



Lami town, Fiji

Kalekana settlement

COMMUNITY-BASED VULNERABILITY ASSESSMENT AND CLIMATE ACTION PLAN



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

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All elements
Fruita...
Banana

Fruita
Banana
Fruita
Banana

Fruita
Banana
Fruita
Banana

Bb
Bird

Bb
Bird

Bb
Butterfly

Bb
Butterfly

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Bird

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Bb
Butterfly

English Alphabet
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Numbers 1-10

Topic: Flowers
Fe Flowers
Color

English Alphabet
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

English Alphabet
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

English Alphabet
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

English Alphabet
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

freshwater fish

Insects

1 INTRODUCTION

The Kalekana 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.

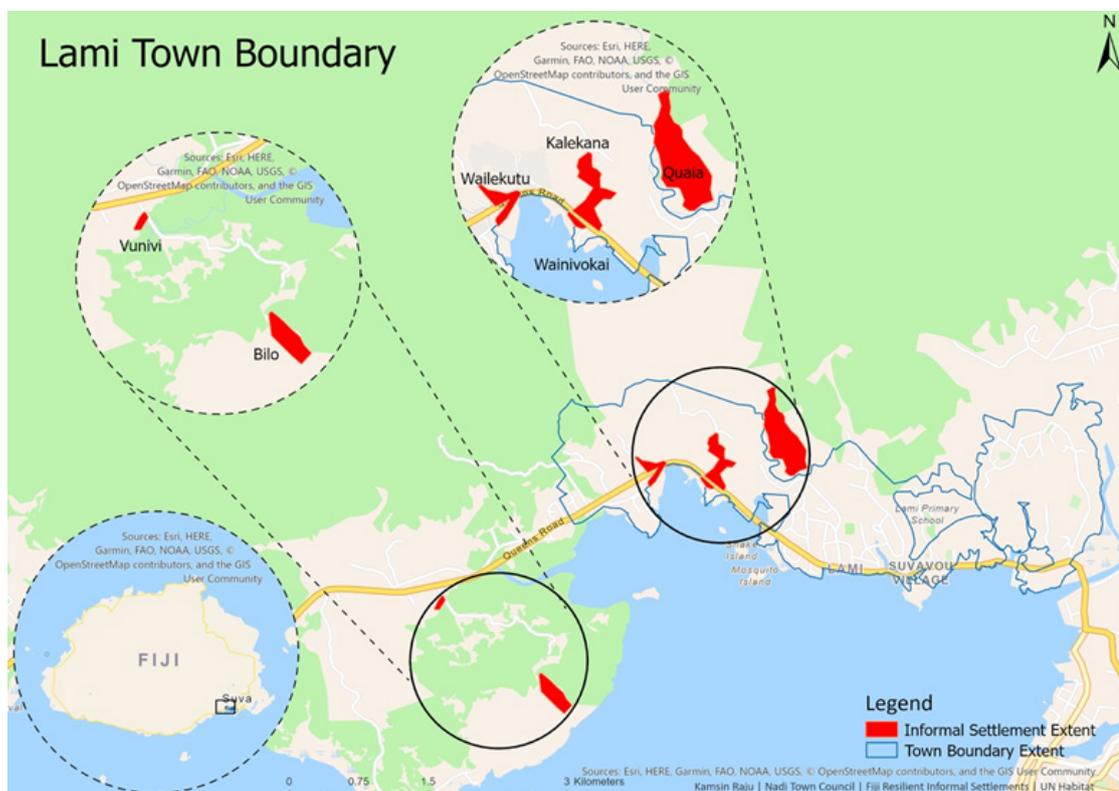
The high levels of physical, economic, social and environmental vulnerability in combination with poor levels of disaster preparedness and adaptive capacity often lead to high climate-related hazard impacts in informal settlements.

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 Lami Town, including Kalekana¹



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 km². Viti Levu and Vanua Levu are the two largest islands. These two islands form up to 87% of the total land area and are also the most populous areas nationally². Fiji's total population is 884,887 people, approximately 55.9 percent of whom reside in urban areas³.

