



Nadi Town, Fiji

Nawajikuma settlement

COMMUNITY-BASED VULNERABILITY ASSESSMENT AND ACTION PLAN



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House in Nawajikuma settlement
UN-Habitat/Kamsin Raju

1 INTRODUCTION

The Nawajikuma 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.

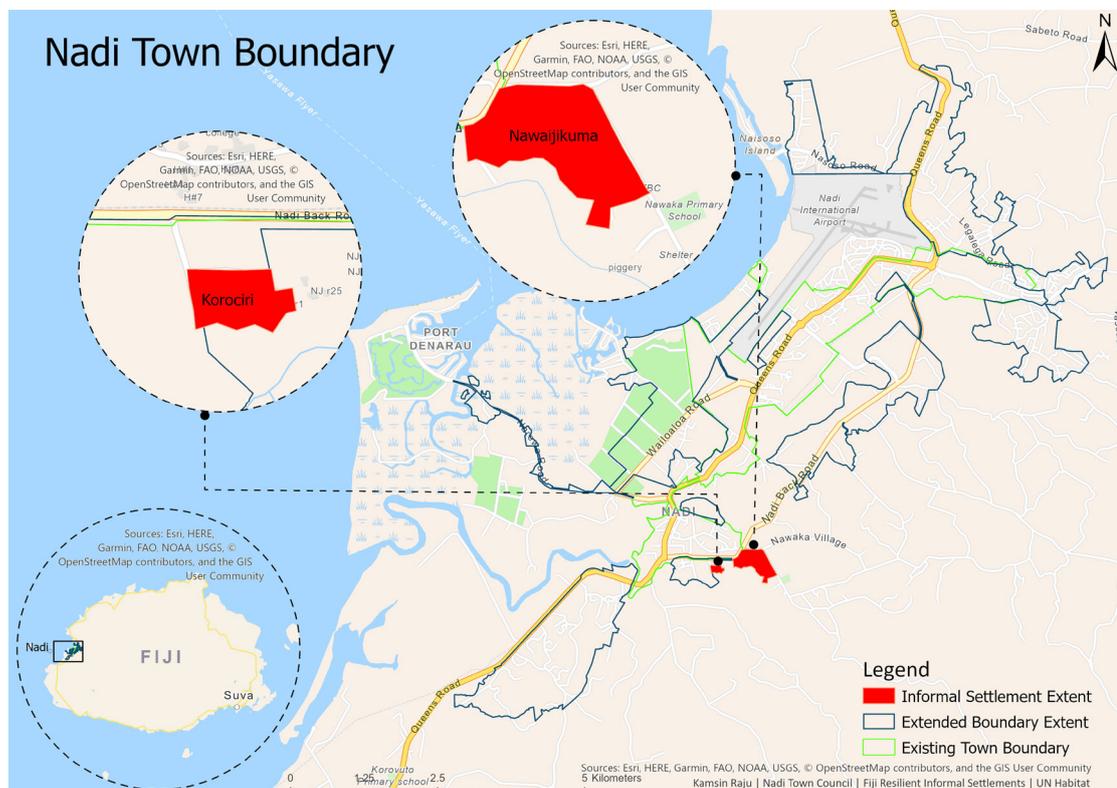
The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

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 Nadi town, including Nawajikuma¹



1. Prepared by: Kamsin Raju, Nadi Town Council

1.1 LOCATION AND PHYSICAL DETAILS

Fiji is located in the western South Pacific. It has a total of 322 islands located between 177°E–178°W and 16°S–20°S and a total land area of 18,333 square kilometers. Viti Levu and Vanua Levu are the two largest islands. These two islands form up to 87 per cent of the total land area and are also the most populous areas nationally². Fiji's total population is 884,887 people, approximately 55.9 per cent of whom reside in urban areas³.

