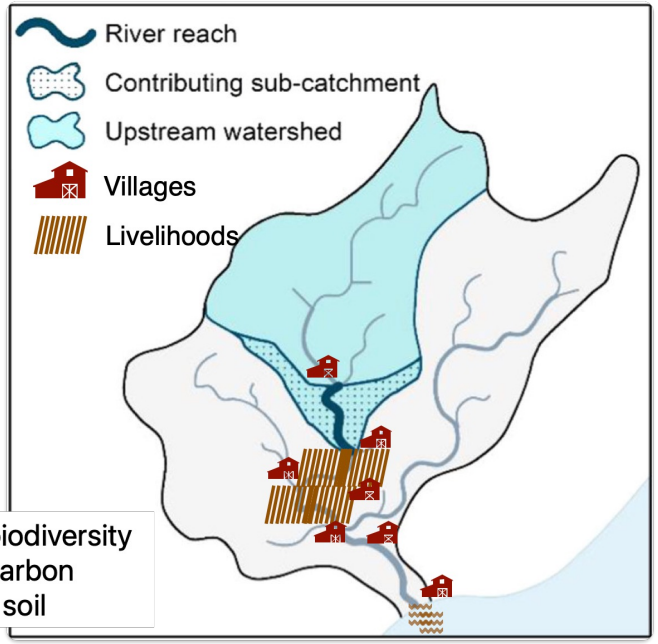
FAO/GCF - Forest Landscape Restoration in Fiji

Target Area Selection approach

Methodological note

The project



Climate change

Temperature

Precipitation

Storms & Cyclones

Reduced tree cover

Upstream livelihoods

Coastal livelihoods

- Loss of biodiversity
- Loss of carbon
- Exposed soil

- Reduced fertility

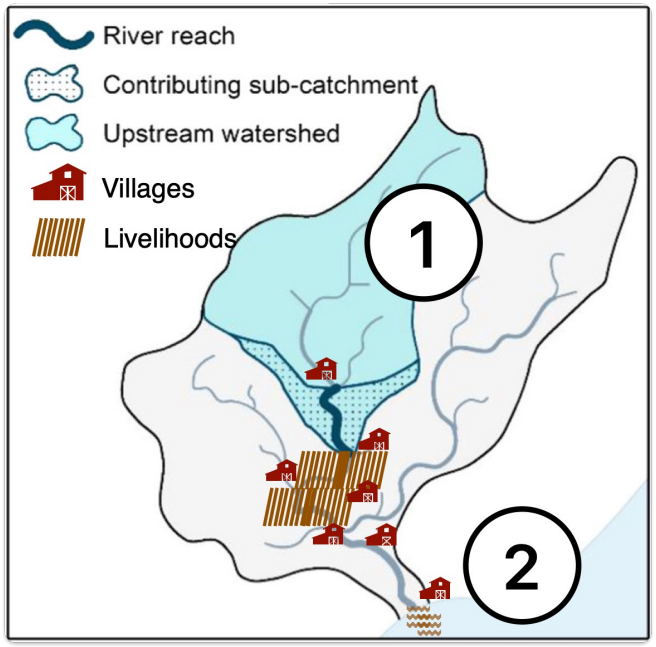
- Reduced water retention
- Reduced ecosystem function

