



**Vanuatu Climate Information Services for Resilient Development Project
Vanuatu Klaemet Infomesen Blong Redy, Adapt mo Protekt (Van-KIRAP)**

Environment and Social Management Plan

July 2022



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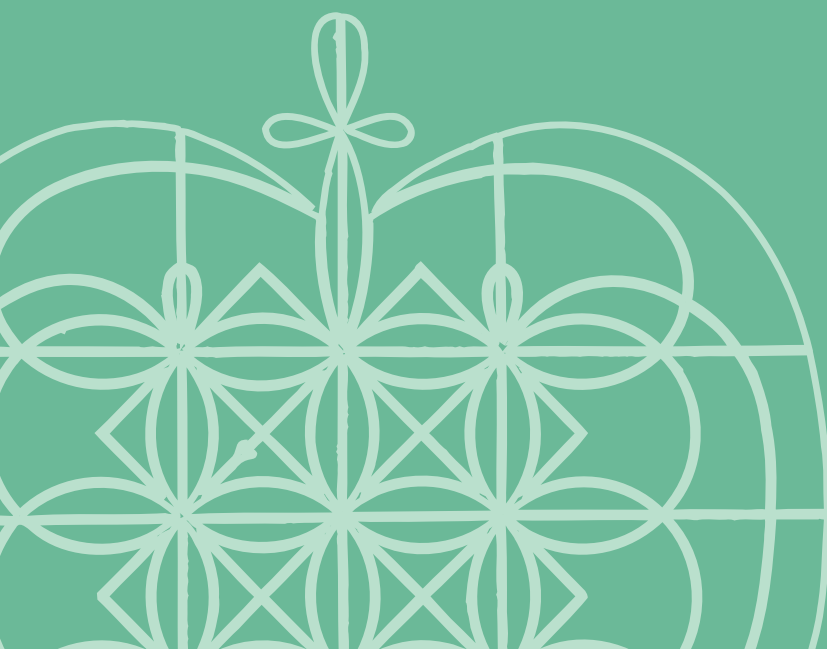
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1. Introduction

1.1 Overview

The Van-KIRAP project is intended to build the technical capacity in Vanuatu to (i) harness and manage all relevant climate data; (ii) develop and deliver practical climate information services (CIS) tools and resources at all levels of society; (iii) support enhanced coordination and dissemination of tailored climate-related information to a wide range of potentially vulnerable stakeholders; (iv) enhance and modernise Vanuatu's CIS information and technology infrastructure; and (v) support the application of relevant CIS through real-time development processes and case studies in 5 sectors, for more resilient outcomes. The sectors covered are water, agriculture, infrastructure, tourism and fisheries.

The main components (and outputs) of the project are:

Component 1. Strengthening the Vanuatu Meteorological and Geo-Hazards Department (VMGD) platform to provide quality climate data and information for climate information services (CIS)

- Output 1.1. Strengthened CIS through improved data and interfaces
- Output 1.2. Research, modelling and prediction to support CIS tools and uptake

Component 2. Demonstrating the value of CIS at the sectoral and community levels

- Output 2.1. CIS implemented within target sectors
- Output 2.2. CIS is incorporated into community practice
- Output 2.3. A socio-economic benefit analysis for Vanuatu using the customised Pacific CIS cost-benefit framework

Component 3. Development of CIS tools and engaging with stakeholders through outreach and communications

- Output 3.1. Traditional knowledge is incorporated into CIS in Vanuatu
- Output 3.2. Development of CIS tools and information products
- Output 3.3. Implementing knowledge management, engagement and outreach across sectors and communities

Component 4. Strengthening the institutional capacity for long-term implementation of CIS in decision-making

- Output 4.1. Institutional capacity to implement CIS across sectors strengthened
- Output 4.2. Training of personnel leads to strengthened institutional capacity

Component 5. Project management and development

The total project cost is US\$19,853,897 (GCF Grant: US\$18,106,905; Co-Financing US\$1,746,992). The project implementation period is from 10 January 2018 to 10 January 2022, although a project extension to December 2023 is requested. This Environmental and Social Management Plan (ESMP) is based on the revised documentation, including the Mid-term Review (to April 2021).

1.2 Environmental and social safeguards screening

At project approval, the project was categorised as C, i.e., with minimal environmental and social implications. During implementation, however, some specific environmental and social issues have indicated the need for extra attention. As a flexible planning tool, the ESMP deals with these details that may emerge during implementation¹. A separate Gender Action Plan has been drafted and for the sake of completeness the main aspects of that plan are included here. The ESMP section on monitoring and evaluation also needs to be reflected in the revised monitoring and evaluation (M&E) plan and any budget implications need to be incorporated into revised budgets.

As additional details, particularly on the case studies, community engagement strategy and gender action plan, became available after the first draft of this ESMP, re-screening of the environmental and social safeguards category was needed (for details refer to Annex 1). The re-screening identified the following potential safeguards concerns that would justify reclassifying the project as Category B.

Free, prior informed consent is needed before making any traditional knowledge public or using it to change access to resources (e.g., tabu areas).

Some vulnerable communities will receive project support which could be perceived as discriminatory by those who don't receive equivalent support. A grievance redress mechanism is needed and should be widely disseminated.

Gender equality is still an issue in Vanuatu and women and girls may not have equal access to project decision making.

People with disabilities may not be able to attend information sessions at Community Climate Centres.

For the fisheries case study, a more substantial understanding of fishing effort and seasonality in the proposed project sites is needed based on extensive surveys and interviews with current and potential users of these areas. If the potential for conflict is high, new sites may need to be found.

Creation of a marine protected area or designation of a 'tabu' area could prevent women from accessing coastal resources, such as shellfish, crabs, and sea urchins.

Additional surveys and local observations in the proposed fisheries case study sites should document the baseline biodiversity, ecological dynamics and ecosystem conditions, so that subsequent monitoring can show that the project has not had any adverse impacts.

In some of the more remote project sites, there will be no capacity for recycling solid waste, e-waste, or hazardous waste like batteries, so waste receptacles should be provided on-site, and the waste returned to Port Vila for recycling or proper disposal.

Table 1 illustrates the main areas of concern triggered by the screening assessment and requiring additional assessment.

¹GCF defines ESMP as "a document that contains a list and description of measures that have been identified for avoiding adverse environmental and social impacts, including, where appropriate transboundary risks and impacts, or minimising them to acceptable levels, or to mitigate and compensate them and [is] usually the main output of the [environmental and social impact assessment] ESIA process".

Table 1. Checklist of environmental and social principles and safeguards

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks (Further assessment and management required for compliance)
<i>Compliance with the Law</i>		✓
<i>Access and Equity</i>		✓
<i>Marginalized and Vulnerable Groups</i>		
<i>Human Rights</i>	✓	
<i>Gender Equity and Women's Empowerment</i>		✓
<i>Core Labour Rights</i>		✓
<i>Indigenous Peoples</i>		✓
<i>Involuntary Resettlement</i>		✓
<i>Protection of Natural Habitats</i>		✓
<i>Conservation of Biological Diversity</i>		✓
<i>Climate Change</i>	✓	
<i>Pollution Prevention and Resource Efficiency</i>		✓
<i>Public Health</i>		✓
<i>Physical and Cultural Heritage</i>		✓
<i>Land and Soil Conservation</i>	✓	

To summarise, re-screening found that the following safeguards would be triggered:

Safeguard 4

Labour and working conditions

An occupational health and safety guidelines document is needed for all stakeholders in the project.

Safeguard 5

Resource efficiency and pollution prevention

A hazardous waste disposal plan should be cleared by SPREP IA and the Department of Environment Protection and Conservation (DEPC).

Safeguard 6

Community health, safety and security

The renovation plans for the Community Climate Centres need to be checked by experts and approved by SPREP IA and the relevant government agencies.

Safeguard 7

Involuntary resettlement

An assurance should be sought from the Government that anyone suffering changes to their livelihood resulting from the fisheries case study will be compensated in some way.

Safeguard 8

Biodiversity conservation and sustainable management of living natural resources

A detailed ecosystem management plan is required before proceeding with the fisheries case study.

Safeguards 9 and 10

Indigenous peoples and cultural heritage

An indigenous peoples' plan based on the current assessment of traditional knowledge and including aspects of cultural heritage is needed.

1.3 Outline of the Environmental and Social Management Plan

The Green Climate Fund (GCF) requires the ESMP to “be designed such that the appropriate measures to address adverse environmental and social risks and impacts including health and safety, as well as opportunities to pursue and enhance positive environmental and social outcomes, are adequately described, roles defined, and the corresponding timelines and resources identified”. In addition, “the ESMP will be integrated into the overall planning, design, resourcing, and execution of the GCF-financed activities”. International Finance Corporation Performance Standards on Environmental and Social Sustainability have been adopted by GCF as its interim environmental and social standards (<http://www.ifc.org/performancestandards>). Where national standards are not sufficient, or absent, the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) should be used.

Accredited entity guidance is provided by the Secretariat of the Pacific Regional Environment Programme (SPREP) Environmental and Social Management System (ESMS)². SPREP requires an ESMP to be developed for all categories of project (A, B or C). The level of detail within the ESMP, however, will vary according to environmental and social risk and impact. The expected contents of the ESMP should cover:

A summary of the overall approach to environmental and social risk and impact management;

- Details of all identified environmental and social risks and impacts;
- Details of mitigation measures which will be applied for each risk;
- Roles and responsibilities for management of risks and impacts;
- Monitoring and evaluation framework;
- Reporting requirements;
- Details of the grievance redress mechanism; and
- Relevant annexes.

National guidance is provided by the Vanuatu National Environment Policy and Implementation Plan (2016-2030) and the National Waste Management, Pollution Control Strategy and Implementation Plan (2016-2020), and the National Sustainable Development Plan (2016-2030). Regional guidance is provided by the Pacific Regional Waste and Pollution Management Strategy 2016–2025 (Cleaner Pacific Strategy 2025) and the Pacific–European Union Waste Management Programme (PacWaste Plus), and the Pacific Leaders Gender Equality Declaration, among others. Support can also be expected from the Japanese International Cooperation Agency (JICA) Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries programme (JPRISM).

The following sections follow the phased sequencing of project activities (sections 2-5) cutting across all components. Section 6 examines the plans for the Community Climate Centres. Section 7 deals with the 5 sector case studies. Sections 8-11 examine project management issues, and Section 12 draws out the key conclusions and recommendations. The possible environmental and social implications of project activities are first identified, followed by practical mitigation measures. In general, the mitigation measures are the joint responsibility of the Executing Entities – SPREP and Vanuatu Meteorological and Geohazard Department (VMGD) project management units (PMU), unless otherwise indicated. The revised work plan generally indicates when the mitigation measures need to be initiated.