Fiji is among the countries with the highest disaster risk, ranking number ten according to the World Risk Index (2018)⁴. Located in the Pacific Ocean's tropical cyclone belt, cyclones are the most frequent hazards to affect the country (with around two to three cyclones occurring every year)⁵. Additionally, the country has a high exposure to other environmental hazards, such as storm surge, severe 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.

Nadi Town is located in Ba Province, on the south-west coast of Viti Levu. It is Fiji's tourism hub due mainly to Nadi International Airport and Port Denarau. According to the latest Government census (2017), Nadi has a total population of 71,048 people⁹ over 1,200 hectares. The average of Nadi's population growth over the past decade is significantly higher than Fiji's average growth rate, at 5.32 percent per year¹⁰. However, the majority of this growth can be attributed to the expansion of urban 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/Tropical_Cyclone.pdf

6. Asian Development Bank (ADB). (2019). Pacific Finance Sector Briefs – Fiji. Retrieved from: <https://www.adb.org/sites/default/files/publication/529841/pacific-finance-sector-fiji.pdf>

7. World Bank (WB). (2017). Systematic Country Diagnostic 2017. Republic of Fiji. Retrieved from: <http://documents.worldbank.org/curated/en/529271512123603244/pdf/116491-revised-PUBLIC-ACS.pdf>

8. Ministry of Economy Republic of Fiji. (2017). 5-Year & 20-Year National Development Plan. Transforming Fiji. Retrieved from: <https://www.fiji.gov.fj/getattachment/15b0ba03-825e-47f7-bf69-094ad33004dd/5-Year---20-Year-NATIONAL-DEVELOPMENT-PLAN.aspx>

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

10. City population, Fiji. <http://www.citypopulation.de/Fiji.html>

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

Nawajikuma settlement is located 1.8 km South-west of the center of Nadi Town, outside of the town boundary (Figure 4). Nawajikuma settlement covers an area of approximately 227,360 square meters (22.74 hectares), and measures approximately 580 meters in length between its longest points and 640 meters in width. The settlement is on a low-lying area along the Nawaka Creek.



Unpaved road
UN-Habitat/Kamsin Raju

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 Nawajikuma, 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.

Nawajikuma settlement
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**.