Flooding + Sedimentation

Target Area Selection

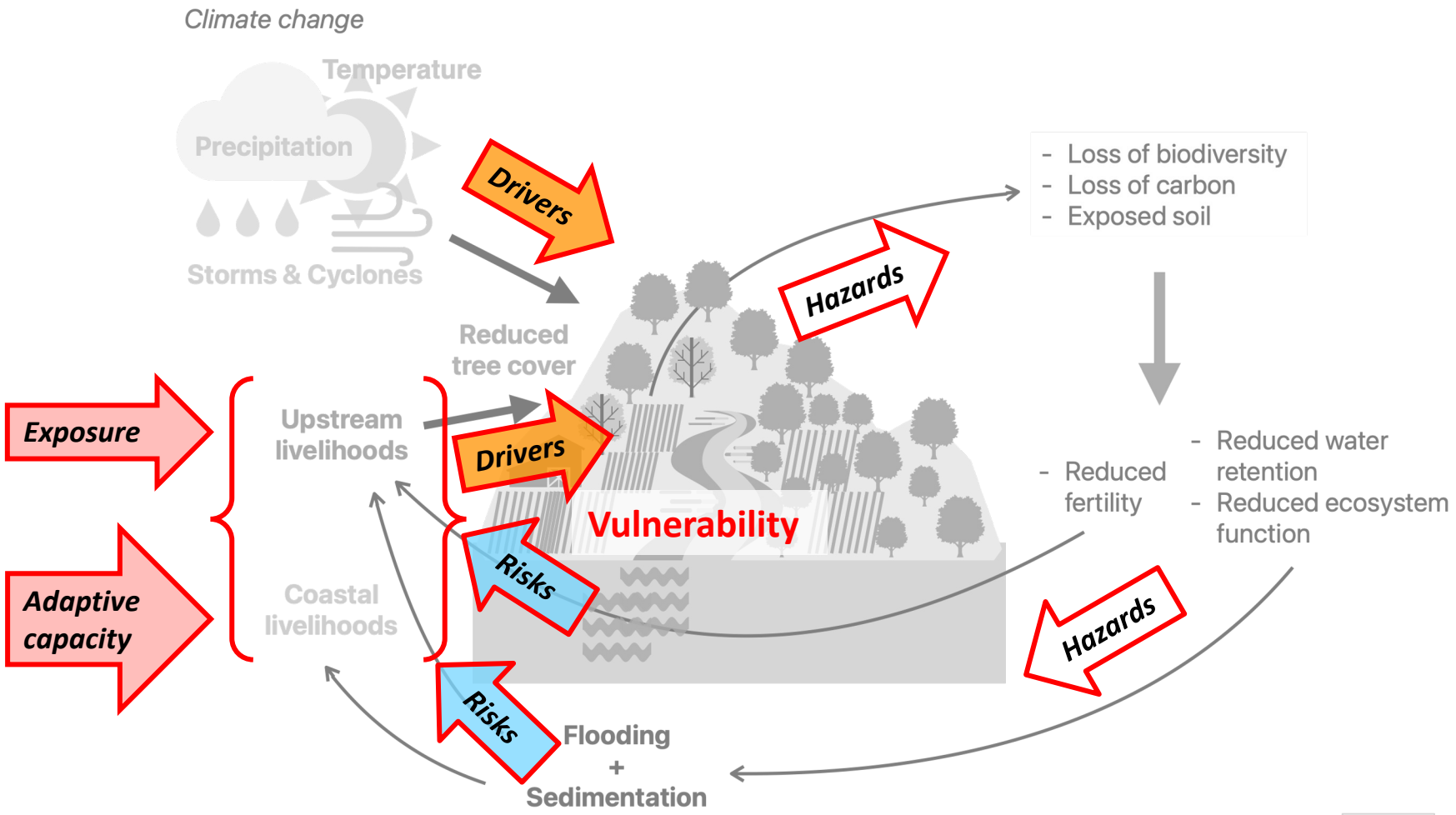
1. **Vulnerabilities at the local catchment**
   - High likelihood of climate and human-induced hazards
   - Worsening of hazards under climate change
   - Prevalence of at-risk population, assets, and livelihoods
   - Lack of adaptive capacity

2. **Vulnerabilities of the coastal ecosystems downstream to the catchment**
   - Contribution of the catchment to the coastal sedimentation
   - Extent of at-risk coastal habitats



IPCC Definitions

apps.ipcc.ch/glossary



IPCC Definitions

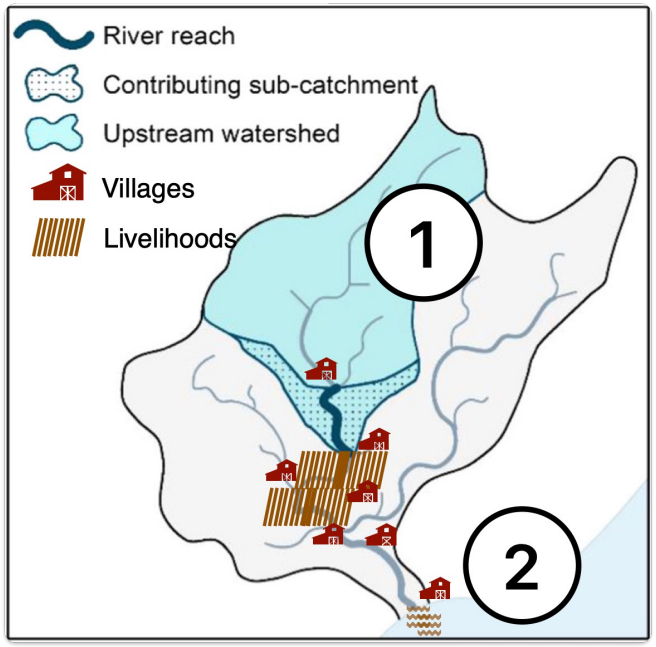
- CLIMATIC IMPACT DRIVER (CID): Physical climate system conditions (e.g., means, events, extremes) that affect an element of society or ecosystems. Depending on system tolerance, CIDs and their changes can be detrimental, beneficial, neutral or a mixture of each across interacting system elements and regions.
- HAZARD: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.
- EXPOSURE: 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.
- VULNERABILITY: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.
- ADAPTIVE CAPACITY (part of vulnerability): The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities or to respond to consequences (MA, 2005).
- RISK: The potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change.