²https://www.sprep.org/attachments/Publications/Corporate_Documents/SPREP-E&SManagementSystem-14Nov16.pdf

2. Equipment Procurement

2.1 Environmental Implications

Care needs to be taken with imported equipment specifications. Generally, for equipment that is exposed to weather and other local conditions in the island environment, it should be climate proof, robust, repairable, recyclable, and environmentally sound. While normal procurement rules must be followed³, sound specifications can ensure that the project does not end up with the cheapest available equipment that breaks down quickly, cannot be repaired, and ends up being discarded on the nearest landfill. As there is a significant quantity of quite sophisticated equipment being procured for this project (Table 2), environmental considerations should be built into all specifications. The revised budget for procurement of goods and equipment (excluding contingencies) is shown in Table 2.

Table 2. Procurement of goods and equipment budget by component (USD)

Component	IT Equipment (\$)	Equipment (\$)	Office Supplies (\$)	Sub-total (\$)	Component Total (\$)
1. VMGD	119,815	2,686,410	9,000	2,815,225	9,842,043
2. Demonstrations	10,300	257,860	13,720 ⁴	281,430	3,221,530
3. CIS tools	60,200	4,000	11,400	75,600	1,990,655
4. Institutional capacity	-	-	-	-	1,144,407
5. Project management	30,240	-	66,422	96,662	1,908,270
Total	220,555	2,948,270	100,092	3,268,917	18,106,905

As this equipment will be shipped or flown from overseas, there will be considerable packaging involved, possibly in wooden crates, with plastic and/or cardboard wrapping, inside a shipping container. While the wooden crates may be useful locally, the plastic and cardboard wrapping is potentially recyclable. As there is no recycling capacity for most of this material in Vanuatu, it is likely to be burned in the open, with possible health implications for those in the vicinity, or just dumped in the nearest landfill.

2.2 Social Implications

Although it is often easiest to arrange direct purchases from overseas suppliers, preference should be given to local equipment suppliers, wherever possible. Not only does this help the local economy, but repairs and maintenance may be more convenient. Local project staff should be trained in 'green' procurement practices. There may be some misalignment with government procurement rules, which require 'best value for money' and may need to be negotiated to demonstrate best value.

³"A Government contract which is funded by a foreign donor or another organisation is subject to the provisions of this Act or any regulations made under this or any other Act, unless it is inconsistent with any requirements of the funding agency" – *Government Contracts and Tenders (Amendment) Act No. 40 of 2013*

2.3 Mitigation Measures

As indicated above, all equipment specifications should include environmental considerations, as well as issues of longevity, repairability, and weather resistance. For example, ocean buoys should not have fragile plastic components, like tethering points, that are likely to break off and add to the existing problem of marine litter. Battery operated electronic equipment should allow battery replacement rather than having sealed battery compartments that require the whole item to be replaced.

The Government of Vanuatu has released the National Waste Management and Pollution Control Strategy (NWMPCS) (2016-2020), so the project should adopt the precautionary principle and not add to Vanuatu's existing waste management problems. In February 2018, under the National Waste Management Act 2014, the Government gazetted new regulations in relation to waste management (Waste Management Regulations Order No. 15 of 2018) which prohibit the manufacture and sale of disposable containers, single use plastic bags, and plastic straws. This heightened attention to plastic waste should also extend to packaging of imported equipment. Significant fines may be imposed for anybody littering the natural environment, with packaging specifically mentioned in the regulation. Waste incineration is also restricted to operators with a valid private waste operator's licence.

The EHS Guidelines note that "if waste materials are still generated after the implementation of feasible waste prevention, reduction, reuse, recovery and recycling measures, waste materials should be treated and disposed of, and all measures should be taken to avoid potential impacts to human health and the environment". SPREP's ESMS states that "SPREP will not support any projects which result in significant or unjustified waste generation". Furthermore, "where avoidance is not possible, SPREP expects that waste generation will be reduced, and that waste will be recovered and re-used in a manner safe for human health and the environment".

An alternative, albeit potentially costly, option is to require the overseas suppliers to take back their packaging and either recycle or sustainably dispose of it in the source country. This requirement can be included in the equipment specification. As containers often return from Vanuatu empty, shipping costs may not be too expensive.

3. Equipment Installation

3.1 Environmental Implications

The project will install automatic weather stations and automatic rain gauges, stream gauges, and other equipment needed for the 5 sector case studies and CIS provided by VMGD. While the installation phase is not expected to have major environmental implications, some minor impacts may be expected, as follows.

Although local procurement of materials is preferred in remote locations, such as locally sourced fence poles and rock, sand and gravel for concrete walls (e.g., for river gauging stations), care needs to be taken that these materials come from sustainable sources and not from illegal logging or quarrying sites.

⁴This budget will be higher once the individual budgets and equipment requirements for the Community Climate Centres is finalised.

Site access can also cause minor environmental damage in remote areas, especially if a new track or road needs to be built to obtain access to a river gauging site or to a microwave transmission tower. When fencing around project sites for security reasons, project staff need to be aware of blocking any local access.

Minor vegetation clearance, for example to keep weather stations or rain gauges open and not encroached on by tree canopies, should be undertaken to the minimum level necessary, preferably without herbicides and pesticides. During operations, local labour can be employed to keep these sites open, for example by trimming overhanging branches or cutting the grass.

Any earth disturbance, such as placing cables underground, can cause soil erosion and/or stream sedimentation, especially on steep slopes. Consideration needs to be given to downstream users of streams (possibly for drinking water) who may be affected by poor water quality.

In the marine environment, anchoring vessels to install monitoring buoys may damage coral reefs and/or disrupt local fishing practices. Plastic items, like handles on the buoys, should be avoided as the plastic can become brittle, break off and add to the marine plastic litter problem. Permanent fish traps or fishing platforms will need to be avoided.]

3.2 Social Implications

Entry into remote villages for installation of equipment will need to follow local traditional greetings with the village chief and elders, possibly with a kava ceremony or other local kastom such as small gifts. Each province in the project will have slightly different traditional requirements and these local customs need to be acknowledged and honoured.

Local employment in construction and installation activities is preferred, especially where unskilled labour is required. This not only provides cash compensation but also provides an opportunity to explain to local villagers what the equipment is intended to do and how it will help their future well-being and survival.

For marine operations, such as installing buoys or arranging access to weather stations via the sea, reef protection and the customary rights of local fishers need to be considered. Local fishers may need to be advised of exclusion zones around the buoys and discouraged from tying up boats or canoes to the buoys.

3.3 Mitigation measures

The EHS Guidelines note that "hazardous waste materials are frequently generated in small quantities by many projects through a variety of activities such as equipment and building maintenance activities, [such as] spent solvents and oily rags, empty paint cans, chemical containers; used lubricating oil; used batteries (such as nickel-cadmium or lead acid); and lighting equipment, such as lamps or lamp ballasts". In the absence of a qualified commercial or government-owned waste disposal operator, these should be handled by either installing on-site treatment or stockpiling the waste until external commercial operations can collect the waste.

Timing of site access, to the extent possible, should be during dry weather to reduce damage to access roads into remote villages, especially if new tracks need to be constructed to get access to new river gauging sites. This will also help to reduce 'down time' waiting for inclement weather to pass.

While use of local materials is preferred, instead of importing all construction materials, care must be taken to ensure that it is sustainably sourced. Project staff responsible for installation should avoid using illegally felled timber, or extraction of sand, gravel, and rocks that damages the local environment. Wooden fence posts may need to be protected against termite damage, with any pesticide containers returned for proper disposal.

At each site, a small amount of soil work is expected, for example for underground cabling. Care needs to be taken to stockpile topsoil, back fill, and revegetate disturbed areas. Necessary erosion prevention measures and minimal clearing of vegetation should be practiced. A grass cover should be maintained around the automated weather stations, with a local person employed to mow the grass periodically.

River gauging may take place at existing locations or preferably further up the catchment to allow for more timely early warning systems. For these new sites, sedimentation control, revegetation of riverbanks, and protection of downstream users from damaged water quality need to be undertaken.

From a social perspective, project staff need to take security issues seriously. For example, fencing needs to be sufficiently robust that thieves and animals will find it difficult to enter. The location of stations needs to be discussed with the village chiefs and/or sector agencies to find the optimal locations, not just from a technical perspective but also in consideration of local social behaviour (e.g., locations next to schools are often a problem as children like to throw stones at solar panels). Depending on the local security situation and the remoteness of the stations, local guards may need to be employed.

Access to land is a serious concern as land tenure and security is always an issue in Vanuatu. While the preference will be to locate stations on land already controlled by different government agencies, these locations might not be the most suitable from a technical point of view. Where land needs to be procured or leased, documentation needs to be watertight, so that changes in the village chief or other local conditions don't set off a new round of negotiations and demands for greater compensation. All land tenure documents need to be retained by SPREP IA.

An important activity in the installation phase is socialisation in each project site. Project staff will need to make sure the local villagers are fully aware of what the equipment does and why it needs to be installed in that location, as well as any penalties for interfering with the equipment. They need to be convinced that this equipment will ultimately help them, for example with early warning systems and advanced notification of changes in seasonal conditions.

While the project should use local unskilled labour, including women, for the installation, care must be taken to avoid any child labour and ensure that payment accords with Vanuatu's labour law (Employment Act 1983, amended).

4. Operation

4.1 Environmental Implications

During the operational phase, multiple visits will be made to the various project sites. The guiding principle should be to avoid any unnecessary trips, both domestically and internationally. Not only does this reduce the project costs, but also minimises greenhouse gas (GHG) emissions.

Replacement of materials such as batteries or tapes, and any disposable items like cleaning rags, or pesticide containers, should not be dumped in the local landfill if it is not properly managed.

While electricity consumption should be relatively minor at each site, the plan to use diesel backup generators should be reconsidered. These are not only noisy and disruptive at night but also release GHGs and can be a fire hazard. Solar panels and power walls or batteries may be a better alternative.

Apparently, the radiosonde balloons are not routinely recovered and many of them probably end up in the sea. Recent evidence suggests that balloons if ingested by marine fauna almost always result in death of the animal. Therefore, additional measures may be necessary to track and recover the balloons.

While the ocean monitoring buoys are soundly tethered, they may break loose during extreme weather events. If this happens, they need to be tracked and recovered as soon as possible to avoid damage to reefs or impede shipping.

4.2 Social Implications

Visits to monitoring sites should follow the same protocols as the installation phase. Local climate champions will be employed by the project, and they can alert project staff to any social issues that arise during this phase. As indicated below, a project level grievance redress mechanism can help stave off any emerging social conflicts.

The specific roles of local labour and other villagers during the operation phase need to be made clear so that there are no unrealistic expectations.

4.3 Mitigation Measures

As for the installation phase, conducting site visits in wet weather should be avoided, partly to reduce any access damage but also to avoid 'down time' and waiting for the weather to clear. Visits to monitoring sites should also minimise noise and other local disruptions.

For most materials, such as paper, tapes, disposables, pesticide cans etc., it may be necessary to bring these items back to base or dispose of them in an environmentally sound way.