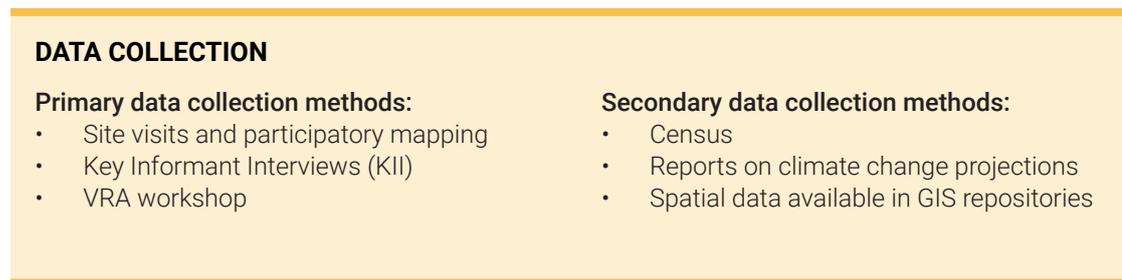
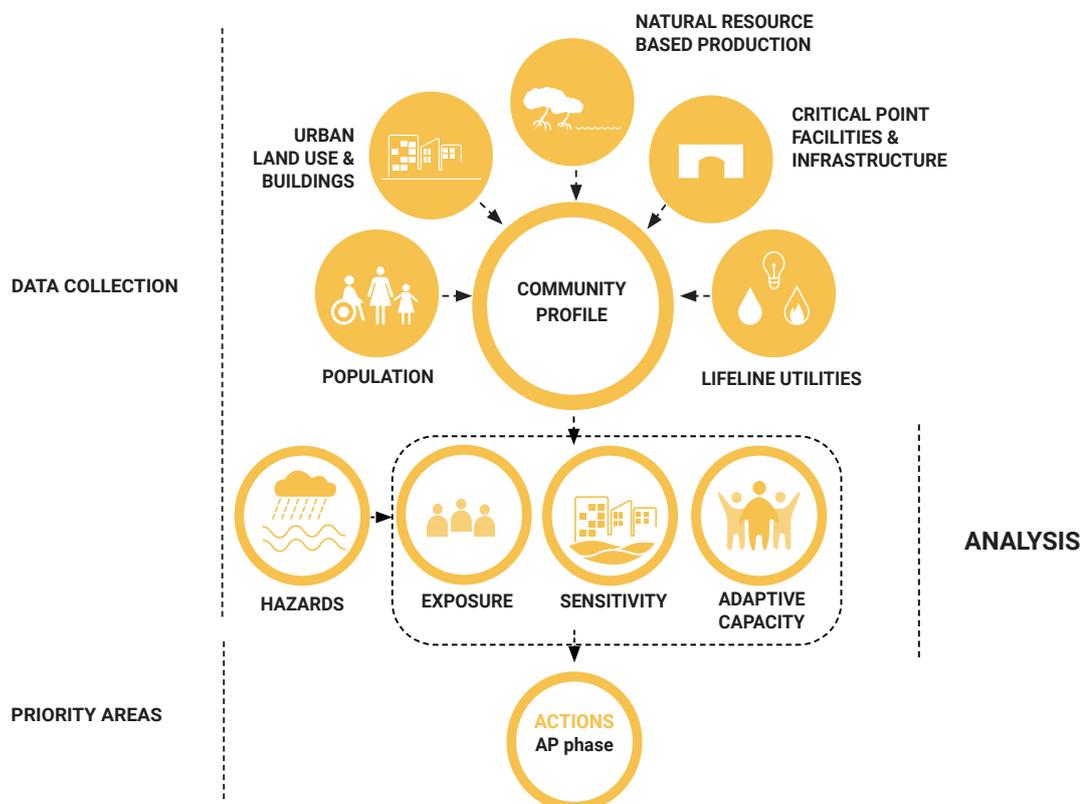


Figure 2 Analytical Framework



3 NAWAJIKUMA SETTLEMENT

Residents in Nawajikuma have no formal land tenure arrangements, limited access to electricity, poor sanitation and housing conditions, and limited access to risk-reducing infrastructure. The aforementioned issues hinder the abilities of informal settlers to cope and adapt to future risks.

Being located on a low-lying area along the Nawaka Creek, Nawajikuma's social, economic and natural systems are exposed to multiple hazards. Furthermore, the informal nature of Nawajikuma which has been built outside of formal systems and regulations, brings many additional issues. Residents in Nawajikuma have no formal land tenure arrangements, limited access to water and electricity supply, poor sanitation and housing conditions, and limited access to risk-reducing infrastructure. The aforementioned issues hinder the abilities of informal settlers to cope and adapt to future risks.

There are 399 houses in the settlement, and two civic buildings (a church and a mosque). The community has an established community leader, who is chosen by community members. Among his roles are conveying meetings with community members and acting as the focal point for outside organizations and institutions.

399	Total number of houses
227.360 m ²	Total area within boundary
51.034 m ²	Residential buildings area
432 m ²	Civic buildings area
175.894 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 climate¹². There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October¹³.

Regarding climate variability, the major features driving climate in Fiji are¹⁴:

- **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 country¹⁵.
- **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 along a creek, the settlement's social, economic and natural systems are exposed to multiple hazards. Based on primary data collected, residents perceive the following climate-related hazards as the most problematic: heavy rainfalls, river floods, and flash floods. 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.



Rainstorms, river floods and flash floods were identified as being highly problematic in the settlement. These events are related, and affect residents of Nawajikuma on a regular basis. FGD participants mentioned that they have perceived an increase in rainfall and its intensity during the last ten years. Associated impacts include water pools across the majority of the settlement, damage to the housing structures – silts and roof structures (e.g., leakages) and impacts on sanitation systems function by saturated septic tanks and drum systems. Surface runoff is a common issue due to the saturation of the soil, and water remains for days after heavy rainfalls.