Target Area Selection

To provide a science-based process for identifying priority areas and target sites for FLR

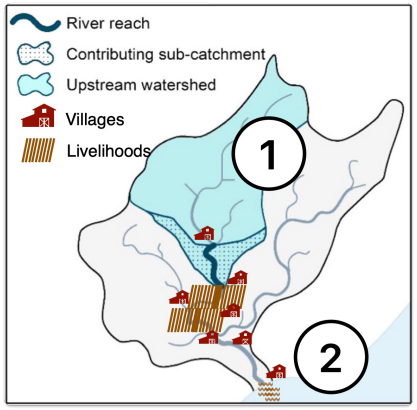
Assess	Score	Develop
Identify and Compute geospatial layers related hazards, risks, and vulnerabilities.	Rank each catchment within the country in terms of needs for FLR	Develop an R Shiny tool which explores the baseline data to support project implementation

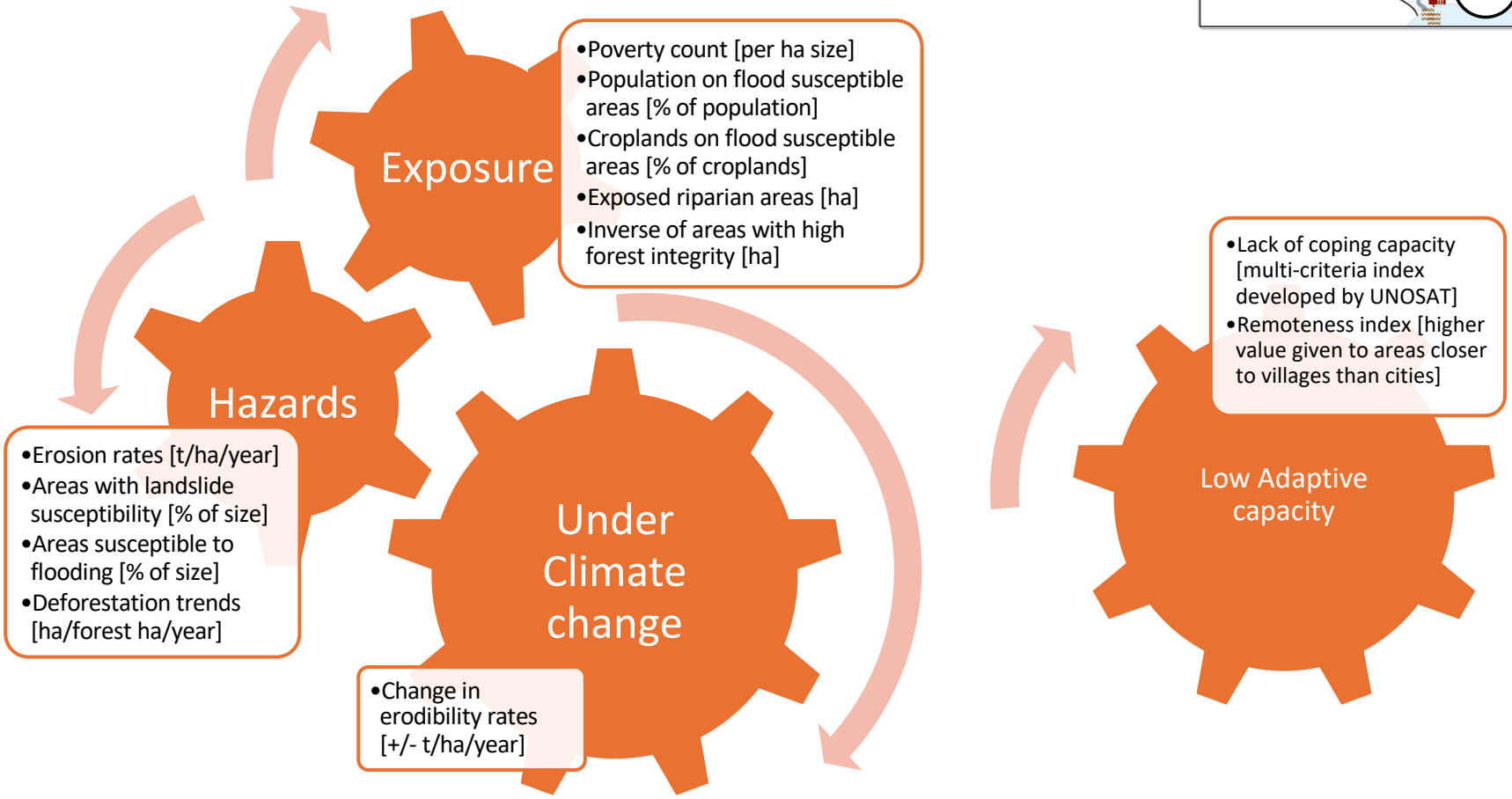
1. **Vulnerabilities at the local catchment**



