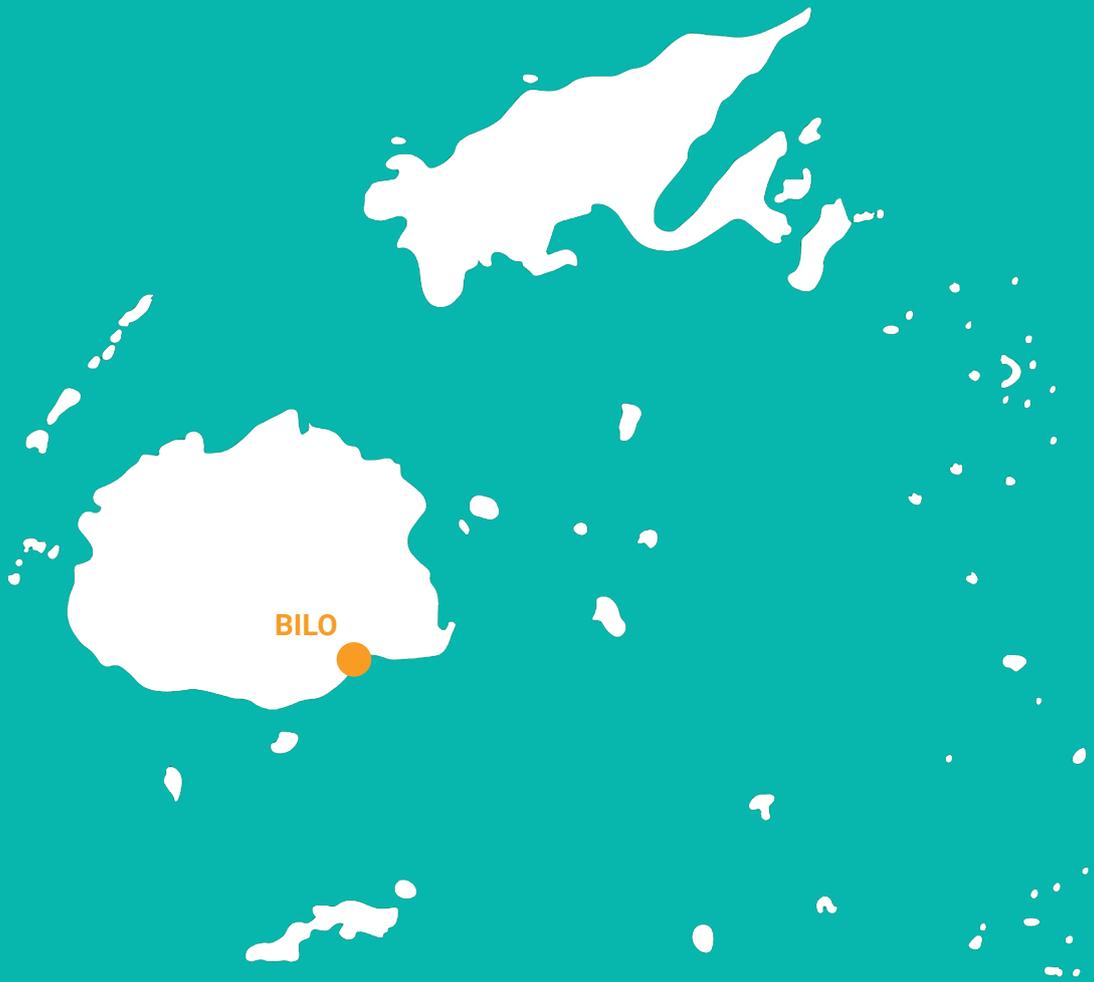




Lami town, Fiji

## Bilo settlement

# COMMUNITY-BASED VULNERABILITY ASSESSMENT AND CLIMATE ACTION PLAN



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

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Children in Bilo's water source  
UN-Habitat/Begoña Peiro