Regular flooding causes disruptions to their lives by affecting crops, accessibility across the settlement and saturation of poorly constructed sanitation systems. During FGDs, river flooding was also noted as a critical issue by community representatives, mainly for the houses located in the low-lying area nearby the river and especially during heavy rains as the river overflows and impact its structure by damaging foundation, stilts, sanitation facilities and livelihoods. According to community mem-

12. 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

13. 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.

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

15. Ibid

bers, the water could reach approximately 1-2 meters when there is a combination of heavy rains and river overflowing mainly due to the lack of a proper storm water management system. Participants highlighted two major flood events, one in 2012 and the last one in 2016, both preceding cyclone events. During the flood event of 2012, the water reached 2 meters and caused major damaged to all houses, loss of property and crops. According to the community members, it also caused one death. In 2016, another huge flood affected the settlement and was generated by a combination of heavy rains and river floods. During this occurrence, the water reached 1-1.8 meters in different parts of the settlement and led to property damages and loss of crops and livestock.

Cyclones were also identified amongst the hazards that affect the settlement. Community representatives reported that TC Winston (2016) had severely impacted the community in several ways. According to the community representatives, approximately 15 houses were affected, particularly due to proceeded rainstorm and strong winds which caused roof damages. Additionally, participants also mentioned that all households lost crops and livestock during this event. Community members also highlighted TC Evan (2012) as one of the major climate events that had impacted Nawajikuma with approximately 100 houses being affected by floods. During this event, water reached two meters as reported by community members. Regarding TC Harold (2020), participants mentioned that approximately 20 houses were affected by heavy rainfall and floods which also affected crops and livestock.



Waste management has a significant impact on the health of informal dwellers, but also on nearby ecosystems and biodiversity. Aiming to address environmental issues, Nadi Town Council actively implements projects that focus on garbage collection, bulky waste collection, drainage cleaning, road verge cleaning, grass cutting and clean schools. However, most of their efforts are designed for areas within the town boundary and does not extend to the large number of informal settlements in Nadi. The limited access to basic services such as garbage collection, and sanitation systems in informal settlements directly impact the nearby environments.

Motivated to address some of these challenges, two young cousins who have lived their whole lives in Nawajikuma, are taking action to reduce waste in their community. They believe that reducing pollution and beautifying their settlement is the responsibility of the people who live there. They actively try to clean up in and around their homes and encourage other kids their age to do the same. Through the clean schools program, they have learnt ways to reduce, recycle and reuse waste for a more sustainable environment. Alvin (10), says that the environment will provide for them as long as they take care of it. They also have little gardens they tend to themselves and encourage their neighbourhood friends to learn and do more for the sake of their own futures.

Initiatives such as the Clean Schools Program help increase awareness in the community and motivates young residents to take the lead in taking care of the environment. However, significant action is required in settlements such as Nawajikuma to reduce environmental pollution.