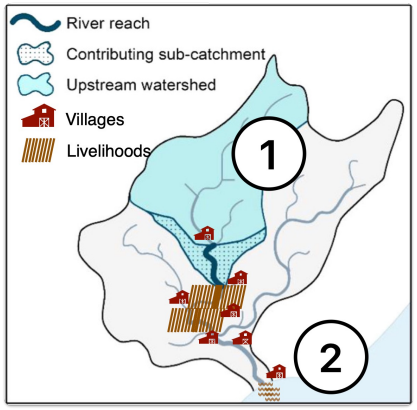
2. **Vulnerabilities of the coastal ecosystems downstream to the catchment**

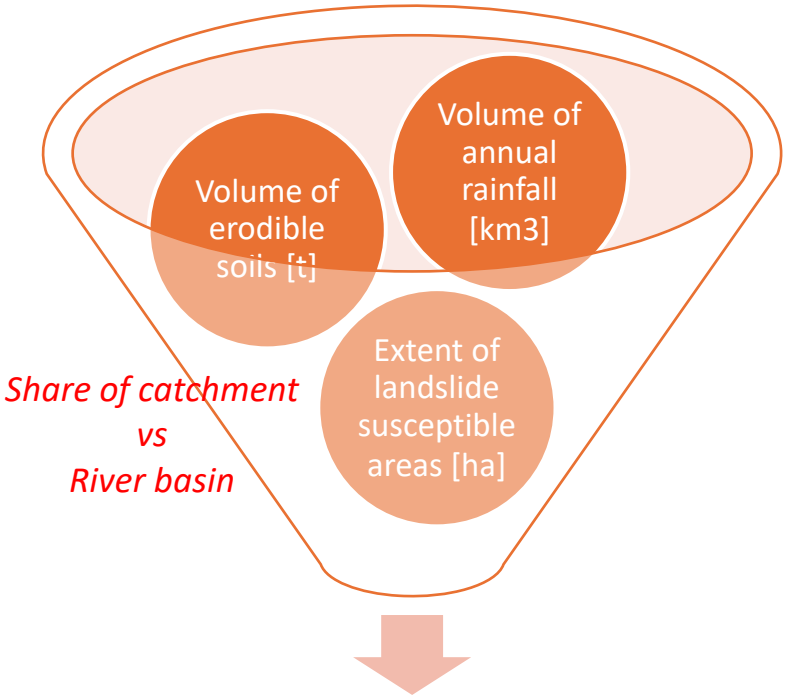
1 – At the local catchment



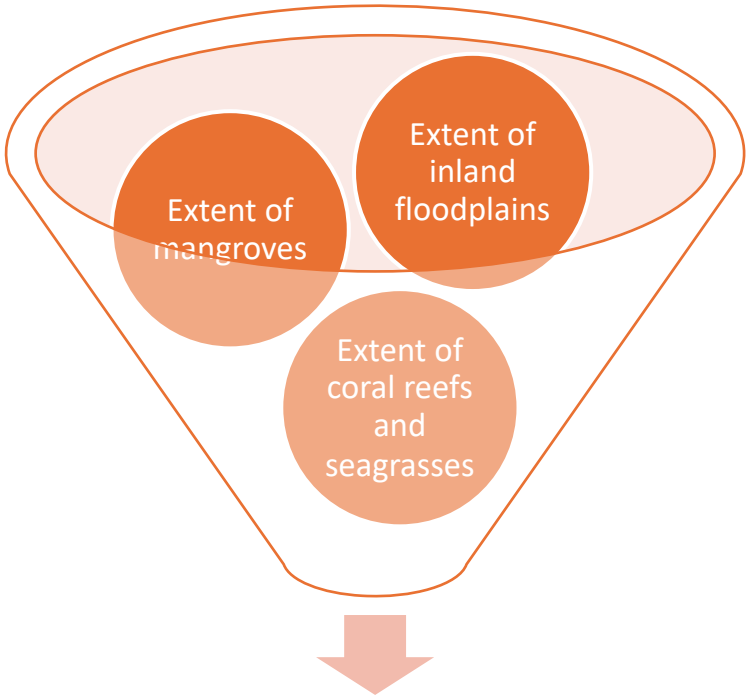


2 – Impacts downstream





Share of catchment
vs
River basin



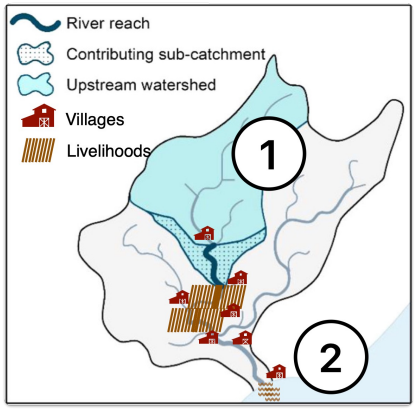
Contribution to downstream coastal hazards **[%]**