# 1 INTRODUCTION

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

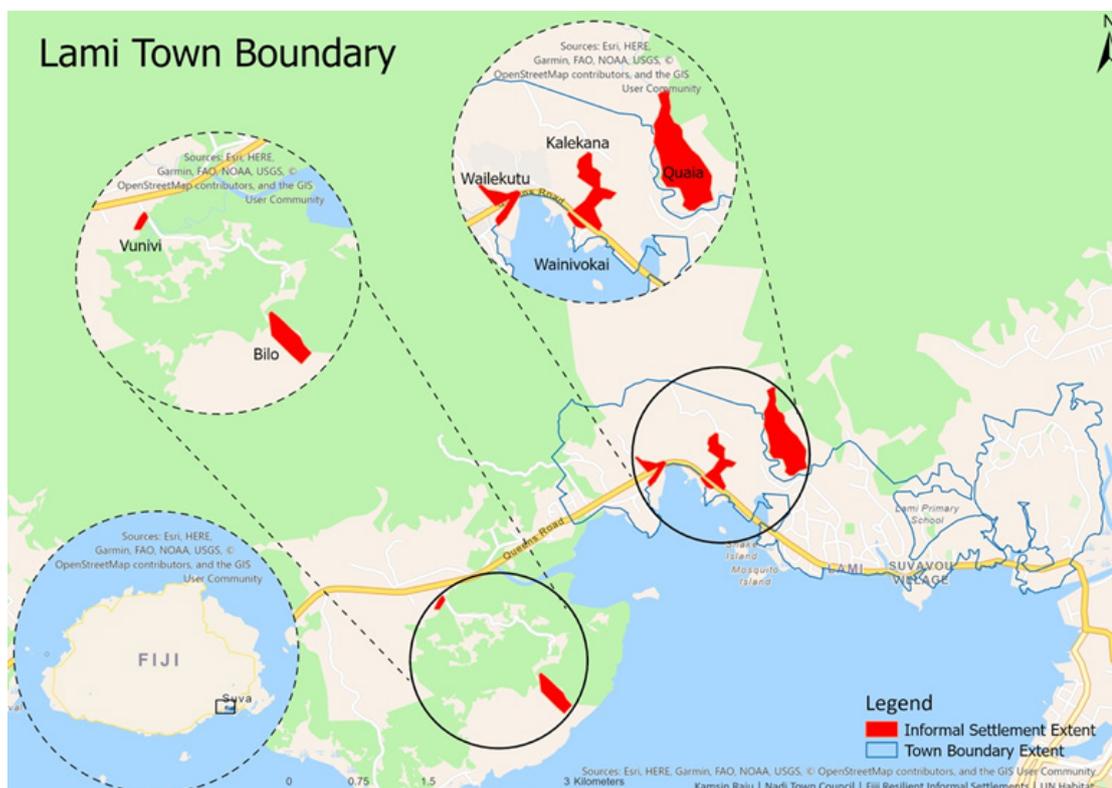
The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

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

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

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

**Figure 1** Informal settlements that are part of the FRIS program in Lami town, including Bilo<sup>1</sup>



<sup>1</sup>. 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 nationally<sup>2</sup>. Fiji's total population is 884,887 people, approximately 55.9 percent of whom reside in urban areas<sup>3</sup>.

Fiji is among the countries with the highest disaster risk, ranking number ten according to the World Risk Index (2018)<sup>4</sup>. 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)<sup>5</sup>. 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 tsunamis. The country is also vulnerable to rising sea levels, and more frequent and intense rainfall caused by climate change.

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

Bilo settlement is located 7.3 km west of the center of Lami Town (Figure 1), outside of the town boundary. Lami has a total area of 680 hectares and a total population of 24,637 people<sup>9</sup>. As compared to the urban population growth in Fiji, Lami's urban population growth has been slower, with a 0.2 per cent per year in the town area and a 1.4 per cent in the peri-urban areas<sup>10</sup>. Bilo settlement covers approximately 4.6 hectares and is situated next to a mangrove area. It measures approximately 270 meters in length between its longest points and 140 meters in width.

2. Fiji's First National Communication under the UNFCCC, 2005; Fiji's Pacific Adaptation to Climate Change, 2009

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

4. Heintze, H., Kirch, L., Küppers, B., Mann, H., Mischo, F., Mucke, P., Pazdzierny, T., Prütz, R., Radtke, K., Strube, F., Weller, D. (2018). World Risk Report 2018. (p. 7). Retrieved from: <https://reliefweb.int/sites/reliefweb.int/files/resources/WorldRiskReport-2018.pdf>

5. NDMO. (n.d.). Tropical Cyclones – Action Guide. Retrieved from: [http://www.ndmo.gov.fj/images/Hazards/Tropical\\_Cyclone.pdf](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>

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

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

The VA aims to understand the level of vulnerability of systems in Bilo, 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.



Two girls looking out the window  
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 land use and buildings**; (iii) **Natural resource-based production**, (iv) **Critical point facilities**; and (v) **Lifeline utilities**. The data collected from both primary and secondary sources provide information on climate hazards and variability and support three main analyses: (1) **Hazard exposure analysis**; (2) **Sensitivity analysis**; and (3) **Adaptive capacity analysis**.