Fiji is among the countries with the highest disaster risk, ranking number ten according to the World Risk Index (2018)⁴. Located in the Pacific Ocean's tropical cyclone belt, cyclones are the most frequent hazards to affect the country (with around two to three cyclones occurring every year)⁵. Additionally, the country has a high exposure to other environmental hazards, such as storm surge, severe storm, flooding, landslide, drought and extreme temperature, earthquake, and tsunami. The country is also vulnerable to rising sea levels, and more frequent and intense rainfall caused by climate change.

Although Fiji is recognized as being one of the most developed economies in the Pacific⁶, signs of socioeconomic 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.

Kalekana settlement is located 2.4 kilometers west of the center of Lami Town, inside of the town boundary. Lami has a total area of 680 hectares and a total population of 24,637 people⁹. As compared to 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 areas¹⁰. Kalekana settlement covers an area of approximately 85,562 square meters (8.55 hectares), and measures approximately 670 meters in length between its longest points and 340 meters in width.

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

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

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

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

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

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

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

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

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

1.2 PURPOSE OF THE COMMUNITY-BASED VULNERABILITY ASSESSMENT & 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 Kalekana, by following a multi-scale approach. The VA has the following sub-objectives:

1. Increased understanding of the underlying causes of vulnerability.
2. Seeks to understand the perceptions on climate change and disaster risk from the residents living in the settlement.
3. Seeks to understand the spatial dimension of exposed assets.
4. Identifies 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.



Resident of Kalekana Settlement
UN-Habitat/Begoña Peiro

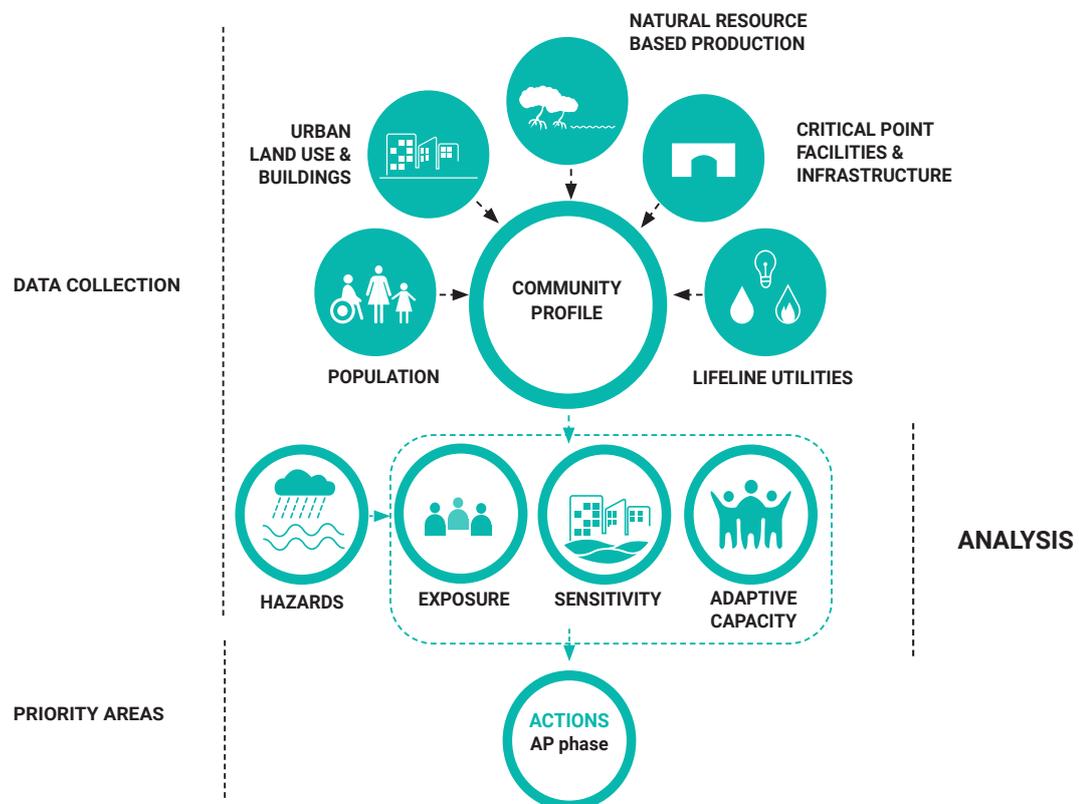
2 METHODOLOGY

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



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 82 per cent of the households in Kalekana settlement. 149 households were surveyed, out of a total of 182 households that were identified in the settlement at the time when the HHS was carried out.