✖

Extent of downstream coastal habitats **[ha]**

Contribution index
per catchment
by River basin

Score Calculation

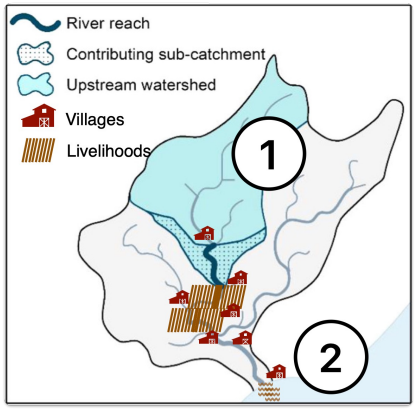


a. Approach
- Standardization
- Weighted combination

b. Formulas

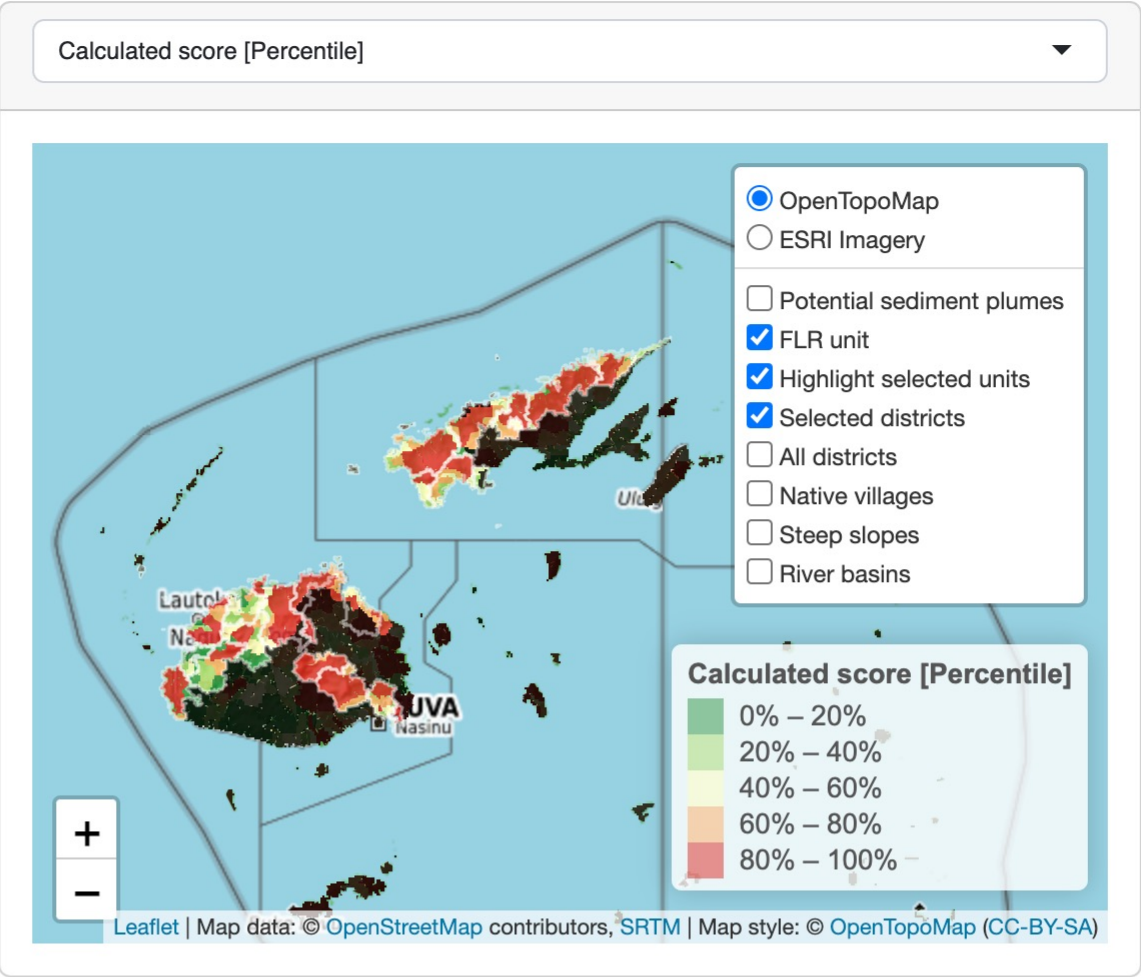
- Hazards = $\left(\frac{Erosion + Landslide + Flooding}{3} + Deforestation\right)/2$
- Exposure = $\left(Poverty\ county + \frac{Exposed\ population + Exposed\ croplands}{2} + Riparian\ areas + Lack\ of\ forest\ integrity\right)/4$
- Climate change = *Erodibility trends*
- Low Adaptive capacity = $(Lack\ of\ coping\ capacity + Remoteness\ index)/2$
- Contribution index = *Contribution downstream x Extent of downstream habitats*