### DATA COLLECTION

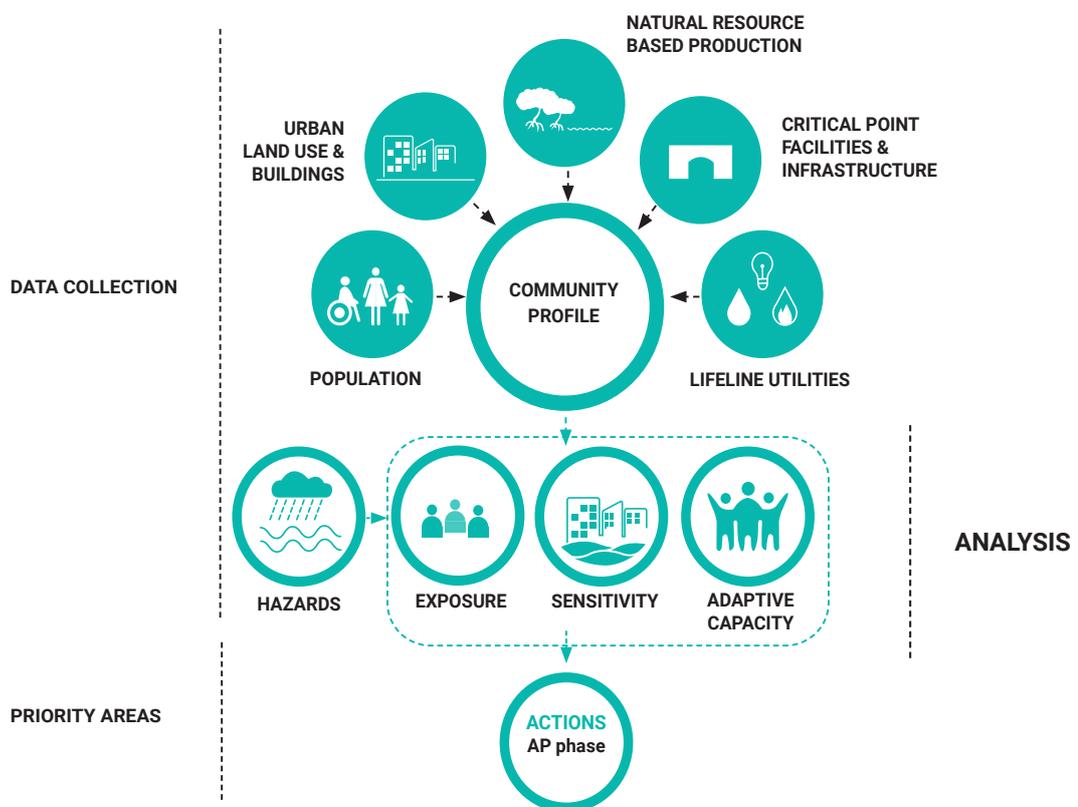
#### Primary data collection methods:

- Household survey (HHS)<sup>11</sup>
- Site visits and participatory mapping
- Key Informant Interviews (KII)
- VRA workshop

#### Secondary data collection methods:

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

Figure 2 Analytical Framework



11. The HHS provides predominantly quantitative data on the household unit, and the community unit once aggregated. The assessment makes a distinction between household and house. Household refers to the family unit living in a same dwelling, and house refers to the physical structure. When providing information regarding the HHS, the unit considered is the household. The household survey covered 94 per cent of the households in Bilo settlement. A total of 17 households were identified in the settlement at the time when the HHS was carried out, and 16 of these were surveyed.



Girl eating a mango  
UN-Habitat/Begoña Peiro

# 3 BILO SETTLEMENT

Being situated outside of Lami's town boundary, Bilo is part of the Suva Rural Area and under the jurisdiction of the Suva Municipal Council. Residents in Bilo have no formal land tenure arrangements, no access to water supply, electricity, poor sanitation and housing conditions, and limited access to risk-reducing infrastructure. 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.

The total population surveyed in Bilo is 107 people, from which 59 are male and 48 are female. Although one household was not surveyed, the total population includes information of the number of people residing in that household. In terms of age distribution, persons aged from 0 to 24 years old represent a large proportion of the total population (57 percent). The youth age group (15-24) on the other hand, accounts for a smaller proportion (16 percent). There are only two people aged over 75 in the settlement. Average household size is 6.3 persons (sizes range from 2 to 17 people amongst the households surveyed).