MAIN ROAD



DRAINAGES ACROSS THE SETTLEMENT



SANITATION FACILITY



HOUSE IN POOR CONDITIONS



HOUSES ON SLOPED TERRAIN



FOOTPATHS

3 KALEKANA SETTLEMENT

Kalekana is a large settlement, with 182 households, and it is located on a hilly area, next to Wainiviokai settlement which is also part of the FRIS project. The total population based on the household survey conducted in Kalekana amounts to 782 people¹², from which 400 are male and 382 are female. The total estimated population is 959 people¹³. In terms of age distribution, persons aged from 0 to 24 years old comprise half of the total population (51%). The youth age group (15-24) accounts for 19 percent and 32 percent of the population are aged 0 to 15. There are eight people aged over 75 in the settlement, and fourteen within the 70-74 age range. A large number of households (59 percent) have been living in Kalekana for over 40 years. The average household size is 5.2 persons, however household sizes range from 1 to 20 people amongst those surveyed.

The community has an established community leader. His responsibilities include conveying meetings with community members and acting as the focal point for outside organizations and institutions. He is also the Advisory Councilor for the Lami District and a representative of the *Community-Based Sanitation Market*. Based on the information collected during FGDs, there are four sub-clans in Kalekana (i.e., Moli, Vava, Areata and Bali). Each sub-clan has a leader (Turaga ni Mataqali) and is linked to the community leader (Turaga ni Koro). In this way, there is a coordination structure in place in the settlement. There is a Development committee established, which is led by the community leader, the four leaders of the sub-clans and representatives from the women's and youth groups. This committee has as overall goal to explore development opportunities for the settlement. There is also an established women's group in the settlement, which is registered with the Ministry of Women, Children and Poverty Alleviation. The function of the Women's group is to support women's interest and development within the community and to have a voice at the National level. Other established groups include: the youth group, the rugby club, netball club, volleyball club and the kids' club. The kids' club was established with the support of Save the Children.

¹². 149 out of 182 households were surveyed. The total population is estimated to be 959 (for those households that were not surveyed, the average household size is used).

¹³. For those households that were not surveyed the average size of household is used.

181	Total number of houses	85.562 m ²	Total area within boundary
182	Total number of households	19.434 m ²	Residential buildings area
1	Uninhabited buildings	165 m ²	Civic buildings area
959	estimated people living in the settlement	65.963 m ²	Open space area



Blocks placed on roof to hold it
UN-Habitat/Begoña Peiro

4 CLIMATIC FEATURES, HAZARDS, PERCEPTIONS

4.1 CLIMATIC FEATURES AND HAZARDS

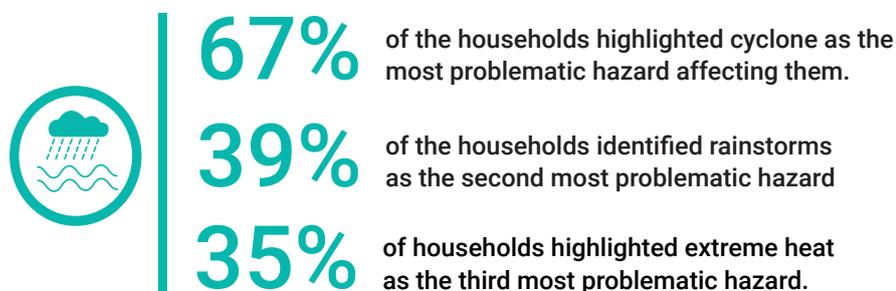
Fiji is generally considered to be an oceanic tropical marine climate¹⁴. There are two distinct seasons namely, a warm wet season from November to April and a cooler dry season from May to October¹⁵.

Regarding climate variability, the major features driving climate in Fiji are¹⁶:

- **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 country¹⁷.
- **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.



14. 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

15. 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.