5 CLIMATE CHANGE AND FUTURE RISKS

5.1 CLIMATE CHANGE PROJECTIONS¹⁶

- 

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.
- 

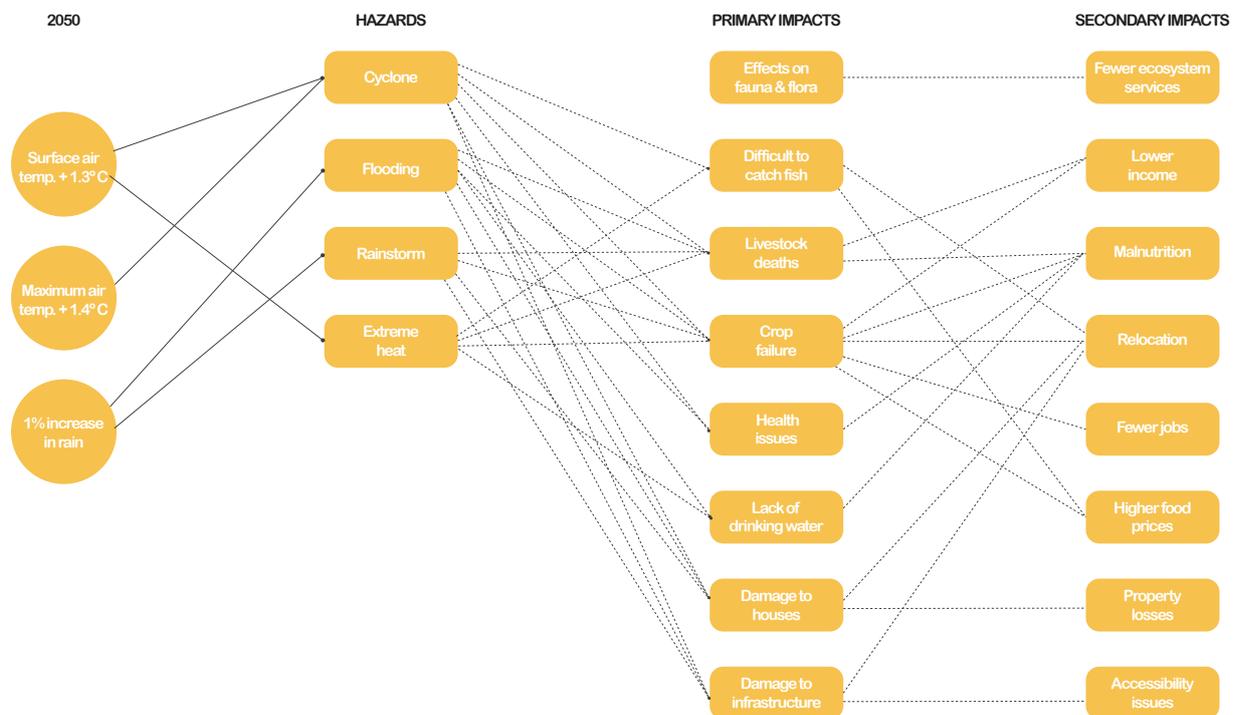
2090 Temperatures are expected to increase as well as temperature on extreme hot days.
- 

2090 Sea level rise is projected to increase across the region.
- 

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

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

Figure 3 Main hazards that affect Nawajikuma settlement and primary and secondary impacts^{17,18}



16. Based on: PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.
 17. Climate projections based on: PACCSAP Program, (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports.
 18. 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)¹⁹.

Cyclones:

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

Extreme Temperatures:

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

Rainfall:

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

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

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



6 VULNERABILITY

Nawajikuma'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 efforts²⁰. 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 centers²¹. Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities²². 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.

Flood events and other hazards have impacts on residents' health, with large cumulative impacts on children who can be deprived of access to school. This means that members of families with children under 6 will have to assume the role of caretakers, and ofte, female members of the household take this role.