19	Total number of houses	12.065 m <sup>2</sup>	Total area within boundary
17	Total number of households	1.407 m <sup>2</sup>	Residential buildings area
2	Uninhabited buildings	225 m <sup>2</sup>	Civic buildings area
107	people living in the settlement	10.658 m <sup>2</sup>	Open space area



Rainwater harvesting tank  
UN-Habitat/Begoña Peiro

# 4 CLIMATIC FEATURES, HAZARDS, PERCEPTIONS

## 4.1 CLIMATIC FEATURES AND HAZARDS

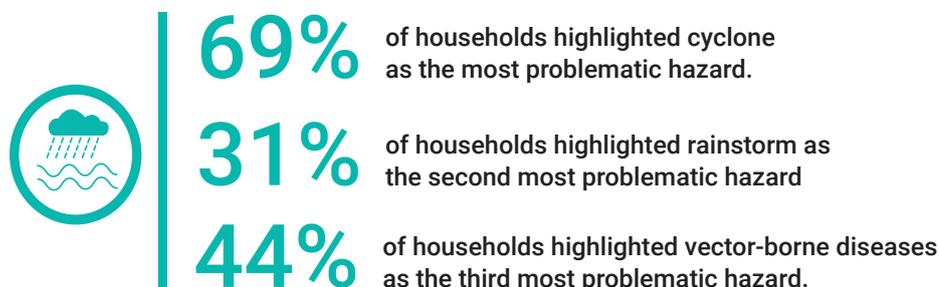
Fiji is generally considered to be an oceanic tropical marine climate<sup>12</sup>. There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October<sup>13</sup>.

Regarding climate variability, the major features driving climate in Fiji are<sup>14</sup>:

- **The El Niño Southern Oscillation (ENSO) phenomenon**, which occurs every two to seven years, four years on average. It is the most important influence on inter-annual climate variations in the country. It strongly influences rainfall, temperature and tropical cyclones. Dry seasons during El Niño event tend to be drier and cooler, with droughts being associated to these periods. On the contrary, La Niña events are associated with floods, depressions and tropical cyclones.
- **The South Pacific Convergence Zone** strongly influences the seasonal cycle, which is most intense during the wet season and closer to the country<sup>15</sup>.
- **The trade winds** bring orographic rainfall to the eastern parts of the country. Around 70% of the national annual average rainfall occurred during the wet season (over the period from 1961 to 2010).

## 4.2 COMMUNITY PERCEPTIONS OF KEY IMPACTS

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



12. Government of Fiji. (2019). National Climate Change Policy. Retrieved from: [https://www.pacificclimatechange.net/sites/default/files/ocuments/National-Climate-Change-Policy-2018--2030\\_0.pdf](https://www.pacificclimatechange.net/sites/default/files/ocuments/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

### KEY FINDINGS

Bilo residents reported being impacted in different ways by the recurrence of climate hazards:

89%

of respondents identified damage to housing stock as a major concern

88%

of respondents were concerned about their ability to provide food

82%

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

36%

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

5%

of respondents were concerned with the possible temporary relocation

All the households in Bilo reported having issues related to cyclones. Given the location of Bilo and the very poor conditions of the housing stock, severe impacts during cyclones are very common. Many respondents referred to TC Winston when identifying the most problematic hazard. Based on the data collected, all the houses were affected by TC Winston. In particular, three houses were severely structurally damaged and one was completely destroyed. Water tanks were damaged, as well as crops and other property assets. Latrine superstructures were damaged and blown away, and sanitation pits were filled with rainwater leading to overflow. Residents from Bilo evacuated to the Bilo Gun Battery and stayed there for four days. The Bilo Gun Battery is a World War II historical site located approximately one kilometer from the settlement. However, it is not intended as an evacuation center and is therefore not equipped with sanitation facilities, water supply, etc. Although participants clearly stated that the impacts caused by TC Winston were much more significant than those caused by other cyclones, they mentioned that even Category 2 cyclones cause disruptions to their lives, affecting their houses, crops and access to drinking water.

Coastal flooding was also highlighted as impacting the community. Although coastal flooding does not affect the houses located in Bilo, there is a water source that is used by community members which gets flooded during high tide. Residents in Bilo do not have access to water supply and generally use rainwater that is collected. However, during extended periods with no rain, they collect water from this source which is affected by coastal floods. Lack of water during periods with no rain were raised as one of the most pressing issues in Bilo. Other hazards highlighted as the most problematic were very diverse: including flash floods, drought, extreme heat, salt intrusion and landslides. This diversity may be related to the differentiated characteristics of each household in relation to their spatial location.