It is strongly recommended that the project should consider using solar panels and power walls/ batteries instead of grid electricity and diesel or petrol back-up generators. While there may be some incremental cost considerations, the security of a constant supply of electricity is important for data collection, especially during extreme weather events when grid electricity may be disrupted. These data points during extreme weather events may be the most important data for input to climate change models.

Collection of radiosonde balloons should be attempted, acknowledging that no one really knows where these balloons go after release. Posting contact information on the balloons and providing a recovery fee for anyone finding a used balloon may help to increase the number of used balloons recovered.

Maintenance of buoys should be scheduled to ensure that all equipment is working properly, and that tethers are still sound. Visits to buoys, however, should avoid damage to reefs and local fishing areas.

If repairs can be done locally, there is no need to travel to the location. Back up supplies and training of local champions or other villagers in simple repairs can avoid sending an expert from Port Vila only to

find that a fuse or a battery needs to be replaced.

In addition, consider using local employment, especially women, in simple operations like manual confirmation of rain gauge readings.

5. Repair, Replacement, and Disposal

5.1 Environmental Implications

Equipment procured will include automatic weather stations (AWS), automatic rainfall gauges, wave buoys, tide sensors, river gauges, global positioning system, and a drone system. It is inevitable during the project that some of the equipment will break down and may need to be repaired or replaced. Where this happens, either some parts (like batteries) or the whole unit may need to be disposed of. Of course, if this is a simple matter of replacing a light bulb, battery or fuse, then it is important for a stock of spare parts to be available locally. From a budget perspective, provision should be made for the items that are known to require replacement within a relatively short time frame, and these need to be securely stored close to the equipment site.

Scheduled maintenance visits and clear instructions to local champions (such as regular cleaning of solar panels or fumigating equipment boxes) will help to minimise the frequency of these breakdowns but cannot avoid them entirely.

For parts of the equipment or whole units that must be repaired or replaced, these items should be brought back to base and appropriate waste disposal approaches will be needed. Old mercury-based thermometers should also be treated as hazardous waste. Rarely is local disposal a satisfactory option.

5.2 Social Implications

Apart from the above protocols about visiting villages, employing local labour, and acknowledging and honouring traditional kastom, there are no major social implications envisaged due these activities.

5.3 Mitigation Measures

In the absence of a qualified commercial or government-owned waste disposal operator, any hazardous material should be handled by either installing on-site treatment or stockpiling until a commercial operator becomes available.

The private sector has been actively engaged in recycling pilot projects on e-waste and lead acid batteries in the completed PacWaste project. PacWaste Plus intends to build on this pilot programme, so there may be scope for greater private sector involvement in the waste management sector.

Local repair capacity and training is preferred to constantly sending out experts from Port Vila for minor repairs. The project should train local people, especially women, in simple repair activities, and ensure they are adequately compensated for these roles. Spare parts stocks should be maintained in a secure location, with a regular inventory. Maintenance schedules should be routine, so that local champions and locally employed labour know when to be available.

As battery and solar panel replacement is inevitable, a plan needs to be in place for recycling used batteries and solar panels, among other used items that cannot be repaired. For batteries, the local car companies should be asked how they treat used batteries. For example, Toyota has already engaged a local recycler⁵ who accumulates car batteries and other recyclables and routinely sends a container load back to Australia. Solar panels are more recent innovations, and it may be difficult to find a firm that is already engaged in this recycling activity. One alternative may be to repurpose the panels, such as roofing material, if no recycler can be identified.

As damaged electronic equipment cannot be recycled in Vanuatu, it must be sent overseas (at present), while other materials may be reused. The extent to which electronic equipment, like laptops, can be repaired locally needs to be ascertained. Project staff should always be encouraged to consider the waste hierarchy.

An interesting alternative that is worth pursuing is the idea of repurposing waste materials by local villagers, such as using plastic twine or bags to make shopping string bags. These could find a ready market in Vanuatu where single-use plastic bags have been banned. Other innovative uses of waste materials to make handicrafts that might appeal to the cruise ship tourists can also be explored.

Disposal sites and management in remote areas, if they exist at all, are little better than open dump sites. Do not rely on local landfills that are not well managed. Certified waste management operators must be used, with proper documentation and tracking of wastes.



6. Community Climate Centres

6.1 Environmental Implications

The Community Climate Centres are intended to be hubs strategically located for receiving CIS from the sectors and VMGD, and further dissemination of CIS. The Community Engagement Strategy and Action Plan sets out how these Centres will contribute to making CIS available to communities and educating them in how to use and respond to the information provided. The community engagement activities of Van-KIRAP are fully aligned to the Vanuatu Framework for Climate Services and the VMGD Strategic Development Plan.

The project intends to use existing buildings for the Community Climate Centres, so no major environmental implications associated with building construction or refurbishment are expected from their establishment. The planned centres are shown in Table 3. The selection of the centres was undertaken by VMGD in consultation with the Department of Local Affairs (DLA), a department under the Ministry of Internal Affairs responsible for overseeing local government (i.e., six provincial councils and three municipal councils).

Table 3. Planned Community Climate Centres

	Climate Centre site	Province	Comments
1	Sola, Vanua Lava Island	Torba Province	Co-located with provincial emergency operating centre. DLA recommends this site
2	Loh Island	Torba Province	Co-located with Vanuatu Climate Adaptation Project building
3	Saratamata, Ambae Island	Penama Province	VMGD office is located here serving the local communities in this region
4	Bwatnabni, Pentecost Island	Penama Province	Central Pentecost (Bwatnabni) and will be co-located with Provincial Emergency Operating Centre.
5	Lakatoro, Malekula Island	Malampa Province	Central Malekula, co-located with Area Secretary in this area. DLA recommends this site
6	Nobul, Ambrym Island	Malampa Province	North Ambrym Island
7	Rovo Bay, Epi Island	Shefa Province	Meet all selection criteria
8	Emae Island	Shefa Province	Co-located with Area Council
9	Ipota, Erromango Island	Tafea Province	Co-located with Ipota Agriculture field assistance office
10	Isangel, Tanna Island	Tafea Province	Co-located with Isangel Agriculture office/ Provincial Headquarters
11	Luganville, Espiritu Santo Island	Sanma Province	South Santo. Co-located with the National Disaster Management Office
12	Nakere, Espiritu Santo Island	Sanma Province	South Santo. Co-located with South Santo Area Council.

⁵<https://recyclevanuatu.com/2018/06/25/recycle-corp-vanuatu/>

The selection criteria for these sites included (i) buildings in good working condition; (ii) meeting the Vanuatu Building Code and Health and Safety Working Conditions requirements; (iii) ability to serve multiple villages; (iv) proximity to case study sites and/or instrument sites; and (v) alignment with ongoing work of the National Disaster Management Office (NDMO) and the DLA.

During the operation phase, posters and other outreach material will be located in these centres. Appropriate arrangements need to be made for their disposal when replaced or no longer needed.

If major dissemination events are conducted in, or from, these Community Climate Centres then there is a likelihood of significant amounts of waste, such as food containers or disposable cups. Appropriate waste management procedures need to be in place to deal with such waste.

If the Community Climate Centres provide other community services, there may be opportunities to provide enhancements to the facilities rather than paying a cash rental fee (e.g., providing rooftop solar panels).

6.2 Social Implications

The Community Climate Centres may also be used for broad-based climate change information, such as information on adaptation options, information about climate resistant crop hybrids, or personal health and safety issues in heatwaves etc.

6.3 Mitigation Measures

Where existing buildings are to be used as the 12 Community Climate Centres, make sure that they are fit for purpose and follow the same environmental and social safeguards as the PMU facilities.

Where outreach materials are prepared for the climate centres make sure that they are recyclable and/or reusable and avoid plastic packaging.

Timing of outreach events should take into account convenient times when people (especially women) are most likely to be available, thus ensuring full inclusiveness of all interested parties, including children.

Opportunities for broader climate change and adaptation measures can be facilitated by the Community Climate Centres and local climate champions, by involving schools, faith-based organizations, NGOs and other civil society organizations.

Waste management, especially after large events, needs careful attention (e.g., water containers should not be plastic bottles and use washable cups and cutlery not disposable cups and plastic spoons). For food containers try to avoid cling wrap, which cannot be recycled.

7. Sector Case Studies

7.1 Overview

Five sector case studies are proposed:

- **Fisheries** – Coral bleaching thresholds in Vanuatu
- **Tourism** – Provision of Climate Information Services to Ni-Vanuatu tourism operators.
- **Water** – Monitoring of flood prone area(s) of the Sarakata catchment, Santo Island.
- **Infrastructure** – Climate-proofing roads and bridges.
- **Agriculture** – Climate sensitivity, potential impacts and vulnerability of food crops (taro, yam, cassava, sweet potato, banana) and cash crops (kava, cocoa and coffee) in Vanuatu.

It is important for each of these case studies that they don't become associated with projects that may have significant environmental and social impacts. Even indirect association could jeopardise the environmental categorisation of the Van-KIRAP project, as shown in the following guidance from GCF.

"In screening activities, GCF will require that risks and impacts are considered and will include direct and indirect, induced, long-term and cumulative impacts, potential environmental and social risks to the activities, and will take into account the activities' areas of influence including associated facilities and third-party impacts. In screening activities, the environmental and social risks and impacts, as well as the nature, magnitude, and complexity of these risks, the specific characteristics of the influence area including risks of displacement, involuntary resettlement and to indigenous peoples, and legal and policy contexts will be considered."

7.2 Agriculture case study

7.2.1 Environmental Implications

The objective of this case study is to "investigate the climate sensitivity, potential impacts and vulnerability of food crops and cash crops in Vanuatu for future food security".

The agriculture sector case study will undertake a threshold analysis using a climate model for cash and food crops on identified sites within the country to look at the suitability of growing conditions related to temperature, rainfall, humidity, and other climate variables under future climate change conditions. Using suitable crop models such as Decision Support System for Agrotechnology Transfer (DSSAT), the study will undertake a more detailed analysis to link climate information and crop model outputs to provide more tailored information to the agriculture sector to avoid potential risks in food and cash crop production.

Twelve sites have been identified by the Department of Agriculture and Rural Development for demonstration of CIS application in production of coffee, food crops, cocoa, kava, and onions. About 235 farmers will be involved in the demonstrations. The four core activities are (i) developing agro-meteorological predictions for the targeted cropping systems; (ii) conducting threshold analysis of crops using climate models; (iii) development of sector-relevant CIS tools; and (iv) training and capacity building. The CIS tools, such as the online Vanuatu Climate Services for Agriculture (VaCSA), will be used to demonstrate the value of early warning systems for farm-level decision making through

farmer field schools. Farmers will be asked to change their normal farming practices and follow the VaCSA bulletins, record the changes and harvesting results, and report to the agricultural coordinator.

The main environmental implications of this case study relate to the farmer field demonstrations and the physical challenges of reaching and using multiple sites and cropping systems. These include (i) use of pesticides and herbicides and treatment of the used containers; (ii) possible use of illegally acquired poles for fencing; (iii) litter during farm demonstration field days; and (iv) possible introduction of invasive alien species.