Score Calculation



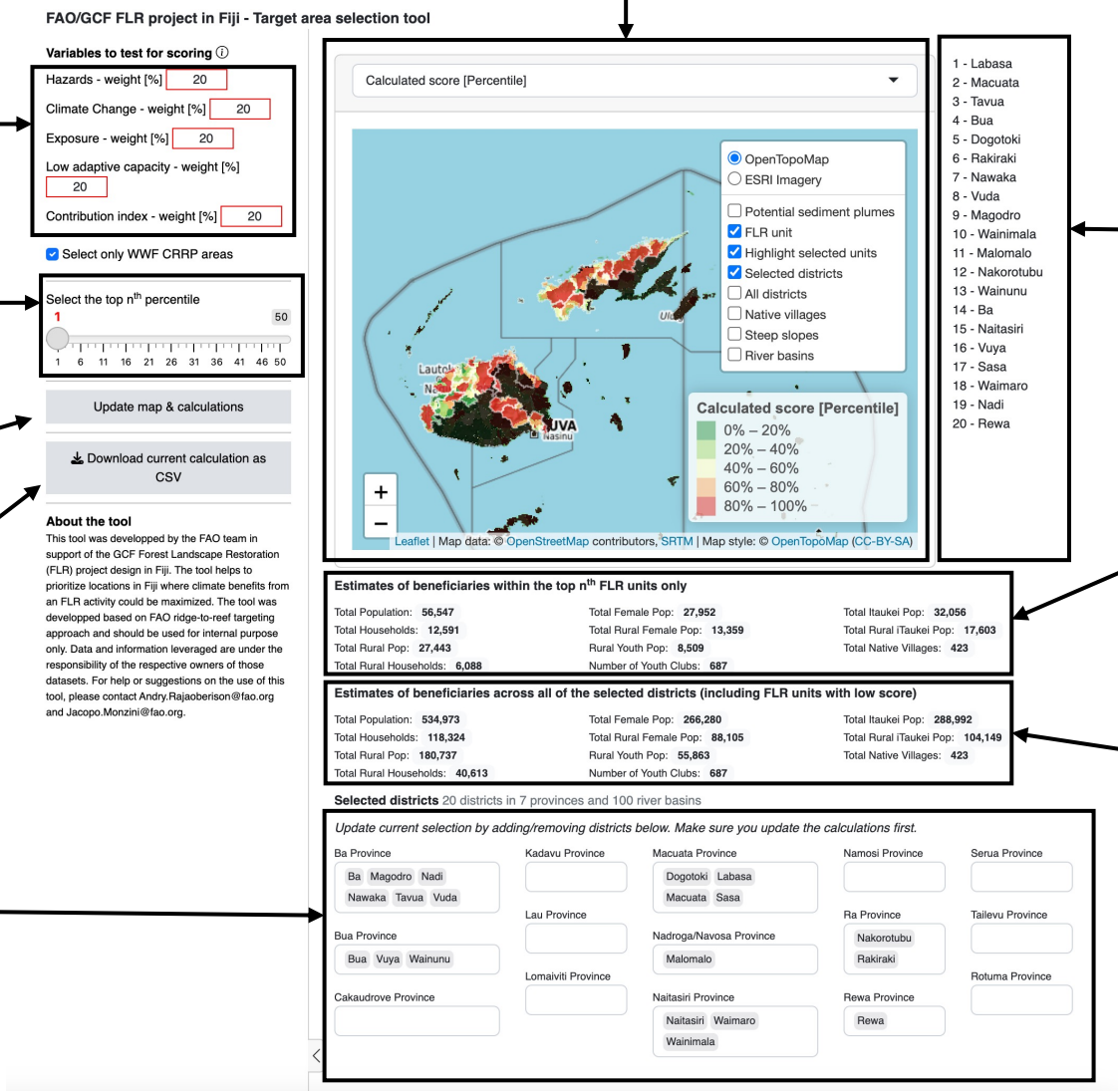
w1 x Hazards + w2 x Exposure + w3 x Climate change + w4 x Low adaptive capacity + w5 x Contribution index = Weighted score