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

16. Ibid

KEY FINDINGS

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



Cyclones were identified as being particularly problematic. TC Winston, which made a landfall in Viti Levu on the 20th of February 2016, was highlighted as being the most damaging, impacting the community in several ways. Among the impacts mentioned were damage to property (especially roof structures), damage to crops and livestock. The community referred to TC Harold which took place on the 8th of April 2020. Community representatives mentioned that the impacts from TC Harold were lower and there were no impacts on crops or livestock, but that the strong winds had damaged three houses.

Surface runoff is a common issue due to the saturation of the soil. Being located on a slope, Kalekana experience frequent surface runoff, soil erosion and there are some areas where landslides are also an issue. The lack of a continuous drainage network leads to some areas being particularly affected, such as the lower side of the settlement near Queen's Road and the more inner areas of Kalekana that are not located along Kalekana Settlement Road. Furthermore, Wainivokai, the settlement located on the other side of Queen's Road is also being affected by surface runoff.

Participants mentioned that trends have been perceived with regards to temperature increases, extremely hot days and cool days. They reported an increase in temperatures and an increase in number of extremely hot days. They mentioned thermal discomfort is a challenge in the settlement, and that this issue throughout the year (both during dry and rainy season).



House in Kalekana
UN-Habitat/Begoña Peiro

5 CLIMATE CHANGE AND FUTURE RISKS

5.1 CLIMATE CHANGE PROJECTIONS¹⁷

- 

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.
- 

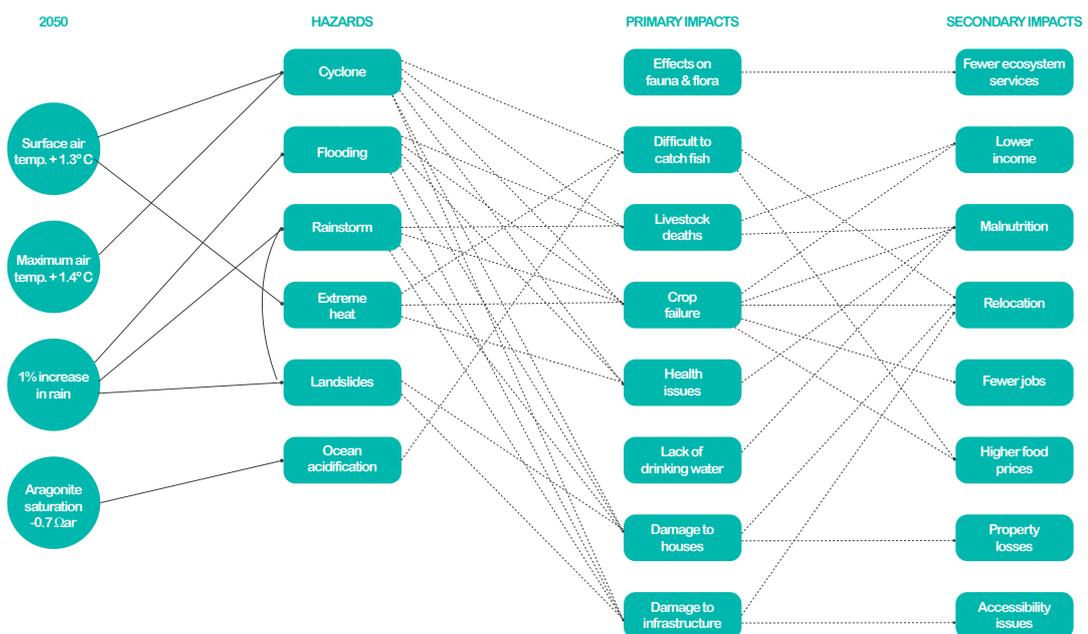
2090 Temperatures are expected to increase as well as temperature on extreme hot days.
- 

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 Kalekana settlement and primary and secondary impacts that were reported by community members during participatory workshops^{18 19}



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

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

19. 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)²⁰.

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.

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



View from the upper side of the settlement
UN-Habitat/Begoña Peiro

6 VULNERABILITY

Kalekana's vulnerability was assessed through three lens-



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 efforts²¹. 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 centers²². Moreover, people with disabilities and especially women are at particular risk of domestic violence due to their intersecting vulnerabilities²³. 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.

