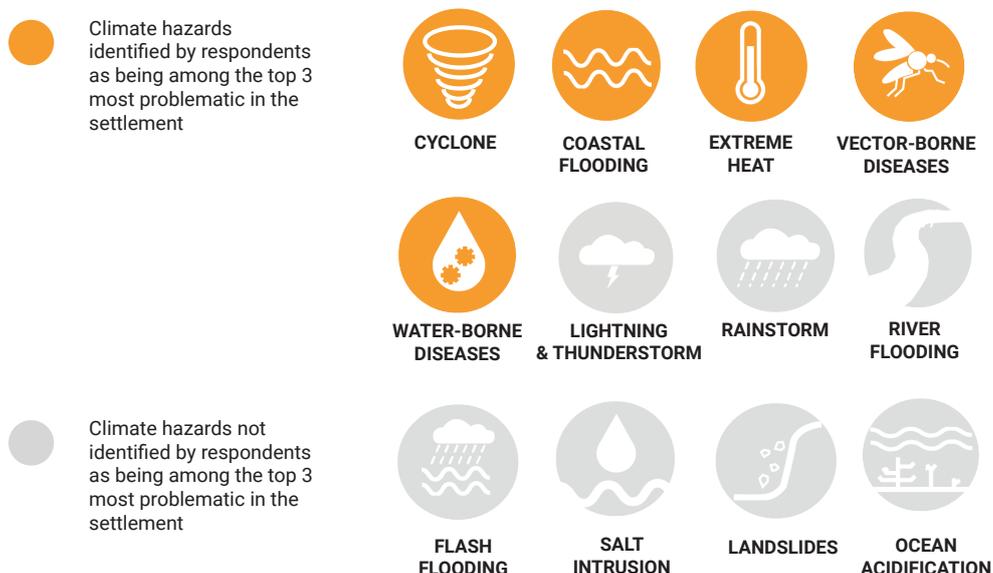
Figure 3 Hazard exposure map developed in participatory workshops



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

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

Figure 4 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 change²⁶.

(i) Population

The dependency rate in the settlement is 65.5 per cent, which is above the national average of 54 per cent²⁷. Young dependents make up 83 per cent of the total dependents, whilst elderly people (aged over 65) make up the remaining 17 per cent. 60 per cent of young people (aged 15-24) in the settlement are either unemployed, or not in education or training. There are six people with disabilities living in Naqiroso 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 only residential buildings in the settlement, all of which are one storey high and are located on a flat terrain. 55 per cent of the houses in Naqiroso have been built between 1991 and 2000, and only 9 per cent were built before 1970. Most buildings have been constructed with light materials (e.g. metal, wood, etc.).

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

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

36%

of the houses have been built before 1990

92%

of the houses have metal roofs. 54% were ranked as being in below average conditions.

77%

of the houses are built with metal exterior walls and 23% of wood.

15%

of the houses are on wooden stilts.

100%

of the stilts are less than 0.5 m off the ground.

(iii) Natural Resource-based Production

Residents in Naqiroso rely on natural resources for food and livelihoods, as well as for protection. For example, mangroves provide coastal protection from waves and storm surges and prevent coastal erosion.

In Naqiroso, 92 per cent of the surveyed households indicated that they grew crops, entirely for subsistence purposes. During the FGDs, community representatives mentioned that they can produce enough for their own subsistence but there is not a significant amount left to sell. The main crops being harvested in the community are cassava, bananas, mango, coconuts, bread fruit and pineapple. From these, cassava is the only crop being sold when there is a surplus.

83 per cent of the households reported fishing frequently. During the FGDs, community members mentioned that productivity levels of the ocean products listed are unpredictable and could vary according to weather conditions. Cyclones (such as TC Harold) and floods were highlighted. Tropical cyclones affect marine ecosystems (e.g., reefs), including the abundance of fish and other organisms.

The proportion of households relying on livestock for food is relatively smaller (67 per cent). Community representatives mentioned that they either store food in their refrigerator or sell it, and also practice *ika vesa* (smoked fish) as a traditional technique for preserve food. Cyclones, floods and heavy rains were also mentioned as the key hazards affecting their livestock, and animal deaths were reported as the main impacts.

(iv) Critical Point Facilities & Infrastructure

Critical point facilities such as educational facilities, health facilities, local government buildings, community centers, bridges, roads, etc., provide key socio-economic support services. Naqiroso is located approximately one kilometer away from Queen's road, and is connected to it through an unpaved road. 38 per cent of the surveyed households highlighted accessibility of the access road to Naqiroso as their main concern. According to community representatives, heavy rainfalls and tidal floods affect the access road, directly impacting the ability of residents to evacuate the settlement during events such as cyclones. During the wet season, the community closes the road to motorized vehicles due to the very poor conditions associated with heavy rainfalls.

(v) Lifeline Utilities

The settlement has no access to services provided by several entities in Fiji (e.g., water, electricity, etc.), with the exception of two houses that have access to water supply (Figure 25). These two households reported having access to water supply provided by the Fiji Water Authority (FWA). In another two households, the water is piped into their yard, and the households that do not have piped water collect water from a neighbouring house through a hosepipe. Sensitivities related to drinking water access are mainly linked to the conditions of the water supply network, given that pipes are often exposed, which can lead to damages and leaks.