# 5 CLIMATE CHANGE AND FUTURE RISKS

## 5.1 CLIMATE CHANGE PROJECTIONS<sup>16</sup>

- 

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

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

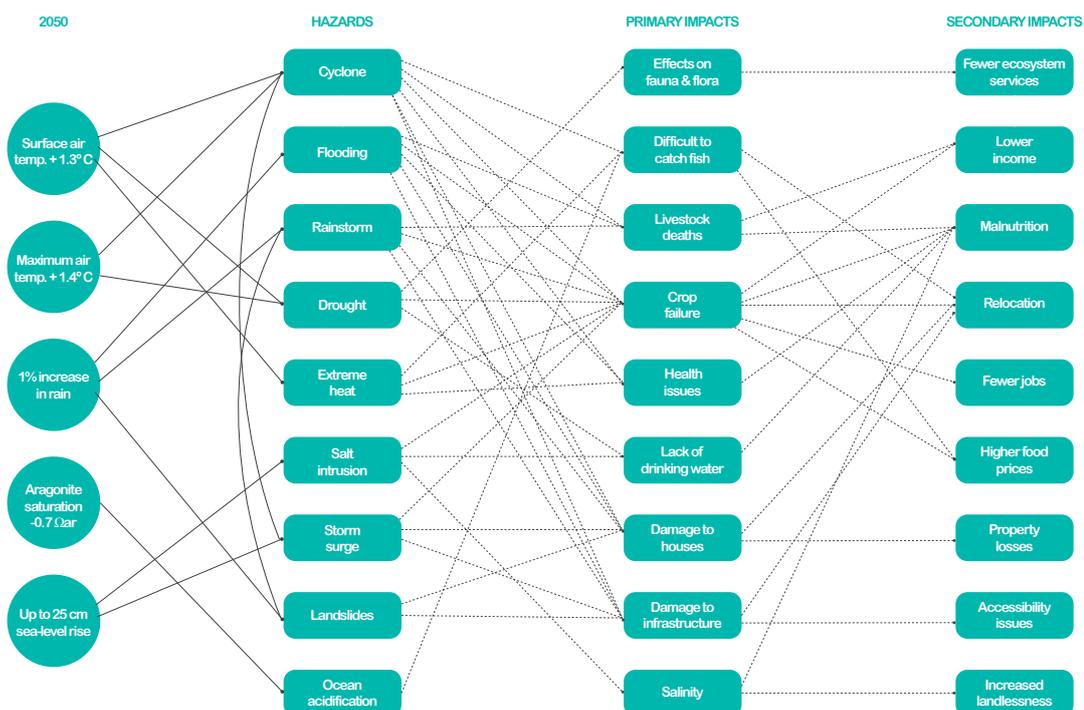
2090 Temperatures are expected to increase as well as temperature on extreme hot days.
- 

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

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

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

Figure 3 shows the main hazards that affect Bilo settlement and primary and secondary impacts that were reported by community members during participatory workshops<sup>17, 18</sup>



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

17. 2050 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 nation-wide climate change projections that are available and were produced by the Pacific-Australia Climate Change Science Program (PACCSAP)<sup>19</sup>.

### 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.



Kelera washing her clothes in the river  
UN-Habitat/Begoña Peiro

”

*Every time our water tanks are empty because of the lack of rain, we have to carry water from the creek nearby to make sure we don't lose our crops. This really affects us and makes farming difficult.*

Kelera, Bilo resident  
[No real names are used in this report]

Although the Eastern side of Viti Levu receives high levels of rain and is the cause of flood events, the lack of water was raised by many residents amongst the most critical issues faced. In response to the lack of access to water supply, residents use all sorts of containers that they can access to collect water (from barrels to old bathtubs and fridges).

Kelera has lived in Bilo for over 50 years. During the interviews she showed her deep care for other neighbors in her community. She explained how she has been appointed by the Ministry of Health as 'community nurse'. This involves acting as focal point, reporting any health issues that are faced, taking care of the medicine kit she has been provided with and filling in monthly reports.

# 6 VULNERABILITY

Bilo'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 efforts<sup>20</sup>. 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 centers<sup>21</sup>. Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities<sup>22</sup>.

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.

Some responses to disaster situations can be particularly damaging for children, who are disproportionately vulnerable. In Bilo settlement, recurrent flood events have impacts on residents' health, with large cumulative impacts on children who can be deprived of access to school. As a consequence, many adult women (given their primary role as caregivers) also miss work in order to take care of their children. In Bilo, none of the children under 6 were reported as being involved in education. This means that members of families with children under 6 will have to assume the role of caretakers. Often, female members of the household take this role.

A transect walk was organized with children in Bilo, during which they were asked to show and map their settlement (e.g., places where they play, the route they take to school, their water sources etc.). This aimed to increase understanding of how they experience climate-related hazards and identify potential risks. It also helped to identify potential issues and risks that affect children.

Children from Bilo settlement attend different schools, some of them take the bus and others walk to school. Several issues were raised during the participatory workshops and transect walks, such as the fact that children have to walk a long way to the bus stop and the very poor conditions of the footpaths, which are often flooded during high floods. Moreover, poor accessibility (frequently flooded roads and footpaths) also has an adverse on the elderly.