7.2.2 Social Implications

The social implications of this case study relate to issues of consent. Participating farmers should be willing to contribute their land and crops to the demonstration plots, accepting that there is a possibility of a decline in yields (or even a complete failure of the crop) if the CIS early warnings are not sufficiently accurate. They should also be compensated in some ways (e.g., free seeds or fertilizer) as an added incentive. The other issue of consent relates to use of traditional knowledge. As for other instances where modern CIS is intended to be integrated with traditional knowledge, free, prior, informed consent from the custodians of that knowledge is required. Another aspect of consent relates to employment of child labour. While children may help their parents on the farm, the project should not encourage their involvement and definitely should not pay them for their labour. Finally, it is expected that most farmers participating in the field demonstrations will be men, so extra effort should be devoted to ensuring that women have equal opportunities to participate.

7.2.3 Mitigation Measures

In addition to the generic measures outlined in Sections 2-5, some specific environmental and social management measures for this case study include:

- Written agreements with the participating farmers that, of their own free will, they will undertake the agricultural practices indicated by the CIS tools as directed by DARD and VGMD and accept the possibility of crop yield declines or failures compared to their traditional practices.
- The local custodians of the traditional knowledge relevant to the agriculture sector provide their free, prior, informed consent to use that knowledge to compare with the results of the CIS demonstrations.
- Use of herbicides and pesticides is carefully controlled and empty containers are returned to base for appropriate disposal.
- Fencing of the demonstration plots does not use any illegally logged poles and the plots have clear signage to prevent interference from other individuals.
- For field days, all litter is collected and appropriately recycled or disposed of in sanitary landfills.
- Women should be given equal opportunity to participate in and contribute to the field-level demonstrations.

7.3 Fisheries case study

7.3.1 Environmental Implications

The fisheries sector case study focuses on the increasingly important issue of coral bleaching due to climate change and other factors. Four sites were selected (Paunangisu (Efate); Tomman Island (Malekula); Nalema (Epi); and Mystery Island (Aneityum)) representing four provinces and different sea surface temperatures. The objective is to “contribute towards improvement in food security and the livelihoods of communities in Vanuatu by using CIS to prepare for, and respond to, marine heatwaves on coastal fisheries”.

The proposed core activities are as follows:

- 1.** Preparing for, and responding to, future marine thermal stress events: Improve understanding of the scale of climate change impact through monitoring of currents, chlorophyll and temperature to address shifts in fishing caused by fish migration, particularly tuna and tuna-like species.
- 2.** Establishment of community-based fisheries management (CBFM) areas and management plans: Support established or new marine protected areas (either customary local tabu/CBFM areas or formal CCAs) as a mechanism for protecting fisheries habitats and fish populations to support recruitment of fish stocks in adjacent areas that are impacted by marine heatwaves and coral bleaching. Management plans will be developed and/or assistance will be given in support of existing management plans as part of this activity.
- 3.** Improving storage and alternative fish preservation methods: Establish or improve storage and alternative food preservation techniques to assist communities impacted by the effects of climate change.
- 4.** Increasing community awareness and understanding of the impacts of climate change, fisheries management and the use of CIS to better manage local fisheries and working with communities to establish the use of an e-reporting toolkit for fish catch effort.

Equipment to be installed under the case study includes (i) 6 data loggers secured on the reef floor (measuring water levels, tides, wave height and temperature); (ii) a spotter buoy (measuring currents, wave length and sea surface temperature); and (iii) two temperature and pH loggers at each coral reef monitoring site.

Two marine protected areas will be established in areas where future exposure to heatwaves is projected to occur after 2045, as these areas are expected to become refugia providing new fish recruits for adjacent damaged reefs. Management of these areas will restrict access, such as reef walking and gleaning, and destructive fishing methods, thus reducing fishing pressure. Exactly how CIS will be used for these areas is unclear as “management plans may include climate information triggers for additional management actions...when marine heatwaves are forecast”. The proposed management interventions, if any, at the other two sites, which have been exposed to past heatwaves, is also uncertain, although observations may provide input to the government policy of moving fisherfolk away from reef fishing to offshore.

The food preservation component is to provide “alternative food resources and storage in preparation for, and during, marine heat waves”. Storage facilities will be established or renovated to implement alternative food preservation methods. If the community currently lacks cold storage facilities, a “solar freezer or other cold storage” will be installed in a community building⁶. In addition, traditional food

⁶ Absorptive chillers like solar freezers use a heat source rather than a compressor to change the refrigerant (e.g., water mixed with either lithium bromide or ammonia) from vapor to liquid. Heating increases the pressure causing the refrigerant to condense into liquid. Turning off the heat lowers the pressure, causing the liquid to evaporate back into a gas, thereby creating the cooling effect.

preservation techniques will be promoted in cultural training sessions.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) will be conducting additional investigation that could potentially assist this case study, including:

- A regionally specific coupled marine biogeochemical-hydrodynamic model for planning of coral ecosystems and inshore fishing under future climate projections; and
- LiDAR-based high-resolution bathymetry, coastal topography and shoreline mapping that will inform predicted changes to coral reefs and ocean acidification.

This case study raises several environmental and social concerns partly centred around the disconnect between traditional fishing practices and the proposed protected area activities, the lack of ecological understanding of the four sites, the assumptions around climate change impacts, and the absence of a significant CIS connection.

Ecological understanding – there is an assumption that marine protected areas in the so-called ‘cold-spots’ will act as refugia for fish that will repopulate adjacent damaged coral reefs once the heatwave abates. If the heatwave is significant, bleaching of the coral reefs, algal infestation, and crown of thorns starfish plagues could persist for decades before the reef recovers (if at all). If these are the reefs that local communities are expected to depend on for their fish, shellfish, octopi, crabs, and sea urchins, while a nearby ‘refugia’ is teeming with fish, the temptation to fish in the marine protected areas will be overwhelming, particularly once the project is finished.

Climate change impacts – one further assumption is that ‘cold-spots’ will remain unaffected by increases in sea surface temperatures at least until 2045. It is true that some coral species show greater resilience to increased temperatures than other more sensitive species, but there is insufficient evidence that in the same area of Vanuatu some reefs are quite resistant to temperature increases while adjacent reefs will be severely damaged.

CIS connection – even if the ‘cold-spot’ refugia and recolonisation of damaged reefs post-heatwave theory is correct, the connection to CIS and how these would lead to early warnings and changed behaviour is missing. Comparison of different reef ecosystems and their changes during heatwaves is valuable research and will help to round out some of the CSIRO modelling efforts, but such comparisons do not provide added value as an early warning system that could help to modify the traditional knowledge of coastal ecosystems.

7.3.2 Social Implications

Traditional fishing behaviour – traditional fishing behaviour was attuned to natural phenomena that had been observed and understood over generations. Communal marine biota harvesting was seasonal and based on a pre-scientific understanding of the tides, sea temperatures, wave behaviour etc. and this was linked to timing triggered by observable flowering of trees and other terrestrial ecosystems. Hickey (2006) provides a good summary of some of the traditional practices in the fisheries sector.⁷ When a taboo was placed on a coastal area, no one was allowed to swim in those waters or even walk on the beach as it would frighten the fish away. The season for a communal harvest was based on traditional knowledge about optimal tide conditions when fish would swim over the coral reef towards the shore. The practice of gleaning crabs, octopus, sea urchins, lobsters and shellfish from the reefs by women and children was also based on a traditional understanding of yearly tidal cycles that would

⁷ Hickey, F.R. (2006) Traditional marine resource management in Vanuatu: Acknowledging, supporting and strengthening indigenous management systems. *SPC Traditional Marine Resource Management and Knowledge Information Bulletin #20*. <https://www.cbd.int/doc/meetings/mar/soiws-2016-05/other/soiws-2016-05-vanuatu-11-en.pdf>

indicate when the reefs would be completely exposed during the day. Giant clam gardens that provided food security also ensured increased reproductive success of the clams. The flowering of different plants were also important observable environmental cues for different lifecycle stages of fish and octopi species. The annual cycle ensured that fishing pressure on any single resource only lasted for a short period, thus providing for long-term species conservation.

Marine protected areas that permanently restrict access to traditional fishing grounds, even if they are called community-based fisheries management, need to combine such traditional knowledge and longer-term monitoring of climate-induced changes, before making significant changes that will affect the livelihoods of local communities.

Food preservation – communal property such as cold storage can be a source of conflict if the cooperative arrangement is not clear and agreed by all stakeholders. If men dominate what can be stored (e.g., with offshore fish like tuna) then women may not be able to store other items that are more important for them. Also, the running costs need to be equitably shared or covered by the local government budget. Project funding will need to be replaced once the project is completed so the long-term financial arrangement needs to be sorted out from the start of this investment.

7.3.3 Mitigation Measures

The main mitigation measures that would help avoid adverse impacts of this case study include:

- Conduct additional baseline ecological investigations in the four sites before proceeding with any specific interventions
- Consult with local communities on their long-established traditional understanding of the coastal ecology and how this governs their use of the marine resources
- Consider how increased ecological and climate change investigation could add value to traditional coastal resource management
- Engage with local communities to discover if any additional climate change early warnings would help to strengthen the traditional ecological triggers (like flowering of certain species)
- Develop a joint workplan to explore the value of this hybrid traditional/modern set of triggers and monitor its effectiveness in the four project sites
- Develop clear management and financing arrangements for each cold storage facility and ensure that women have equal access to the facilities

7.4 Water sector case study

7.4.1 Environmental and Social Implications

The water sector case study will involve monitoring of floodwater during Vanuatu's wet season, cyclonic events, ENSO, and short-term intense rainfall events. The main objective is to determine the changes in, and extent of, floodwater for use in early warning systems, advisory services and awareness of the local community in the Sarakata-Solwe area on how to use the CIS for localised flood preparedness management plans. LiDAR data will be incorporated in flood modelling to help formulate future policies and plans. The main environmental and social implications of this case study are included in Table 4.