Most settlements under the FRIS program do not count with kindergarden facilities within their boundaries. However, Kalekana is one of the settlements that has one. The Kalekana kindergarden was built on 2006 and acts also as community hall and evacuation center. Community members expressed that both areas are too small for the functions they serve. Despite the kindergarden being located within the settlement's boundaries, a limited number of children under 6 were reported as being engaged in education.

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

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

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



Kindergarden painted by artist under the FRIS project
UN-Habitat/Inga Korte

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 affected²⁴.

Kalekana occupies an approximate total area of 85,562 square meters (8.55 hectares). Being located close to the coast and on a sloped site, its 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).

FGD participants indicated that the areas with the highest slopes have suffered from slope failure issues. Furthermore, participants indicated areas that are prone to floods. As shown in the map, there are two areas located on lower ground, where floods have been particularly problematic. Participants reported having witnessed flood levels up to one meter high in one of these areas, and three meters high in the other area. FGD participants mentioned that they have perceived an increase frequency of rainfall during the last ten years. Surface runoff is a common issue due to the saturation of the soil. Given that Kalekana is located on a slope. This does not only lead to soil erosion in some areas, but it is one of the major issues being experienced by many residents. The lack of a continuous drainage network leads to some areas being particularly affected, such as the lower side of the settlement near Queen's Road and the more inner areas of Kalekana that are not located along Kalekana Settlement Road. Furthermore, Wainivokai, the settlement located on the other side of Queen's Road is also being affected by surface runoff.

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



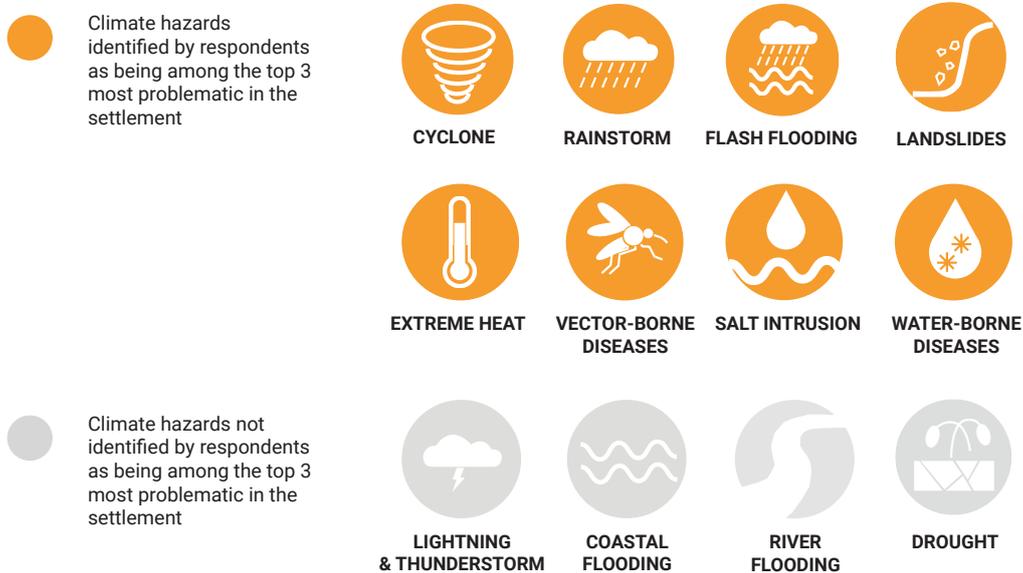
Houses on a high slope
UN-Habitat/Begoña Peiro

Figure 3 Hazard exposure map developed in participatory workshops



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

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 change²⁵.

(i) Population

The dependency ratio in the settlement is 52, slightly lower than the national average of 54. Young dependents make up 93 percent of the total dependents, whilst elderly people (aged over 65) make up the remaining 7 percent. 65 percent young people (aged 15-24) in the settlement are neither in employment, education or training. All individuals aged 6 to 16 reported being enrolled in education programmes. However, children under 6 have limited access to early childhood facilities, as these are located outside of the settlement. There are 14 people with disabilities living in Kalekana according to the information collected through the household survey.

(ii) Urban Land Use

The town council is responsible for ensuring that buildings are compliant with the building code. However, often, compliance is not checked in informal settlements. There are residential buildings, two churches, one community hall and a kindergarten in the settlement. 92 per cent of the buildings

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

16%

of houses in Kalekana were built before 1990.