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

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

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



Workshop
UN-Habitat/Kamsin Raju

6.2 EXPOSURE



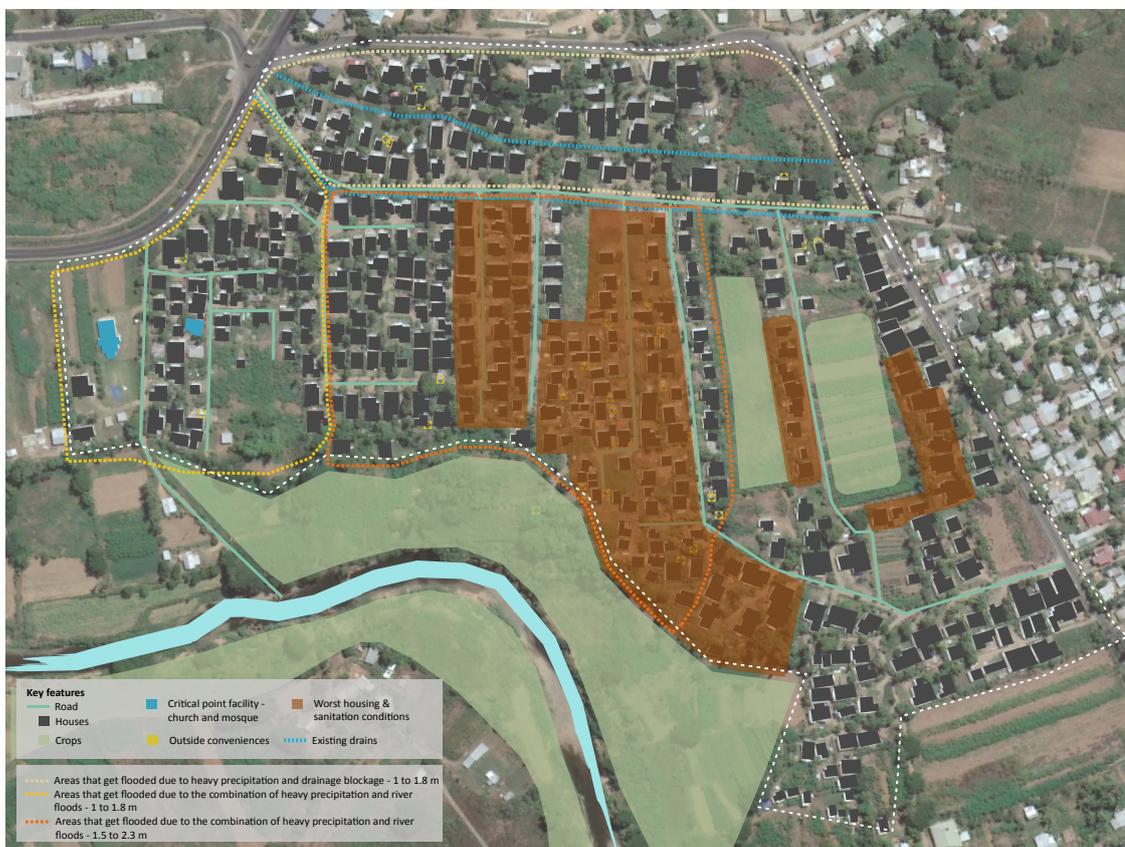
Exposure is defined as the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected²³.

Nawajikuma occupies an approximate total area of 227,360 square meters (22.74 hectares). Being located in a flood prone area, 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 white dashed line represents Nawajikuma's settlement boundary. The houses located in the areas marked in brown were identified by community representatives as being in the worst conditions. Here, sanitation facilities are also very poor. The map also shows the location of the churches and of existing drains.

The yellow and orange dotted lines show the areas that get flooded in the settlement. The areas marked in light yellow were reported as being flooded due to heavy precipitation and poor drainage systems, reaching water levels of up to 1.8 meters. The areas marked in darker yellow were reported as being flooded due to the combination of heavy rainfalls and river floods, reaching levels of up to 1.8 meters. The areas marked in orange were highlighted as being affected by heavy precipitation and river floods and reaching levels of up to 2.3 meters.

Figure 3 Hazard exposure map developed in participatory workshops



23. 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

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 change²⁴.

(i) Urban Land Use & Buildings

With regards to the building stock, town councils are responsible for checking the conditions of buildings and their compliance with the building code. The building department (and building inspectors within this department) is responsible for carrying out this task. However, compliance is not checked in informal settlements. According to community representatives, Nawajikuma settlement is around 50 years old.