Table 4. Environmental and social implications of the water sector case study

Planned Activities	Environmental Implications	Social Implications
Develop and implement decision support systems for the water sector	Inadequate framing of the climate problem for the water sector may result in maladaptation	Social exclusion, particularly of women, may cause key social issues to be missed in the decision support systems
Demonstration of climate information services in the water sector	Water quality and health implications may not be included	Although women may be responsible for water supply and use at the household level, they may be excluded
Develop and implement a flood management and response plan for the case study location	Flood management options may not include nature-based solutions and/or relocation of vulnerable communities	Evacuation plans for significant flood events may not reach or accommodate women, the elderly and disabled residents
Undertake groundwater monitoring to support planning and decision making by Provincial Water Advisory Committees	Groundwater monitoring may not include critical water quality parameters or provide for continuous quality assessment	Provincial Water Advisory Committee may not have equal representation of women and therefore miss key household concerns like the quality of water for cooking
Support the role of the Provincial Water Advisory Committee	The Provincial Water Advisory Committee may not have adequate environmental training or awareness	As above – Provincial Water Advisory Committee may not have equal representation of women
Develop and enhance sector-related climate information services products information for the community	The CIS products may not include warnings of flood event environmental concerns, such as water contamination	The CIS products may not be provided in local languages and readily available to vulnerable communities
Training and capacity building for Provincial Water Management personnel with the application of climate information and data in planning and decision making	Capacity strengthening programs may not include environmental concerns associated with flood, saline intrusion and water contamination events	Provincial Water Management may not provide equal career opportunities for women and/or training in handling community concerns or complaints
Introduce CIS tools to Provincial Water Management	The CIS tools may have no linkage to environmental concerns in the water sector	The CIS tools may not address critical social issues like detailed evacuation plans
Report of the projections and water status for technical infrastructure planning and resource management	Environmental issues like water quality and biodiversity may not be included in the data provision for planning and resource management	The social issues in the water sector may not be included in the technical data prepared for water resource planning and management

To illustrate the sensitivity of this river basin to extreme climate-related events, tropical cyclone Harold in 2020 shut down the water infrastructure for a week and caused public health concerns on outbreaks of leptospirosis and diarrheal diseases. The basin is also part of the Vanuatu hydrological monitoring network, has an existing hydrometeorological station located in the upper catchment, and has a recently completed flood hazard map. The early warning system will comprise regular drills, automated flood warning signs, sign boards, sirens, and social media platforms. The area already has early warning infrastructure in the Luganville area for tsunami warnings. Communities will also be encouraged to create their own flood warning systems building on traditional approaches.

7.4.1 Mitigation Measures

To address the potential environmental and social implications, the following mitigation measures are suggested.

- Ensure that women are fully engaged in developing the decision support system, demonstrations of the CIS tools for the sector, and evacuation plans and drills, and equally represented on the management agencies and committees.
- Use downscaled climate models for the Sarakata watershed to get a more accurate fix on future climate conditions and likelihood of increased frequency and severity of floods.
- Include water quality and health implications in the climate information services for the case study area and include water quality monitoring in the groundwater component.
- In the flood management and response plan consider alternatives to concrete channelling and flood berms, including nature-based solutions, and the longer-term alternative of relocating people away from areas that are subject to existing and future severe flooding.
- Include environmental and social concerns associated with water resources management in the training and capacity building activities.
- Include environmental issues like water quality, saline intrusion, and biodiversity protection in the technical infrastructure planning.

7.5 Tourism case study

7.5.1 Environmental and Social Implications

The tourism case study will focus on identifying climate change related natural disasters affecting tourism products and operators in Tafea Province, southeast Tanna Island and Sanma Province, southeast coast of Santo Island. Each site has about ten tourism operators. The potential impact of climate change on selected tourism businesses in terms of physical damage, flow of visitors, loss of income and employment, will be analysed and potential responses identified. New measures and climate information tools to help tourism operators mitigate the negative impacts of climate change will be provided.

The sites selected are close to existing or planned hydrometeorological observation equipment and are already subject to climate-related impacts such as coastal flooding, storm surges, tropical cyclones, heatwaves, and coral reef bleaching.

The planned activities are as follows:

- Increasing the uptake of CIS by tourism operators, including contributing to Department of Tourism (DoT) standard operating procedures to enable tourism operators to minimise the impacts of climate change
- Supporting decision making through the use of CIS, including (i) legislative amendment in the Tourism Act to mainstream climate information in the Accreditation and Permit System and tourism investment process; (ii) incorporating CIS in the Tourism Minimum Standards and Accreditation system; (iii) using risk and hazard maps to determine suitable locations for investment; (iv) climate risk assessments to inform future tourism development; (v) including climate change projections in the DoT bungalow guide; and (vi) provision of climate information for development of Provincial Tourism Zoning Plan.

- Planning future tourism investment opportunities in the context of climate change.
- Training and capacity building in the tourism sector in the use of CIS for planning and decision making, including collaboration with the Vanuatu Skills Partnership programme.

From an environmental perspective, there is little concern about these activities, provided that the environmental implications of climate change response measures are also documented. The environmental risks of investments using these procedures and maps, however, would be a greater concern and these risks will go well beyond the project duration. With the possible exception of the proposed bungalow guides, there appears to be little emphasis on practical options for climate change adaptation. Other buildings and tourism-related infrastructure would benefit from clear guidance on climate change adaptation options, possibly by including these in the proposed DoT standard operating procedures.

The main social concern is the exclusive focus on tourism operators and the Department of Tourism, without any involvement of other stakeholders who may be negatively impacted by tourism development in these locations. In addition, staff working for these tourism operators, who would be at the frontline of any climate-related emergency, should also participate in training activities.

7.5.2 Mitigation Measures

The risk and hazard maps for tourism development should use multi-hazard mapping, including environmental sensitivity and not only climate risks. Of course, actual investment by tourism operators using this locational and operational guidance is another matter and the specific environmental risks of all investment plans should be studied under the national environmental impact assessment procedures.

Increased attention needs to be paid in guiding tourism operators on possible adaptation measures and how these measures can be turned into marketing opportunities – e.g., world’s safest beach resorts. Tourism accommodation and other facilities are likely to be the first to be damaged by extreme climate events and sea level rise, so they should have high priority for national and local adaptation priorities.

As many, if not most, of the tourism staff are female and they may have multiple household responsibilities in addition to their work roles, understanding potential constraints that they may face during a climate-related emergency is key to developing effective training material for staff. For example, do they need to stay to help guests evacuate safely or rush to school to collect children or to home to help an elderly parent? Under what conditions are they required to stay and protect the property and guests instead of meeting their immediate family obligations? This gender-differentiated training material should be checked by the Department of Women’s Affairs and relevant NGOs.

7.6 Infrastructure case study

7.6.1 Environmental and Social Implications

For the infrastructure case study, LiDAR data collection will contribute to predesign analysis for certain road sections, especially pinpointing topography where there are vulnerable areas, such as wetlands, flood plains, coastal areas or unstable slopes potentially subject to climate impacts and therefore requiring an adaptation response. The LiDAR data will be input to CAD software for road designs to resist extreme weather events due to climate change.

Most of the current infrastructure was built without any consideration of climate change and the Public Works Department doesn't have the data or the software to predict climate change impacts in specific locations. Data collected by the project on rainfall, bathymetry and tides will be used to develop a real-time flood inundation model based on multiple scenarios. The project's CIS will help to climate-proof roads, bridges, jetties and wharfs. The proposed activities include the following:

- Provision of climate data for vulnerable locations to enable better planning and implementation of roads, bridges, culverts and seawalls
- An update of current design standards for infrastructure, incorporating climate information
- Decision support tools on risk-based mapping, vulnerability assessments, seasonal forecasts and long-term climate projections
- Training and capacity building on the use of CIS for Public Works Department staff

Four sites in three provinces have been selected for ground-level demonstration of CIS: (i) Mele bridge and Teouma bridge in Efate Province; (ii) Lowantom bridge in Tanna Province; and (iii) Sarmet bridge in Malekula Province. All these low-lying sites are subject to flooding during heavy rainfall events. As only one of these bridges (Teouma) is in the design phase, it is not clear if the Government will replace or retrofit the bridges or what length of the approach roads is also flooded.

The data collection activities are unlikely to have significant environmental implications but, as experienced in other countries, publicly available data on the flood sensitivity of properties can have major social and economic consequences. Landowners may even find it impossible to sell their property. Exactly who has access to that data is also important as it could be used unethically to convince a landowner to sell the land before the data are released or to purchase land above the projected future flood levels. The information on flood-sensitive roads and bridges is not restricted to the infrastructure alone, as it will also have implications for the adjacent properties and road destinations.

The revised design standards have several environmental implications including (i) the need to access additional road fill material from local quarries to elevate the roads and bridges above the projected future flood levels; (ii) reconsideration of road surfacing material such as asphalt which may melt under future heatwave conditions; (iii) barriers to wildlife crossing; and (iv) the need to revegetate cross drains and culvert approaches to prevent soil erosion and sedimentation. For jetties and wharfs, the environmental implications are mostly related to the construction phase when coral reef and other coastal habitats may be damaged by sediment discharge.

7.6.2 Mitigation Measures

The following mitigation measures are suggested:

- Reach an informed decision on the accessibility of the flood modelling data and maps. If the information is to be made available to the public, establish a mechanism that will allow landowners to demonstrate that they have been adversely affected by release of the information. If the data is to be kept confidential, then decide on who has access to the information and ensure that they are warned about possible criminal charges if they use the information unethically.
- Extend the revised infrastructure design standards to cover environmental and social considerations from implementing the new standards.
- Provide for additional environmental features in the design standards to cover revegetation, wildlife passages, and coastal biodiversity protection.
- Conduct a review of the heat sensitivity of current road surface material such as asphalt and the

likely impact of future heatwaves and the need for alternative less heat sensitive material.

As the application of the new design standards will take place after the project is completed, ensure that Public Works Department staff are fully trained in environmental and social considerations associated with climate-proofed infrastructure.

8. Social Inclusion and Gender Action Plan

8.1 Traditional Knowledge

8.1.1 Social Implications

Indigenous knowledge on environment is an essential part of the project design and should be documented carefully and sensitively. The Traditional Knowledge Strategy and implementation Plan noted that “although traditional farmers and fishers may listen to contemporary weather and climate forecasts via radio broadcasts, they often ignore this advice due to their strong reliance on traditional knowledge”. This framing implies that the project could try to counter traditional knowledge that appears to be at odds with VMGD climate information. VMGD should note that if traditional knowledge is not taken into account, there is likely to be a lower uptake of their forecasts and warnings in areas where traditional knowledge systems are still strong. The correct approach, however, is “embracing the strengths and weaknesses of these different knowledge systems”. Build on the strengths of traditional knowledge with an extra layer of up-to-date scientific information.

8.1.2 Mitigation Measures

A good starting point to adding CIS to traditional knowledge systems is to address the linguistic diversity in Vanuatu, as currently most of the CIS is released in English. Vanuatu has more than 100 indigenous languages ranging from the 900 people who speak Aneityumese to the 250 who speak Hiu. The indigenous languages are recognised in Vanuatu’s Constitution and taught in primary schools. Outreach material, therefore, should help to keep these languages alive, while recognising that Bislama is becoming the lingua franca of most people with connection to markets in the main cities. Unless the language issue is dealt with effectively, there is a danger of misinformation, poor interpretation, or indeed ignoring the VMGD advice. Language is the principal means of conveying and preserving indigenous culture and heritage.