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.



Children showing their route to school  
UN-Habitat/Begoña Peiro

## 6.2 EXPOSURE



**Exposure** is defined as the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected<sup>23</sup>.

Being located along the coast next to a mangrove area, Bilo's social, economic and natural systems are exposed to multiple hazards. During the participatory workshop, community-members identified key locations, infrastructure and assets. Participants schematically demarcated the areas that are exposed to the main climate-related hazards that affect their community and discussed key impacts (see Figure 3). The areas marked as being affected by heavy rainfalls are areas that become very muddy, such as the unpaved road that crosses the settlement and an area which is used to plant crops affected by pooling of water. The houses marked as being affected by surface runoff are located on an undulating terrain on the lower side of the settlement. Community representatives mentioned that surface runoff from the other parts of the settlement affects this area the most. Furthermore, participants identified those houses that were affected the most during TC Winston, households where elderly people who require special support live, areas where children play, among other key features.

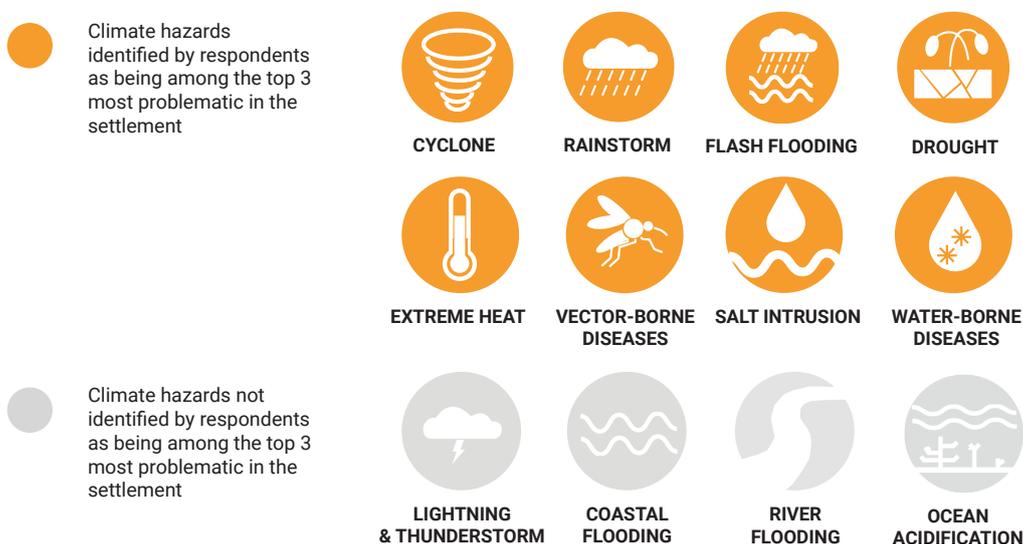
Figure 3 Hazard exposure map developed in participatory workshops



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

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

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



## 6.3 SENSITIVITY



**Sensitivity** is defined as the degree to which a system or species is affected, either adversely or beneficially, by climate variability or change<sup>24</sup>.

### (i) Population

Residents of Bilo do not have formal land tenure arrangements. However, their perceived tenure security is high, as many households have family ties to their landowner. 69 percent of the current residents reported having lived in Bilo for over 20 years. The dependency ratio<sup>25</sup> in the settlement is very high, at 91, compared to the national average of 54<sup>26</sup>. Young dependents make up 84 percent of the total dependents, whilst elderly people (aged over 65) make up the remaining 16 percent.

### (ii) Urban Land Use & Buildings

The town council is responsible for ensuring that buildings are compliant with the building code. However, compliance is not checked in informal settlements. All the houses are one storey high and are mostly located on relatively flat terrain. 32 per cent of the houses are located on a medium-sloped terrain, and 5 per cent on high-sloped terrain. All houses have been constructed with light materials (e.g. metal, wood etc.), which are often reused and already in poor conditions when the houses are assembled.

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

25. Age population ratio of those that are not in the labor force (the dependent part ages being used are 0 to 14 and 65+) and those typically in the labor force (the productive part ages 15 to 64). However, it must be noted that for some professions (e.g. government officials) in Fiji, the age of retirement is 55. For the purpose of this study, the retirement age of 65 is used.

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

**70%**

of houses in Bilo were built after 1990.

**100%**

of houses have metal roofs. 74% are in are in poor conditions, 26% were ranked as fair.

**74%**

of houses are built with metal exterior walls, and the remaining 26% are wood.

**74%**

of houses are on stilts, most of which are made of wood.

**61%**

of the stilts are less than 1m off the ground.