Based on the assessment carried out to obtain information on the building materials and general conditions and characteristics of the housing stock in the settlement, it was possible to identify that most of the houses in Nawajikuma have been constructed with light material. Almost all houses have metal roofs and walls or a combination of metal and wood with a few exceptions that are made of concrete. These concrete houses either belong to landowners or those residents that feel secure with the existing land tenure and/or have good relations with their respective landowners. A large proportion of houses were ranked from poor to average conditions (based on a 5-point scale). Due to the number of flooding occurrences, a considerable number of people have made extra rooms or have started building their homes on stilts. However, the majority of houses have been built on low wooden or concrete stilts (below 0.5 meters) or do not have stilts which make them highly prone to flooding. The condition of wooden stilts is in most of the cases very poor. Furthermore, the combination of humidity variations (being partly under the groundwater level and partly exposed above the ground level), lack of adequate treatment of the wood have led in many cases to pathologies of different sorts. All households are located on a relatively flat terrain.

(ii) Natural Resource-based Production

Community members in Nawajikuma often rely on natural resources for food and livelihoods, as well as for protection. Residents grow crops, mainly for own consumption, but also for selling when there is a surplus. The main crops being grown include cassava, bele (spinach), eggplant, kumala (sweet potato) and chili. However, residents mentioned having a limited access to land and being affected by floods regularly, which limits their ability to grow crops. According to participants, after floods, all crops have to be replanted.

Residents from Nawajikuma fish both in the river and in the sea. Although participants reported that productivity levels are low, they mentioned that the amount of fish being caught is enough for own consumption. The main types of fish available referred by the community are kambatia, kawakawa, saga and kanade. The main fishing techniques being practiced include using a long line with a hook during low tide, net and spearfishing.

Regarding livestock, participants mentioned that community members' rear livestock for semi-commercial purpose. The main type of livestock reared by the community are pigs, cows and chickens. According to the FGD participants, during disaster events, community members' frequently have to relocate their animals in safer and higher places.

24. 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

(iii) Critical Point Facilities & Infrastructure

The settlement is located next to Nadi's Back Road. The main access road to the settlement is unpaved and is approximately 475 meters long. Formerly, this road was a tramline that was used as a cargo line for the sugarcane field (which was the previous use of this land). The tramline (Figure 28) is still in place even though it has not been operating since 1993.

There are two other roads connecting the settlement to Nadi's Back Road and both are unpaved. Residents have made several footpaths that allow them to access their houses, although most of these are unpaved. Residents have made several footpaths that allow them to access their houses, although most of these are unpaved. Hence, accessibility and mobility across the settlement is challenging, particularly during flash flood events, when roads and footpaths get regularly damaged. There is a church located within the settlement's boundaries, which is used as an evacuation center by the community during disaster events. There is also a mosque in the settlement, which was built in 2003.

(iv) Lifeline Utilities

The settlement has access to services provided by several entities in Fiji (e.g., water, electricity, etc.). The majority of the households have access to water supply provided by the Fiji Water Authority (FWA). However, there are some households that do not have access to water supply and collect water from neighbouring houses. Sensitivities related to drinking water access are mainly linked to the conditions of the water supply network, given that pipes are often exposed. This not only leads to leakages but can also lead to cross contamination. Additionally, in some parts of the settlement, some households reported not having access to water supply.

Access to adequate sanitation is measured by the percentage of the population using improved sanitation facilities, which refer to facilities that hygienically separate human excreta from human contact. Like the rest of the settlements within and in the periphery of Nadi Town, Nawajikuma does not have access to sewerage infrastructure. According to the technical assessment conducted and the information gathered during the validation workshop, all households have access to a sanitation facility. However, there is a considerable number of households sharing these facilities with other neighbors. This is largely related to their inability to build their own and the lack of access to water supply. There is a small proportion of the households connected to septic tanks and most of the households dispose excreta into metal drums. Frequent flash flooding 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. Another frequent issue related to sanitation and fecal water is that septic tanks are poorly constructed (including the pipe connections), leading to leakages.



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 consequences²⁵.

Three different levels of adaptive capacity are analysed:

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

(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 institutions²⁶.