Riehl (2019) gives a good example of the vines grown on Malekula Island which have dozens of names in the Na’ahai language based on thickness, growth rate, and distance from the ocean that have no equivalence in Bislama or any other language.⁸

Project staff should also be fully aware of the legal and ethical issues associated with traditional knowledge. In Vanuatu, the Bill for the Protection of Traditional Knowledge and Expressions of Culture Act No. of 2018 specifies that traditional owners have exclusive legal and moral rights to traditional knowledge and expressions of culture. The Act also requires free, prior informed consent

⁸ Riehl, A. (2019) Vanuatu: Indigenous language loss and the multiplying effects of climate change. In *Minority and Indigenous Trends 2019* edited by Minority Rights Group International

to use traditional knowledge or culture for a non-customary use, with applications referred to the Malvatumauri Council of Chiefs. Protocols and consent forms which can be used are available from the Climate and Oceans Support Program in the Pacific (COSPPac).⁹

Traditional culture may have subtle differences across the different provinces in the project and these should be acknowledged and honoured. For example, access to villages may require some traditional gifts or ceremonies or other access rituals, which have been handed down for generations, presumably related to security considerations and protection from 'outsiders'.

Also, note that any local taboo issues found through community consultation may not be appropriate for wider dissemination, as they are often based on and controlled by animistic rituals and ancestor worship, which may not be acceptable in 'modern' Vanuatu.

The Traditional Knowledge Strategy and Implementation Plan recommends "that any traditional knowledge collected through the Van-KIRAP project should be treated with respect and securely stored, e.g., in password protected computers (digital versions) and hard copies safely archived, scanned and locked in cabinets accessed only by those with Manager privileges. It is acknowledged that all TK information collected by Van-KIRAP will be accorded the same protection and respect beyond the lifecycle of the project".

In an era of Wikileaks and other security breaches, however, the intent of such a recommendation is clear but it might be much harder to achieve in practice. Traditional knowledge is normally passed on by oral means, often involving storytelling by village elders. Locking up information gathered by the project may not be the best approach to ensuring that traditional knowledge continues not only to be transmitted from generation to generation but also can accommodate more scientific CIS over time and gradually evolve.

It is a fine line to walk between fully protecting the data and ensuring it is available for all to use. The approach taken in the project is to openly share narratives deemed by the traditional knowledge holders to be of low cultural sensitivity, thus ensuring that further generations have access to it. However, some information provided to the project was indicated, by the traditional knowledge holders, to be culturally sensitive with only select members of the community being allowed access. The project must prohibit the open sharing of this information, and it can only be used in products with permission from the knowledge holders. The project is designed to respect the wishes of those providing the information. The objective should be to see the traditional knowledge legacy continue to be passed on but adjust to new realisations and observations as the climate continues to change.

8.2 Gender Equality, Disability, and Social Inclusion (GEDSI) Action Plan

8.2.1 Social Implications

A draft GEDSI action plan has been prepared and requires all project activities to be examined through a gender lens. As noted in the plan, "GCF requires accredited entities to adequately assess the gender risks and impacts (as part of social risks and impacts assessments), and to link the corresponding gender risk management measures to the activity-level gender action plans". Gender actions also need to align with and implement the SPREP Gender Policy and the Vanuatu Government's Gender Equality

⁹ <https://www.sprep.org/project/climate-and-oceans-support-program-pacific>

Policy. The Department of Women's Affairs is reviewing the Government's gender equality policy with an emphasis on (i) reducing domestic and gender-based violence; (ii) enhancing women's economic empowerment; (iii) promoting women's leadership and equal political participation; and (iv) building a foundation for gender mainstreaming.

The key gender barriers for Van-KIRAP include the following:

- Lack of awareness regarding gender and social inclusion and no gender focal points in the Project Management Unit
- Confusion caused by use of 'scientific' terminology and communication predominantly in English
- Inadequate engagement of NGOs and community networks in the project
- Lack of independence for women in the household and workplace, making it difficult for them to participate in the project
- Stereotypical gender norms, partly related to traditional culture, that may lead to unequal participation
- Inadequate consultation with women's groups, young people and people with disabilities in the design and implementation of the project
- Lack of gender and social inclusion in project workplans
- Inadequate recognition of upward mobility opportunities for women that could be enhanced by the project
- Workplaces in the project that are not wheelchair accessible
- Inadequate access to communication devices such as mobile phones, as well as language issues, that are crucial for last-mile' CIS communication

8.2.2 Mitigation Measures

A detailed GEDSI action plan is attached as Annex 4, with an extensive list of actions proposed. A brief summary of the key actions follows:

Priority area 1: capacity building, knowledge management, and communication

- Implement GEDSI responsive CIS across the entire project
- Appoint a woman and youth as GEDSI focal points for the project
- Provide a range of capacity building and employment opportunities, including those specifically for women
- Strengthen the evidence base on the differentiated impacts of climate change on less advantaged people and increase their access to tailored CIS
- Use a wide range of media to ensure that climate information reaches everyone

Priority area 2: gender balance, inclusive participation, and inclusive leadership

- Strengthen leadership capacity of women, disabled people, youth, and LGBTQI+
- Increase participation of all people in Van-KIRAP activities, including provision of support for travel and employment opportunities

Priority area 3: coherence

- Ensure that the entire Van-KIRAP team is aware of the importance of gender and inclusion and incorporate GEDSI-responsive decision making into all Van-KIRAP work
- Provide adequate human and financial resources for GEDSI implementation
- Work with or develop community gender, youth, disability and LGBTQI+ CIS networks

Priority area 4: GEDSI responsive implementation and means of implementation

- Capacity development training on GEDSI responsive budgeting
- Webinars and workshops to strengthen gender integration
- Promote GEDSI responsive technological solutions
- Support collection and consolidation of information and expertise on GEDSI and climate change
- Enhance the availability of sex-disaggregated data for GEDSI analysis

Priority area 5: monitoring and reporting

- Monitor and report on the implementation of gender-responsive climate information services activities
- Document case studies on the implementation of gender responsive CIS.

8.3 Grievance Redress Mechanism

8.3.1 Environmental and Social Implications

Grievance redress mechanisms need to be in place so that anyone who feels that the project has caused some damage or other problems has ready access to a problem-solving approach and potential compensation if the problem can't be solved to their satisfaction. The official government conflict resolution avenue is through the Office of the Ombudsman¹⁰ under the Ombudsman Act of 1998 and the Leadership Code. During the socialisation process at the installation stage, local villagers should be made aware of the grievance redress mechanism provided by the project and try to avoid having complaints directed through the Minister or local member of parliament. Care also needs to be taken in responding to any media enquiries about possible conflicts.

Typical problems encountered during project implementation include:

- Land acquisition and compensation
- Lack of information about the project objectives, design, or implementation schedule and arrangements
- Inadequate consultation and participation
- Disruption of livelihood activities
- Inadequate environmental and social due diligence
- Problems with village infrastructure such as power supplies or water reticulation

¹⁰ <https://ombudsman.gov.vu/>

- Community and social problems
- Health and safety issues
- Issues related to contracting

Currently, the project follows both the SPREP grievance redress mechanism process and the Government of Vanuatu process. If there are any grievances, the complainant can place a name leaf at the entrance of a project site. Within all communities in Vanuatu, there are village chiefs whom all grievances are brought to. If issues arise that Chief cannot resolve, then it is brought to relevant government authorities. Additionally, the complainant can also officially write to the Director General, MoCC to register grievances. The matter will then be referred to the VMGD Director and VMGD Management for action. The VMGD Director can organize face to face meetings with the complainant to discuss resolutions in the presence of the State Law Office (SLO). In the near future, project sign boards will be erected with contact details of whom to contact for registration of grievances. The Government of Vanuatu grievance redress process will then be activated as outlined above.

8.3.2 Mitigation Measures

The grievance redress mechanism should anticipate these kinds of concerns and be prepared to address them. For example, for any land procurement and/or leasing, to avoid social conflict, care must be taken in arranging land for weather stations, river gauges or other CIS equipment. While the intention is to use government-controlled land wherever possible, technical considerations may mean that more remote locations need to be acquired. Compensation may be needed if any damage is caused by the project during installation or operations.

A staged grievance redress mechanism is proposed: (i) stage 1 – problem solving by project staff; (ii) stage 2 – elevation of the grievance to VMGD or other responsible government agencies if it can't be resolved by the project staff; and (iii) stage 3 – referral to SPREP Management (and possibly to GCF, as a last resort, if the matter still cannot be resolved).

A standard problem-solving approach involves a sequence of six steps using the acronym RESOLVE:

- **R**eview and **E**xpound – qualify and frame the problem, identify stakeholders, timeframe, impacts, and risks if the problem is not solved
- **S**olicit – gather information from the field and talk to the stakeholders to get their perspectives
- **O**bserve – verify the facts and data from the field and observations of potential risks and root causes and engage stakeholders to gather further inputs
- **A**na**L**yse options – generate potential solutions, analyse the options, and collectively decide on the best approach
- **I**mpro**V**e – diligently work on implementation of the agreed solution and make course corrections as necessary
- **E**valuate – monitor the implementation results and evaluate the outcomes, making sure that problem has really been solved

Some grievances, however, may not be readily solved at the project level. For example, complainants may claim that government or SPREP policies have not been followed (e.g., on procurement). In these cases, a compliance review by the responsible agency is required, possibly by an independent consultant or auditor. The results of the compliance review are then referred to Senior Management to take appropriate action (if the grievance is found to have merit), which may include sanctions on the responsible staff.

An important aspect of the grievance redress mechanism is how to ensure that complaints can reach the appropriate level without putting the complainant in any danger of reprisal or even physical danger if the complaint concerns some influential person. For Van-KIRAP an appropriate mechanism for at least stage 1 problem solving is to place a locked complaints box in each of the Community Climate Centres, at VGMD offices, and the PMU office. A multi-lingual poster in each location should outline the grievance redress mechanism and assure project stakeholders that they can submit their concerns anonymously, if necessary. PMU staff also need to be trained in how to handle complaints.

Further details on some of the tools available for implementation of an effective grievance redress mechanism can be found in (i) ADB (2016) Problem Solving: Guidebook for ADB-Assisted Projects; and (ii) ADB (2017) A Guidebook on the Compliance Review Function of ADB's Accountability Mechanism.

8.4 Labour Management

8.4.1 Environmental and Social Implications

The PMU, VMGD, and other responsible parties should be aware of potential environmental and social risks that may be encountered during project implementation. Environmental risks include labour incidents such as (i) accidental poisoning from use of herbicides or pesticides; (ii) inhalation of toxic gases; (iii) drowning; or (iv) injuries or accidents due to improper handling of meteorological or hydrological equipment. Social risks include (i) personal conflicts among workers or with members of the beneficiary communities; (ii) sexual harassment and bullying; (iii) discrimination on the basis of race, ethnicity, or social standing; (iv) disease transmission; (v) transport risks during commuting to office or in the field; and (vi) cheating or corruption in the procurement process. Anticipation of these possible risks and preparedness to deal with them in an appropriate and sensitive manner is a responsibility of employers and work colleagues alike.