97%

of the houses have metal roofs. 45% are in below average conditions

58%

of the houses are built with metal exterior walls, 29% in wood, 12% concrete blocks and 1% bricks

80%

of the houses are on stilts, 64% of which are made of wood, the rest are concrete.

38%

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

are one storey high. All the buildings have been constructed with light materials (e.g. metal, wood, etc.), which are often reused and already in poor conditions when the houses are assembled. 54 per cent of the buildings are located on a flat terrain, 25 per cent in a medium sloped terrain and 21 per cent on high slopes.

(iii) Natural Resource-based Production

Kalekana residents depend on natural resources for food and livelihoods. 35 per cent of the households said that they grow crops, making use of the open space near their houses. The main crops being grown include cassava, taro, kumala (sweet potato), yam, ginger, breadfruit, banana, coconuts, papaya, dalo and vudi. During FGDs, participants reported no major impacts from climate-hazards on their crops. Some high intensity cyclones such as TC Winston had impacts on their crops, while other cyclones such as TC Harold did not have major impacts. Climate change impacts on root crops are expected to be lower as compared to grain crops. Expected impacts on cassava crops on the short term (2030) are insignificant to low, and those on taro crops are low to moderate²⁶. Other climate-related impacts that are expected to increase, and that could present a risk to taro crops, is the increase in pest incidences due to increased temperatures.

Dependency on fishing is not very high, with 21 per cent of the households reporting to fish frequently. Residents from Kalekana access the ocean through Wainivokai settlement. During FGDs, participants mentioned that they have not perceived a decrease in catch, and that there are in fact more fish available than there used to be a decade ago. However, coral bleaching and ocean acidification represent a threat to the availability of fish. The proportion of households relying on livestock for food is very low, at 3 percent of households.

(iv) Critical Point Facilities & Infrastructure

Kalekana is located along on its lower side along Queen's Road (the main thoroughway in Fiji). There is a paved road that crosses the settlement. As such, accessibility is one of the positive aspects of Kalekana that many residents highlighted. Based on information identified during site visits and the FGDs, there are some sections of the road that are often damaged due to slope failure. Pedestrian accessibility in the settlement is inadequate in most areas. Residents have built some footpaths in certain locations with materials such as concrete, gravel or wooden planks, but these do not form a continuous and well-connected network. Moreover, the characteristics of the terrain make mobility even more difficult. Elderly people and people with disabilities are amongst the vulnerable groups that are affected the most.

There are two churches, one community hall and a kindergarten in the settlement. The kindergarten and community hall are in the same two storey building. Several issues were reported with this building. Most notably, that windows are broken, and that it does not function as an evacuation centre owing to its small size.

(v) Lifeline Utilities

Most households have access to piped water supply (86 percent of the surveyed households reported this). 93 percent of respondents said the quality to be good. However, pipes and connections are often informally built by residents in a way that these can lead to damages and leaks. Like the other settlements in the periphery of Lami Town, Kalekana does not have access to sewerage infrastructure. Septic tanks are poorly constructed (including the pipe connections), leading to leakages and outlets that lead to the nearby surroundings (e.g., drains dug by residents, bushes, etc.).

Kalekana households have access to rubbish collection services provided by the city council and 95 percent of households reported disposing their household waste in through this service. Nonetheless, garbage can be found spread across the settlement, particularly in those areas that are located further away from the Kalekana Settlement Road. 87 percent of households have access to electricity. During FGDs, participants mentioned that they had been without electricity for approximately three months after TC Winston and two weeks after TC Harold. 'Fuel-stacking' is a common issue in all households. This is generally formed by a combination of either kerosene or gas with fuelwood

26. 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 consequences²⁷.

Three different levels of adaptive capacity are analysed:

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

(i) Independent Capacity

Independent capacity is how individuals or families are able to respond and adapt to climate hazards without assistance from the larger community or local government. Also referred to as 'autonomous' adaptation. In this report the unit considered for the analysis is the household²⁸.

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.



Most respondents reported having access to information on climate change, either through technology (including radio, television, etc.) (93 percent), or through social media (36 percent). Only 3 percent of households reporting not having access to any information on climate change and disasters. With regards to disaster preparedness, most households reported having access to early warning systems (EWS).