### (iii) Natural Resource-based Production

Bilo residents are highly dependent on natural resources for food and livelihoods, in addition to environmental protection. The settlement is located next to a mangrove area. Mangroves provide coastal protection from waves and storm surges and prevent coastal erosion, as well as act as a source of food and wood.

All the households reported growing crops, mainly cassava, dalo, kumala (sweet potato), coconut, red fruit and vudi. Future climate change impacts on root crops are expected to be lower as compared to grain crops. However, risk to taro crops is expected to increase due to higher pest incidences resulting from increased temperatures<sup>27</sup>.

69 percent of households report fishing frequently. However, coral bleaching and ocean acidification represent a threat to the availability of fish. The main fishing techniques being practiced include using a long line with a hook during low tide, nets, and spear fishing. Women generally fish during low tide and use a long line with a hook, while men practice spear fishing and freediving. During the workshops, community members highlighted that fish being caught are enough for own consumption, despite observing a decreasing trend in the amount of fish available. Other marine products that are used by the community, mainly for own consumption, include kaiqoso (sea shells), crabs, cawaki, sea cucumber and yaqa.

The proportion of households relying on livestock for food is smaller, although still relatively high (44 per cent). Community members reported that a lack of electricity supply and food refrigeration options present significant challenges. Heat stress was highlighted among the climate-related issues affecting livestock, with residents reporting livestock casualties during extremely hot weather.

### (iv) Critical Point Facilities & Infrastructure

Bilo is located at the end of Bilo road, and close to the coast. Although this road connects to Queen's Road (the main thoroughway in Fiji), and it is paved for most of its length, accessibility to the settlement was highlighted by many households as a main concern. The nearest bus stop is approximately one kilometre away, which is considered too far by residents given that most children take the bus to go to school. The schools available in the nearby towns are located between 3 and 9 kilometers away. Lami's health center is located 7 kilometers from the settlement.

There is a church in Bilo, which was built in 1974, and has been used as an evacuation hall previously. However, there are a number of issues with its structural integrity.

### (v) Lifeline Utilities

None of the households in Bilo have access to piped water supply. The majority of residents collect water from open water containers (head drums, buckets, old bathtubs etc.), which poses a high risk of water contamination. In total, there are 10 households that do not have access to water harvesting tanks.

Like the rest of the settlements within and in the periphery of Lami Town, Bilo does not have access to sewerage infrastructure. 13 per cent of the households share sanitation facilities. The lack of rubbish collection services was highlighted as a key issue in Bilo. Many residents bury or pile their waste. Areas where waste is regularly piled pose a threat to the local public and environmental health.

Whilst households reported that there is no electricity supply in Bilo, at the time of data collection, this was under construction. 44 per cent of households rely on kerosene lamps for light, and 'fuel-stacking' is a common issue in all households. This is generally formed by a combination of either kerosene or gas with fuelwood.

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

## 6.4 ADAPTIVE CAPACITY



**Adaptive capacity** is the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences<sup>28</sup>.

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<sup>29</sup>. Also referred to as 'autonomous' adaptation. In this report the unit considered for the analysis is the household.

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

**44%**

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

**19%**

households mentioned having access to the social pension scheme

**13%**

have access to the food voucher program, and 6% to the poverty benefit scheme.

**19%**

households reported not having access to any social protection programs.

Most respondents reported having access to information on climate change, either through technology (including radio, television, etc.) (55%), or through social media (25%). 10% of households reported being involved in trainings, but another 10% of households mentioned not having access to any type of information regarding climate change and disasters.

With regards to disaster preparedness, none of the households had an evacuation plan or being connected to a formal disaster and risk reduction (DRR) network. However, they do have an informal evacuation plan in place and make use of the Bilo Battery site as shelter during disaster events. 50% of households reported having access to early warning systems.

**24% of households reported evacuating to the Bilo Battery site, as an informal response to disasters.**

When asked about the types of post-disaster assistance that the household had received in the past, 39 per cent of the households reported not having received any kind of aid in the past. 22 per cent mentioned having received food items and 11 per cent first aid kits. Assistance material for crops, for shelter and cash had been received by 6 per cent of the households.

<sup>28</sup>. 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

<sup>29</sup>. UN-Habitat, 2014. Planning for Climate Change.

## (ii) Collective Capacity

**Collective capacity** is how well are communities, neighbourhoods or other groups able to respond and adapt to climate hazards without assistance from government or other agencies and institutions<sup>30</sup>.

There is a lack of financial capital at the community-level, as there are no collective savings groups or systems in place. Despite individual households reporting having access to early warning systems (either through radio or SMS), the community is not connected to a formal DRR network nor has a formal evacuation plan. During FGDs and interviews, community representatives mentioned relying on their social networks and neighbors to respond during disaster events.