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

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 the FGD, participants reported that despite not being formally connected to a disaster management plan, all residents have access to early warning systems through radio, social media, SMS. Furthermore, community members have also been warned by the police who frequently come to the settlement to support evacuation. According to the participants, there is some degree of coordination in Nawajikuma since there is a large proportion of households that are aware of the evacuation center available in case of disaster events which is the Andrews Primary School located 0.5 kilometres distance from the settlement. Participants also highlighted some challenges faced by the community with regards to the evacuation center such as lack of adequate water supply, inadequate sanitation facilities and unsafe access. Informal settlements lack many of the institutional support structures that are available to households with tenure.

There are community leadership structures in place community (e.g. established community leader, community groups, etc.) that have been effective following past disaster events and all community mentioned being well connected to various sources of information. However, the lack of community representation was highlighted by the participants during the FGD as one of the main issues faced by the residents. A community committee was proposed to be established in a shorter term in order to enable the communication between the residents and the landowners and the organization of regular meetings to discuss community matters, garbage collection campaigns, etc. These systems present opportunities that can be tapped on in order to strengthen other aspects at the community-level such as stronger mechanisms for disaster preparedness, response and climate change adaptation.

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

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

(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)²⁷.

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. 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 Nawajikuma 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.

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



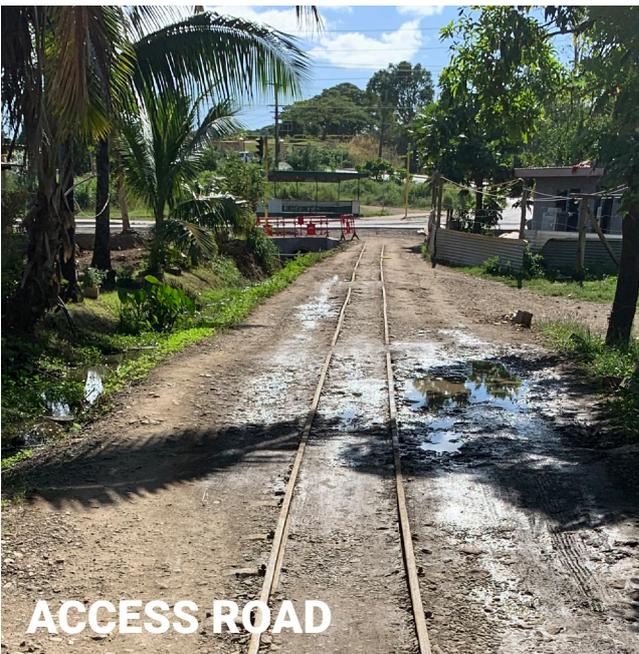
House in Nawajikuma
UN-Habitat/Kamsin Raju



CREEK



CULVERT



ACCESS ROAD



SANITATION FACILITIES



HOUSING STOCK CONDITIONS



INADEQUATE FOOTPATHS

7 CLIMATE ACTION PLAN

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

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

7.1 CLIMATE RESILIENCE & THE SUSTAINABLE DEVELOPMENT GOALS

As stated in the National Climate Change Policy, vulnerability to climate change in Fiji has the potential to derail and undermine progress against each of the SDGs³³. 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)³⁴ 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

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

29. 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 adequate stormwater drainage network	 	1
Localized interventions to improve the building conditions of those structures that are identified as being in the worst conditions	 	5
Improvement of road conditions	 	3
Improved sanitation facilities (resilient to floods)	  	4
Waste containers (composting bins and waste segregation)	  	2
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	 	5
WASH trainings that target adults and children	 	3
Disaster preparedness and response related activities	 	6
Training on financial literacy and social protection programs	 	4
Community involvement in elimination of larval habitats (through clean up campaigns and awareness raising)	 	2
Training on community governance and support establishing community groups/committees	 	1

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.

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	3	3	8
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 road conditions	 	2	3	2	7
Construction of an evacuation center	 	2	2	3	7
Lifeline utilities					
Improved access to piped water supply	  	1	3	2	6
Rainwater harvesting tanks	  	2	2	3	7
Improved sanitation facilities	  	2	3	3	8

- 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
Lifeline utilities					
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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