Preliminary results



1 - Labasa
2 - Macuata
3 - Tavua
4 - Bua
5 - Dogotoki
6 - Rakiraki
7 - Nawaka
8 - Vuda
9 - Magodro
10 - Wainimala
11 - Malomalo
12 - Nakorotubu
13 - Wainunu
14 - Ba
15 - Naitasiri
16 - Vuya
17 - Sasa
18 - Waimaro
19 - Nadi
20 - Rewa

Target Area Selection Tool



Map and Layers

Adjust weights to calculate score

Filter top nth districts based on the calculated score

Run the calculation

Download the data for Excel

List of currently selected districts and their ranks according to the calculated score

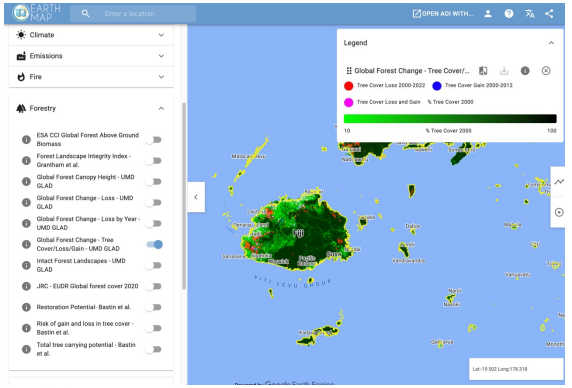
Count of potential beneficiaries based on the catchment with high scores

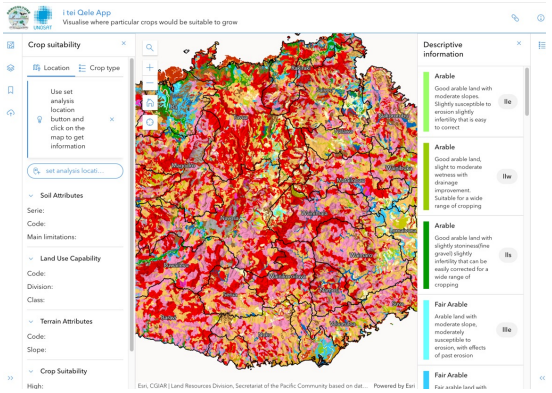
Count of potential beneficiaries anywhere within the selected districts

Remove or Add districts in the current selection

Other tools

- https://rajaoberison.shinyapps.io/Fiji-FLR/
  - This target area selection tool. It provides estimates of potential areas based on calculated score, and the resulting estimates of beneficiaries.
- https://rajaoberison.users.earthengine.app/view/fijilulc
  - It provides information on land cover and river basins in Fiji.
- https://earthmap.org/
  - It has information on several environmental and socio-economic layers that could further support / justify area selection.
- https://unosat-geodrr.cern.ch/dss/FJI/
  - UNOSAT's decision support system has several datasets and information tailored for climate change projects in Fiji.
- https://unosat-geodrr.cern.ch/apps/FJI/i-tei-Qele/
  - It provides information on slope and land classes in Fiji. Also, it provides insights on the suitability of several crops.