Participants mentioned that there are two female community representatives that were appointed as 'health focal points' and are regularly in contact with the Ministry of Health. They are also provided with a basic medicine kit that is stored in their houses in case community members need to access medicines.

There are community leadership structures in place community (e.g. established community leader, community groups, etc.) that have been effective following past disaster events. These structures are functioning, and carry out activities such as the organization of regular meetings to discuss community matters, small fund-raising activities, etc. These systems present opportunities to strengthen community-level mechanisms for disaster preparedness, response and climate change adaptation.

## (iii) Institutional Capacity

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

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

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

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

The National Disaster Management Office carries out activities such as community awareness programs and disaster management trainings. However, informal settlements are often left out of formal systems, networks and programs. For example, activities such as the community awareness programs have been carried out in villages, but not in informal settlements up to the time when the report was developed. Given that informal settlements such as Bilo 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.

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<sup>30</sup>. Ibid

<sup>31</sup>. Ibid

# 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 understandings of climate variability and change.

## 7.1 CLIMATE RESILIENCE & THE SUSTAINABLE DEVELOPMENT GOALS

As stated in the National Climate Change Policy, vulnerability to climate change in Fiji has the potential to derail and undermine progress against each of the SDGs<sup>32</sup>. 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<sup>33</sup> (NAP) is aligned to international processes such as the SDGs of the 2030 Agenda, the Paris Agreement of the UNFCCC and the Sendai Framework for Disaster Risk Reduction. It contains 160 adaptation measures that are to be prioritized over the five-year period of the NAP, organized across a total of 10 components (five systems components and five sectoral components). The actions included in this report are aligned and respond to the aforementioned focus areas.

### OPTION IDENTIFICATION & PRIORITIZATION

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

## 7.3 PRIORITIZED SHORTLISTED ACTIONS

During the participatory workshops, potential adaptation options were co-designed and discussed. Some examples include improved sanitation facilities that are resilient to floods, and rainwater harvesting tanks to ensure continuous access to water. Based on the long-list of adaptive measures (see Annex A where the technical scoring is included), a short-list was prepared and prioritized. Below is the table that includes

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

<sup>33</sup>. 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](https://www4.unfccc.int/sites/NAPC/Documents/Parties/National%20Adaptation%20Plan_Fiji.pdf)

the short-listed options and the results from the community ranking, community acceptability, community support and technical feasibility. This work forms the basis for the selection of options that will be implemented as part of the FRIS project. However, it must be noted that the fact that the options have been shortlisted does not mean that all of them will be implemented. 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
<b>Interventions in physical, natural and social assets</b>		
Construction of an evacuation center (which also serves as a kindergarden and community center)	 	1
Rainwater harvesting tanks	 	2
Improved sanitation facilities	 	3
Storage units for livelihood materials	 	4
<b>Trainings and awareness raising</b>		
Training on waste management following a participatory approach that identifies opportunities linked to livelihoods	  	5
Trainings on safe construction for hazard proof shelters for low-income residents	 	2
WASH trainings that target adults and children	 	4
Disaster preparedness and response related activities	 	7
Training on financial literacy and social protection programs	 	1
Training on livelihoods linked to sustainable agricultural practices	 	3
Establish youth community groups and increase their skills and capacity		6

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

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #f4a460; margin-right: 5px;"></span> Interventions in physical, natural and social assets</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #f4a460; margin-right: 5px;"></span> Trainings and awareness raising activities</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #f4a460; margin-right: 5px;"></span> Activities that support the project implementation</li> </ul>	<p>These actions were identified as part of the long-list of adaptive measures, and were short-listed for further prioritization.</p>
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OPTIONS	SDG CO-BENEFITS	EASE OF IMPLEMENTATION	URGENCY	COST	TOTAL
<b>Population key area</b>					
Community involvement in elimination of larval habitats (through clean up campaigns and awareness raising)	 	2	1	3	6
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
- 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
<b>Population key area</b>					
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
<b>Urban land use</b>					
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
<b>Natural resource-based production</b>					
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	3	3	8
<b>Critical point facilities</b>					
Improvement of road conditions and monitoring potential slope failure along the road	 	1	2	2	5
Improved access to the settlement, including paved access of the last segment of the road and the reducing distance to the bus stop	 				
Construction of an evacuation center (which also serves as a kindergarden and community center)	 	2	3	3	8
<b>Lifeline utilities</b>					
Access to piped water supply	  	1	3	2	5
Rainwater harvesting tanks	  	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
<b>Lifeline utilities</b>					
Construction of an adequate drainage network	 	2	2	3	7
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)



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