With regards to sanitation, all the households reported having access to a facility. 54 per cent of the households are sharing these facilities with members from other households. Although Lautoka City has a sewerage network, Naqiroso is not connected to it. A small proportion of households (23 per cent) are connected to a septic tank. From the households that are not connected to a septic tank, 70 per cent (7 households) dispose their wastewater into a pit and 30 per cent (3 households) into drums. Lautoka City Council provides garbage collection services within the town's boundaries.

Being located outside the town boundaries, Naqiroso settlement has no access to rubbish collection services. During FGDs, participants reported being affected by the solid waste coming from neighboring settlements during high tide. Community members mentioned that they organize cleaning campaigns to collect this waste, however, most of this rubbish is being burned or dumped into nearby surroundings.

There is no access to electricity supply network in Naqiroso settlement at the time when the survey was conducted. Consequently, none of the households were connected to a metered power source. Furthermore, there is a lack of access to clean and modern fuels and technologies for cooking, with a large proportion of households relying on fuelwood, kerosene and gas. "Fuel-stacking" is a common issue that has been identified in all the households. This is generally formed by a combination of either kerosene or gas with fuelwood. Among the impacts related to the use of inadequate cooking fuels are not only health issues, but also environmental pollution.

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 consequences²⁸.

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 household²⁹.

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 Naqiroso.

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.

Three households reported not having access to any of the abovementioned social protection programs. Seven households reported that at least one member in the household had access to the Free Bus Fare Program, making it the most commonly accessed program. Three households mentioned having access to the Social Pension Scheme program, two households to the Food Voucher Program and one household mentioned having access to the Poverty Benefit Scheme.

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

²⁹. UN-Habitat, 2014. Planning for Climate Change.

23%

households reported not having access to any social protection programs

54%

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

15%

household reported access to the food voucher program, and 8% to the poverty benefit scheme.

23%

households mentioned having access to the social pension scheme

(ii) Collective Capacity

Collective capacity is how well are communities, neighbourhoods or other groups able to respond and adapt to climate hazards without assistance from government or other agencies and institutions³⁰.

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.

The level of awareness and existing mechanisms of early warning systems, evacuation routes and disaster management committees in the settlement are higher in comparison to other informal settlements that are part of the FRIS project. During FGDs, a high number of households reported being connected to a formal DRR network and having a formal evacuation plan. Participants also explained that other than relying on EWSs through radio, SMS, etc., the Turaga-ni-Koro warns them after being informed by the District Officer. Lautoka Primary School is the evacuation centre being assigned to Naqirosa's residents, however, transportation has been identified as one of the main challenges to access the evacuation centre. Community members reported that they have not ever gone to any evacuation centre during past extreme events.

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 lifeline utilities (electricity, water, etc.) is among the most pressing issues, as highlighted by many residents.

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 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)³¹.

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

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

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

³⁰. UN-Habitat, 2014. Planning for Climate Change.

³¹. Ibid

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 Naqiroso 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 in Naqiroso
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 SDGs³². 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)³³ 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 support and technical feasibility. This work forms the basis for the selection of options that

³². Ministry of Economy, Republic of Fiji, (2019). National Climate Change Policy 2018-2030.

³³. Government of the Republic of Fiji, (2018). Republic of Fiji. National Adaptation Plan. A pathway towards climate resilience. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Parties/National%20Adaptation%20Plan_Fiji.pdf

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 evacuation center (which also serves as a community hall)	 	4
Improvement of the access to the settlement	 	1
Rainwater harvesting tanks	 	3
Improved sanitation facilities (resilient to floods)	 	2
Coastal protection	 	5
Storage units for livelihood materials	 	6
Trainings and awareness raising		
Training on waste management following a participatory approach that identifies opportunities linked to livelihoods	  	3
Trainings on safe construction for hazard proof shelters for low-income residents	 	1
WASH trainings that target adults and children	 	4
Disaster preparedness and response related activities	 	5
Training on financial literacy and social protection programs	 	6
Community involvement in elimination of larval habitats (through clean up campaigns and awareness raising)	 	2

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 rainwater harvesting tanks.

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	3	3	8
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, 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 the access to the settlement	 	2	3	3	8
Construction of an evacuation center (which also serves as a community hall)	 	2	3	3	8
Coastal protection		2	3	3	8
Storage units for livelihood materials	 	2	3	3	8
Lifeline utilities					
Improved access to piped water supply	  	1	3	2	6

<ul style="list-style-type: none"> Interventions in physical, natural and social assets Trainings and awareness raising activities Activities that support the project implementation 	<p>These actions were identified as part of the long-list of adaptive measures, and were short-listed for further prioritization.</p>
--	---

OPTIONS	SDG CO-BENEFITS	EASE OF IMPLEMENTATION	URGENCY	COST	TOTAL
Lifeline utilities					
Construction of an adequate drainage network	 	2	2	3	7
Rainwater harvesting tanks	  	2	3	3	8
Improved sanitation facilities	  	2	3	3	8

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

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



ADAPTATION FUND
HELPING DEVELOPING COUNTRIES
BUILD RESILIENCE AND ADAPT TO CLIMATE CHANGE

The Adaptation Fund finances projects and programmes to help the most vulnerable communities in developing countries adapt to the negative effects of climate change.



RISE-UP
RESILIENT SETTLEMENTS FOR THE URBAN POOR

RISE UP aims to improve the socio-economic prosperity of the urban poor by reducing the impact of natural disasters, enhancing urban basic services and community resilience.