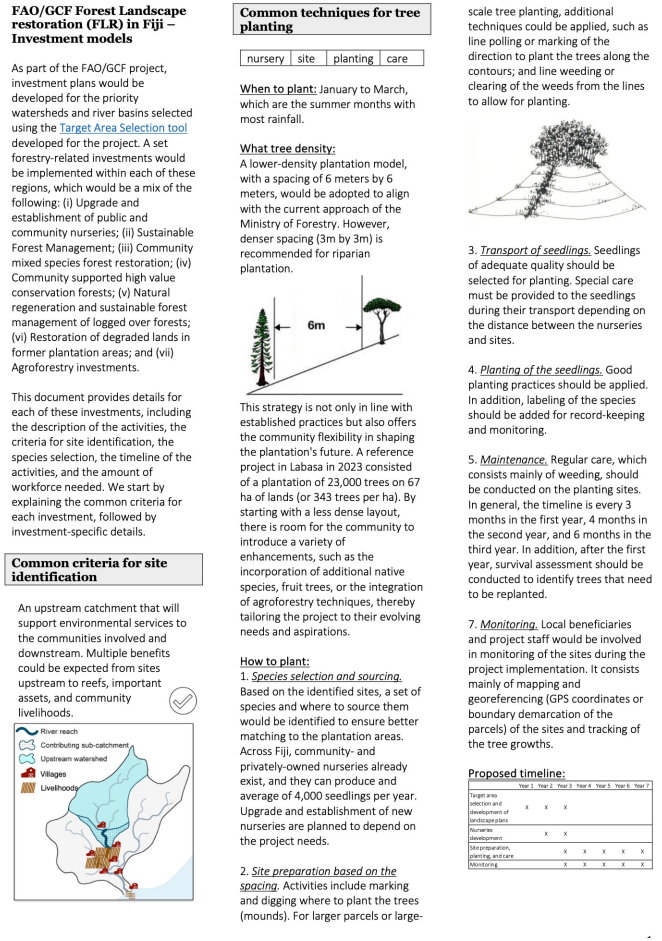


Considerations during project implementation

- Aim: Maximize resilience of forest systems in Fiji, to future climate related trends and shocks, with impacts in watersheds and downstream, especially of most vulnerable forest related groups and systems.
- Identify:
  - Watershed areas that are vulnerable to hazards
  - Watersheds which are vulnerable to change in hazards (climate rationale)
  - Watersheds which contribute to downstream hazards - by also identifying which downstream areas (lowland and marine) that are most exposed to hazards
- Watersheds systems and communities that have higher vulnerability
- Maximize environmental service functions of upland forests, including carbon sequestration
- Taking into account practical considerations – ex: Are there other projects ongoing in areas, Necessity for community agreements, etc.

Considerations for project activities

- Annexed to this methodological document is a manual of investment models for the the activities under this FAO/GCF FLR project in Fiji.



FAO/GCF Forest Landscape restoration (FLR) in Fiji – Investment models

As part of the FAO/GCF project, investment plans would be developed for the priority watersheds and river basins selected using the Target Area Selection tool developed for the project. A set forestry-related investments would be implemented within each of these regions, which would be a mix of the following: (i) Upgrade and establishment of public and community nurseries; (ii) Sustainable Forest Management; (iii) Community mixed species forest restoration; (iv) Community supported high value conservation forests; (v) Natural regeneration and sustainable forest management of logged over forests; (vi) Restoration of degraded lands in former plantation areas; and (vii) Agroforestry investments.

This document provides details for each of these investments, including the description of the activities, the criteria for site identification, the species selection, the timeline of the activities, and the amount of workforce needed. We start by explaining the common criteria for each investment, followed by investment-specific details.

Common criteria for site identification

An upstream catchment that will support environmental services to the communities involved and downstream. Multiple benefits could be expected from sites upstream to reefs, important assets, and community livelihoods.

River reach
Contributing sub-catchment
Upstream watershed
Villages
Livelihoods

Common techniques for tree planting

nursery	site	planting	care

When to plant: January to March, which are the summer months with most rainfall.

What tree density:
A lower-density plantation model, with a spacing of 6 meters by 6 meters, would be adopted to align with the current approach of the Ministry of Forestry. However, denser spacing (3m by 3m) is recommended for riparian plantation.

6m

This strategy is not only in line with established practices but also offers the community flexibility in shaping the plantation's future. A reference project in Labasa in 2023 consisted of a plantation of 23,000 trees on 67 ha of lands (or 343 trees per ha). By starting with a less dense layout, there is room for the community to introduce a variety of enhancements, such as the incorporation of additional native species, fruit trees, or the integration of agroforestry techniques, thereby tailoring the project to their evolving needs and aspirations.

How to plant:
1. *Species selection and sourcing.* Based on the identified sites, a set of species and where to source them would be identified to ensure better matching to the plantation areas. Across Fiji, community- and privately-owned nurseries already exist, and they can produce and average of 4,000 seedlings per year. Upgrade and establishment of new nurseries are planned to depend on the project needs.

2. *Site preparation based on the spacing.* Activities include marking and digging where to plant the trees (mounds). For larger parcels or large-scale tree planting, additional techniques could be applied, such as line polling or marking of the direction to plant the trees along the contours; and line weeding or clearing of the weeds from the lines to allow for planting.

3. *Transport of seedlings.* Seedlings of adequate quality should be selected for planting. Special care must be provided to the seedlings during their transport depending on the distance between the nurseries and sites.

4. *Planting of the seedlings.* Good planting practices should be applied. In addition, labeling of the species should be added for record-keeping and monitoring.

5. *Maintenance.* Regular care, which consists mainly of weeding, should be conducted on the planting sites. In general, the timeline is every 3 months in the first year, 4 months in the second year, and 6 months in the third year. In addition, after the first year, survival assessment should be conducted to identify trees that need to be replanted.

7. *Monitoring.* Local beneficiaries and project staff would be involved in monitoring of the sites during the project implementation. It consists mainly of mapping and georeferencing (GPS coordinates or boundary demarcation of the parcels) of the sites and tracking of the tree growths.

Proposed timeline:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Target area selection and development of landscape plans	X	X	X				
Nurseries development		X	X				
Site preparation, planting, and care			X	X	X	X	X
Monitoring			X	X	X	X	X