73 percent of households reported receiving SMS alerts.

10 percent of households reported having an evacuation plan, but only 4 percent mentioned being connected to a formal DRR network.

When asked about the types of post-disaster assistance that the household had received in the past, 87 per cent of the households reported not having received any kind of aid in the past.

(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 institutions²⁹.

27. 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

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

29. Ibid

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. However, the community has initiated several actions to prepare and respond to disasters through bottom-up approaches. There is a disaster management committee in place, and existing groups (e.g., women's group, youth group, church) that are utilized to prepare and respond to disaster events.

Material resources, infrastructure and access to services are very limited in the settlement. With only one access road leading to the settlement, transportation may easily be disrupted during an extreme event. During the validation workshop, participants mentioned that there is a 'community nurse' and that there are approximately 30 people who have been trained in first aid. Furthermore, the FGDs evidenced that community members know where people with specific needs (e.g., people with disabilities, elderly, etc.) are living and there are bottom-up mechanisms in place to support them. For example, the disaster management committee will warn people with specific needs (e.g., people in wheelchairs, blind people, elderly, etc.) before a cyclone and will help them get to the evacuation center on time. There are community leadership structures in place (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 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.

(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)³⁰.

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 date. Given that informal settlements such as Kalekana 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.

³⁰. 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

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 SDGs³¹. 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 Plan³² (NAP) is aligned to international processes such as the SDGs of the 2030 Agenda, the Paris Agreement of the UNFCCC and the Sendai Framework for Disaster Risk Reduction. It contains 160 adaptation measures that are to be prioritized over the five-year period of the NAP, organized across a total of 10 components (five systems components and five sectoral components). The actions included in this report are aligned and respond to the aforementioned focus areas.

OPTION IDENTIFICATION & PRIORITIZATION

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

7.3 PRIORITIZED SHORTLISTED ACTIONS

During the participatory workshops, potential adaptation options were co-designed and discussed. Some examples include improved sanitation facilities that are resilient to floods, and rainwater harvesting tanks to ensure continuous access to water. Based on the long-list of adaptive measures (see Annex A), a short-list was prepared and prioritized. Below is the table that includes the short-listed options and the results from the community ranking. These were also assessed against the following criteria: acceptability, community

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

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

support and technical feasibility. This work forms the basis for the selection of options that will be implemented as part of the FRIS project. However, it must be noted that the fact that the options have been shortlisted does not mean that all of them will be implemented. The next steps of the project include further developing the priority actions for their implementation. This will be done in a participatory manner and will involve technical experts (e.g., engineers, architects, etc.), representatives from the Ministry of Housing and Community Development as well as from the local government with support from UN-Habitat.

PRIORITIZED OPTIONS	SDG CO-BENEFITS	COMMUNITY RANKING
Interventions in physical, natural and social assets		
Slope retaining structures	 	1
Construction of an adequate stormwater drainage network	 	3
Improved sanitation facilities (resilient to floods and surface runoff)	 	2
Construction of adequate footpaths across the community	 	4
Waste containers (composting bins and waste segregation)	 	5
Trainings and awareness raising		
Training on waste management following a participatory approach that identifies opportunities linked to livelihoods	  	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	 	1
Training on financial literacy and social protection programs	 	7
Establish youth community groups and increase their skills and capacity		6
Training on livelihoods linked to sustainable agricultural practices	 	3

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	These actions were identified as part of the long-list of adaptive measures, and were short-listed for further prioritization.
	Trainings and awareness raising activities	
	Activities that support the project implementation	

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

- Interventions in physical, natural and social assets
- Trainings and awareness raising activities
- 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
Urban farming area and cyclone-proof storage units for livelihood materials	 	2	1	3	6
Critical point facilities					
Slope retaining structures and stabilization	 	3	3	2	8
Construction of an evacuation center	 	2	2	3	7
Road improvements, particularly last segment	 	2	2	2	6
Lifeline utilities					
Construction of an adequate drainage network	 	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					
Improved sanitation facilities (resilient to floods and surface runoff)	  	2	3	3	8
Improved access to piped water supply	  	1	3	2	6

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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