8.4.2 Mitigation Measures

The SPREP Environmental and Social Management System states that "Workers will be provided with a safe and healthy work environment. Processes will be implemented to (i) identify potential hazards to workers; (ii) provide preventative and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) training of workers; (iv) documentation and reporting of occupational accidents, diseases and incidents; and (v) emergency preparation, preparedness and response arrangements".

The International Labour Organisation (ILO) has 40 Codes of Practice and more than 40 standards related to occupational health and safety.¹¹ These include the Occupational Safety and Health Convention (1981, and 2002 Protocol); Occupational Health Services Convention (1985); Hygiene (Commerce and Offices) Convention (1964); Safety and Health in Construction Convention (1988); Safety and Health in Agriculture Convention (2001); Working Environment (Air Pollution, Noise and Vibration) Convention (1977); Asbestos Convention (1986); Chemicals Convention (1990); and various Codes of Practice. These international standards should be used as a guide where there is no equivalent national standard.

Local employment should be the first option considered, especially for unskilled labour, but appropriate labour laws and local practices must be followed. The Vanuatu labour laws are available through the Department of Labour and Employment Services.¹² In particular, the Health and Safety at Work Act

¹¹ <https://www.ilo.org/global/standards/subjects-covered-by-international-labour-standards/occupational-safety-and-health/lang--en/index.htm>

¹² <https://dol.gov.vu/index.php/2016-03-15-14-31-48>

1986 states that it is the duty of every employer “to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all employees” and to minimise risks to the health and safety of others who are not employees.

9. Project Management Unit(s) Office Management

As the region’s foremost environmental agency, SPREP has a unique responsibility to demonstrate leadership in environmental management, including in all its project offices. It is acknowledged that the influence of the VMGD PMU over the broader Ministry and the sector agencies covered by the case study coordinators may be more problematic, but best effort should be encouraged. Some of the activities that should be ensured in both PMUs (or the merged PMU) are as follows:

Travel – international and domestic travel should be minimized to the extent possible. Consideration may be given to offsetting GHG emissions, with local reforestation or other carbon sequestration projects.

Energy and lighting management – LED lights to replace fluorescents (but think about disposal of waste globes as well), motion activated light switches, computers and photocopiers turned off at lunch and at night. While the office may be rented, there is still scope for some of these changes to be made.

Sustainable procurement of supplies – while local suppliers may not initially have sustainable office supplies, they should be encouraged to move in that direction. Often, they have not even been asked to source sustainable materials.

Reduce, Reuse, Recycle (3Rs) – the waste hierarchy should be the key management principle, especially knowing that landfill management is still quite weak in Vanuatu.

Temperature control – air conditioning in offices and workshops is often excessively cold and uses excessive amounts of energy, so control the temperature and encourage appropriate clothing like shorts.

Training of new staff in the environmental principles followed in the office and on site should be carried out whenever new staff join the project. Copies of this ESMP should be available to all staff.

It should be reiterated that local labour laws, immigration and customs procedures must be followed, acknowledging that these procedures can be rather time consuming.

10. Monitoring and Evaluation

“GCF requires the accredited entities to maintain effective due diligence, including participatory monitoring approaches, to address unanticipated developments in the activities or to reflect improved

techniques and technologies for addressing environmental and social risks and impacts and meeting the environmental and social safeguards requirements pursuant to the ESS standards of GCF”.

Incorporation of this ESMP into the project M&E Plan, annual workplans, and budgets should be carried out and provided to GCF as part of an integrated package of documents.

Environmental and social indicators in the logframe may need further clarification, partly drawing from the summary of mitigation measures outlined below.

The frequency and specific staff responsibilities for M&E need to be specified in the annual work plans and individual terms of reference. Staff responsibilities for M&E need to be defined at SPREP IA also, particularly if no dedicated M&E specialist is included in the project team.

An audit of environmental and social safeguards should be included in the draft final project evaluation, to be carried out by an independent qualified professional.

11. Reporting and Budgeting

GCF requires “the accredited entity to take all necessary measures to ensure that the executing entities fulfil the activity-level ESMP requirements, and the accredited entity will conduct the necessary due diligence and oversight to ensure that these requirements are fulfilled”. The accredited entity should also submit annual performance reports and interim evaluation and final evaluation reports.

Quarterly and annual reports should document specific activities that have been undertaken to protect the environment and safeguard against any social concerns. Any complaints, social or environmental issues should be flagged immediately, and the action taken reflected in the quarterly reports.

The draft final report should include an environmental and social safeguard audit, undertaken by a qualified professional.¹³

Annual budgets should include provisions for all the mitigation measures outlined above, plus a price and physical contingency budget, especially for unavoidable equipment failures.

Case study reports should contain sections on environmental and social safeguards and how they should be handled in these sub-projects.

¹³ It must be noted that the Mid-term Review did not cover implementation progress of the draft ESMP as this revision was anticipated.

12. Conclusions and Recommendations

12.1 Re-screening

Project stakeholders may think the environmental and social implications of this project are minimal (after all it is only climate information) but all activities should be looked at through environmental and social lenses to see how the Van-KIRAP project can contribute to improved environmental and social management in Vanuatu and ensure that no harm is caused.

From the re-screening exercise, which suggests that the project should be elevated to Category B, the following mitigation measures are recommended (details in Annex 1):

Principles

- 1. Human rights** – free, prior informed consent before making any traditional knowledge available to the public; specific plans to reach disabled people in remote project locations; development of an effective grievance redress mechanism; and examine potential for conflict related to current users of fisheries case study locations.
- 2. Gender equality** – incorporate measures identified in the gender action plan into the project budget; provide effective access for women and girls to the grievance redress mechanism; examine denial of access by women to coastal resources in the fisheries case study locations.
- 3. Child protection** – provide promotional material on CIS appropriate to children’s educational needs; ensure that local contractors check the police records of their workers; and allow concerned parents to report any suspicious behaviour of workers.
- 4. Climate change** – provide early warnings of potential extreme climate-related events; and help vulnerable communities to understand effective responses to minimise loss and damage.
- 5. Biodiversity and ecosystem services** – conduct additional surveys and compile local observations to document the baseline conditions of the proposed fisheries case study sites.
- 6. Waste management** – provide waste receptacles and where necessary return waste to Port Vila for recycling or disposal at a sanitary landfill; prepare a waste management plan for each project office and the Community Climate Centres; ensure appropriate treatment of used printer cartridges, batteries, and e-waste; and ensure that Community Climate Centres have proper sanitation and wastewater disposal systems.

Safeguards

1. Assessment and management of environmental and social risks and impacts – develop an exit plan for dealing with post-project environmental and social impacts; and involve the Department of Environmental Protection and Conservation (DEPC) in finalising the ESMP.

2. Public participation and information disclosure – conduct much wider community consultations, using focus groups and online forums; use the Community Climate Centres to post detailed information on the project as well as the grievance redress mechanism in relevant languages; and upload project information, the grievance redress mechanism and the final ESMP to the VMGD website.

3. Accountability, grievance and conflict resolution – the grievance redress mechanism outlined in the ESMP should be implemented, with information on how to submit concerns widely disseminated; ensure that any emerging problem is first dealt with at the project problem solving level; and finalise SPREP's formal grievance redress mechanism.

4. Labour and working conditions – follow all labour employment laws in Vanuatu; any concern about project practices that discriminate against any group or individual should be dealt with under the grievance redress mechanism; exploitation of child labour should not be permitted; and an occupational health and safety guidelines document should be made available for all project stakeholders.

5. Resource efficiency and pollution prevention – waste disposal at sanitary landfills or recycled; and a plan for hazardous waste management (including empty weedicide or pesticide containers) should be cleared by SPREP IA and DEPC.

6. Community health, safety and security – renovation plans for the Community Climate Centres should be cleared by a qualified engineer and WASH specialist and inspected on completion, with sign off by SPREP IA and the relevant government agencies.

7. Involuntary resettlement – early warning systems that may require evacuation should indicate safe places for temporary residence of vulnerable households; locating hydrometeorological equipment on private land or land with usage rights should provide appropriate compensation according to Vanuatu regulations; and any requirement to provide 'alternative livelihood opportunities' should be guaranteed by the Government before implementation.

8. Biodiversity conservation and sustainable management of living natural resources – further ecological and social assessment of the fisheries case study sites is needed, including a more complete understanding of the ecosystem dynamics under heatwave conditions; the official procedures in Vanuatu for identifying and creating a marine protected area should be followed, including community support for a community-based fisheries management area; and a detailed ecosystem management plans should be prepared before proceeding with the fisheries case study.

9. Indigenous people – a more complete understanding of the different aspects of Ni-Vanuatu people depending on their island culture and traditions is needed before trying to make significant changes; it should not be assumed that local government officials are the true leaders or represent the communities in which they work; and an indigenous people's plan based on the current assessment of traditional knowledge should be prepared.

10. Cultural heritage – cultural heritage issues should be included in the indigenous people's plan.

12.2 Cross-cutting Issues

Environmental and social concerns cut across all activities being implemented by the project. It is useful to consider these concerns by using a project cycle approach (procurement, installation, operation, repair and maintenance) and overall project management (social inclusion and participation, operation of PMUs, monitoring and evaluation, reporting and budgeting) (Table 5).

Table 5. Summary of cross-cutting ESMP mitigation measures

Project activity	Mitigation Measures	Implementation Responsibility	Means of Verification	Timing	Monitoring Responsibility	Reports
Procurement	'Green' specifications Take back provisions Recycling packaging	PMUs	Equipment specifications	Part of all procurement packages	SPREP IA/PCU	Quarterly reports
Installation	Access, use of local sourced materials, site works, social awareness, local labour	VMGD PMU	Site visit notes and photos	2020-2022	VMGD Senior Management	Back to office reports
Operation	Monitoring visits, back up electricity, balloon collection, back up supplies, local labour	VMGD PMU	Database of climate information generated	2021-2022	VMGD Senior Management	Quarterly report Draft Final Report
Repair, Replacement and Disposal	Local repair capacity, spare parts, maintenance schedules, recycling, reuse and repurposing waste	VMGD PMU	Equipment inventory	2021-2022	VMGD Senior Management	Quarterly report Draft Final Report
Social Inclusion, Participation and Gender	Gender neutrality, land procurement, local employment, traditional culture, access to villages, indigenous knowledge, grievance redress mechanism	PMUs	Gender Action Plan Annual work plans	2021-2022	SPREP IA/PCU, VMGD Senior Management	Gender and social sections of quarterly reports
Project Management Units	Energy management, green supplies, recycling, temperature control, staff training	PMUs	Office procurement and energy bills	2021-2022	SPREP IA/PCU, VMGD Senior Management	Quarterly, annual, interim reports
Monitoring and Evaluation	ESMP into logframes, work plans and budgets, additional ESS indicators, frequency and responsibility for M&E	PMUs	Quarterly, annual, interim reports	2021-2022	SPREP IA/PCU, VMGD Senior Management	Quarterly, annual, interim, and draft final reports
Reporting and Budgeting	Quarterly, annual, mid-term, and completion reports to document ESS actions.	Executing Entities (VMGD and SPREP)	Quarterly, annual, interim reports	2021-2022	SPREP IA/PCU	Quarterly, annual, interim, and draft final reports

12.3 Environmental and Social Risks and Suggested Mitigation Measures

A summary of the proposed activities to be implemented by the project is provided in Annex 2. The main environmental risks and mitigation options are provided in Table 6, organised according to each project output. While completion of the ESMP is rather delayed in comparison to the initial project duration, there is still sufficient time to ensure that these mitigation measures are budgeted for and implemented in the remaining 2 years of the project (assuming that a project extension will be forthcoming).

Table 6. Detailed environmental and social measures by Project Output

Output	Activities	Environmental risks	Mitigation options	Responsibilities	Timeline
1.1. Strengthening climate information services through data and interfaces	<p>Climate data digitised, homogenized and uploaded into the VMGD portals;</p> <p>VMGD IT platform upgraded;</p> <p>User interfaces strengthened to support CIS decision-making</p>	<p>As this activity is digitising about 40 years of old paper records, the retention or disposal of these records poses a potential environmental risk.</p>	<p>Do not burn the discarded records.</p> <p>If there is a paper recycling company locally then recycle.</p> <p>If the records are retained, then ensure they are kept in a fire-proof storage room</p>	<p>VMGD</p> <p>Recycling company</p>	<p>As each batch of records is digitised.</p>
1.2. Research, modelling and prediction to support CIS tools and uptake	<p>Three observational networks established and operational;</p> <p>Seasonal climate forecasts with improved utility and functionality;</p> <p>Long-term projections developed;</p> <p>Risk-based coastal and climate hazard mapping;</p> <p>Vulnerability mapping of the coastal zone target areas; and</p> <p>Agro-met predictions for cropping systems</p>	<p>The environmental implications of installing meteorological and hydrological equipment depend on the sites and the access to those sites. If all weather access is required to service and maintain the equipment, then site selection is important. If the sites involve passage through private property, then compensation may be needed.</p> <p>While the office-based work has minimal environmental impacts, each office should also have a defined plan.</p>	<p>Ensure that all weather access to the selected sites is possible.</p> <p>Negotiate access rights with the local landowners and compensate them for any loss of land or damage.</p> <p>Packaging of the equipment purchased should be recycled or returned to the supplier.</p> <p>The observation sites should be securely fenced, and vegetation manually controlled (no herbicide)</p>	<p>VMGD</p> <p>Local landowners</p> <p>Equipment suppliers</p>	<p>At site selection, equipment installation, routine maintenance visits</p>

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1.2. Research, modelling and prediction to support CIS tools and uptake	Three observational networks established and operational; Seasonal climate forecasts with improved utility and functionality; Long-term projections developed; Risk-based coastal and climate hazard mapping; Vulnerability mapping of the coastal zone target areas; and Agro-met predictions for cropping systems	The environmental implications of installing meteorological and hydrological equipment depend on the sites and the access to those sites. If all weather access is required to service and maintain the equipment, then site selection is important. If the sites involve passage through private property, then compensation may be needed. While the office-based work has minimal environmental impacts, each office should also have a defined plan.	Ensure that all weather access to the selected sites is possible. Negotiate access rights with the local landowners and compensate them for any loss of land or damage. Packaging of the equipment purchased should be recycled or returned to the supplier. The observation sites should be securely fenced, and vegetation manually controlled (no herbicide)	VMGD Local landowners Equipment suppliers	At site selection, equipment installation, routine maintenance visits

<p>2.1a CIS implemented within target sectors</p>	<p>Agricultural practices strengthened through the use of climate information services to improve crop production – (j) Demonstration sites established for case studies (ii) Climate change projections developed</p>	<p>Site selection for the demonstration farms, bearing in mind the need for all weather access. Farmer practices need to be environmentally sound. Demonstration workshops or farmer climate field schools can also generate a lot of litter.</p>	<p>Ensure that the demonstration farmers have appropriate equipment, seeds, and fertilizer. If necessary, fence off the demonstration plots. Ensure that all litter is removed and disposed of appropriately.</p>	<p>Agricultural extension department; VMGD, landowners, local community, media</p>	<p>Site selection, farmer training, crop establishment and harvest, and regular farmer field schools (at least once per year).</p>
<p>2.1b CIS implemented within target sectors</p>	<p>Fisheries sector strengthened through the use of CIS in MPA Management Plans in at least 3 communities</p>	<p>Heat stress in coastal waters can cause coral bleaching, algal blooms, reduced oxygen levels and fish mortality. The proposed interventions, however, are not clear. The plan is to support marine protected areas (MPAs) as a mechanism for protecting fisheries habitats and fish populations to support recruitment of fish stocks in adjacent areas that are impacted by marine heatwaves and coral bleaching. Encouraging increased fishing effort close to MPAs at times of stress does not appear to be an environmentally sound strategy.</p>	<p>Early warning of elevated temperatures could trigger a closed period where no fishing is allowed. Alternative fish preservation techniques may make sense instead of importing canned fish, but this needs to involve local women and an understanding of their food preparation techniques and preferences for fresh fish. The Gender Action Plan should address this planned activity. If illegal fishing activity is present, then the e-reporting toolkit for fish catch effort may not yield accurate evidence.</p>	<p>Fisheries Department, local fisherfolk, national park management, VMGD</p>	<p>Establishment of MPAs needs to start from the beginning of the project, as fish stocks take some time to build up. The early warning advice will depend on the incidence of extreme weather events. The study of alternative fish preservation techniques should proceed as soon as possible. The e-reporting tool kit may need to be reconsidered if it is not going to be accurate.</p>

<p>2.1c CIS implemented within target sectors</p>	<p>Vanuatu infrastructure design strengthened utilising climate data in the design and construction phases – Design Standards for Infrastructure updated, and Public Works Department engineers trained in new standards and climate information</p>	<p>Upgrading the design standards for roads, bridges, and other public infrastructure is highly desirable. It appears that surveys and mapping may be undertaken but no infrastructure is intended to be constructed under this activity. The new design standards will be supplemented by awareness raising and training of PWD engineers.</p>	<p>If the survey work finds that current infrastructure is not 'climate proof' consider preparing supplementary projects for retrofitting. There is a danger that 'old' infrastructure will be regarded as not worthwhile upgrading or repairing. The new design standard should also include environmental measures, especially for jetties and wharves.</p>	<p>VMGD, PWD, engineering consultants and trainers</p>	<p>Standards should be completed in time for PWD to demonstrate before the project completion how the upgraded standards have been or will be applied.</p>
<p>2.1d CIS implemented within target sectors</p>	<p>Improved water management and security in the Sarakata catchment – (i) Draft Flood Management & Response Plan developed and/or modified to incorporate CIS input; (ii) Integrated Water Management Committee established and operational; (iii) Operational groundwater model developed and/or adapted</p>	<p>Due to climate change, drier and wetter periods can result in poor water quality due to excess sedimentation, contaminants and/or bacteria. The planned activities, however, focus on flood management, flood warning system, and groundwater quantities. There is mention of including the results in the Drinking Water Safety and Security Plan, but no specific activity on water quality monitoring or early warnings.</p>	<p>Develop a water quality monitoring program to accompany the flood warning system and groundwater modelling. The Sarakata flood management plan should also examine the stability of riverbanks and propose additional riparian vegetation or other bank stabilisation measures. Highly contaminated floodwaters may also affect the coastal zone, so the early warning system should extend to those who collect shellfish or crabs from the coastal sediment close to the river mouth.</p>	<p>Provincial Integrated Water Resource Management Committee; Department of Water Resources; Department of Public Health; Luganville Municipal Council; Sanma Provincial Government</p>	<p>Necessary survey work conducted in 2021; draft flood management and response plan ready in Q1 of 2022; and the early warning system operational by Q2 of 2022.</p>
<p>2.1e CIS implemented within target sectors</p>	<p>Tourism sector is utilising climate information services in decision-making – (i) Standard Operating Procedures for local tourism bungalow design developed and/or modified to incorporate CIS input; and (ii) tourism 'hotspots' identified and mapped</p>	<p>The activities under this case study essentially involve providing climate information to tourism operators in Santo and Tanna islands, with no physical activities planned. Of course, there may be subsequent action taken by the tourism industry but that is beyond the scope of the project.</p>	<p>The bungalow designs are intended to reflect the cultural traditions of each island. Therefore, the use of locally sourced natural materials may be important. The designs, therefore, should include environmental protection of these sources.</p>	<p>Department of Tourism; Provincial Tourism Association; VMGD; private tourism companies; and town planners.</p>	<p>As tourism is strongly constrained due to COVID-19, these activities can be undertaken in 2022.</p>

<p>2.2. CIS is incorporated into community practices</p>	<p>Communities are engaged and utilising CIS at 12 Community Climate Centres</p>	<p>The intention of this activity is to create a network of 'CIS champions' and Community Climate Centres in 'hotspots'. This will help to build community capacity to access and use CIS, as well as integrate traditional knowledge. The environmental and social impacts include (a) physical impacts of establishing the Climate Centres and (b) the social impacts of accessing and using traditional knowledge.</p>	<p>The physical impacts of establishing the Community Climate Centres can be minimised by upgrading existing community centres to make them multi-purpose. Each centre, however, should have a dedicated environmental plan in the same way as the main project office(s). The social concerns around accessing and using traditional knowledge will require an indigenous peoples' plan, prior informed consent, and appropriate benefit sharing arrangements.</p>	<p>Project staff; CIS champions; VMGD; community leaders and traditional elders; and Vanuatu Volunteers Network</p>	<p>Extensive community consultation should take place in 2021, with the Community Climate Centres established and operational in 2022-2023.</p>
<p>2.3. Socio-economic benefit (SEB) analysis for Vanuatu utilising the customised Pacific CIS cost-benefit framework</p>	<p>A SEB on return on investment in climate information services is utilised in decision-making – (i) SEB database established and populated (ii) At least one SEB report produced</p>	<p>The intention of this activity is to quantify the multiple costs and benefits of climate services, by including economic, social and environmental considerations in a SEB report.</p>	<p>As this activity only involves preparation of a report, there are no significant environmental implications, although it is expected that non-marketed environmental and social benefits should be included in the analysis.</p>	<p>Project staff and consultant(s).</p>	<p>As the results of this analysis should inform future policy development in Vanuatu, this assessment should be conducted as soon as possible.</p>
<p>3.1. Traditional knowledge is incorporated into climate information services in Vanuatu</p>	<p>CIS tools and products incorporate TK and climate science and uptake by communities – (i) TK strategy implemented and TK data observational network in place; (ii) At least four examples of TK data collected and integrated into CIS tools.</p>	<p>As indicated in Output 2.2, there is concern about accessing and using traditional knowledge. Issues of prior, informed consent, fair and equitable sharing of benefits, and application of international guidelines on traditional knowledge will need to be followed.¹⁴ Particular care will need to be taken in relation to tabu areas both on land and in the sea.</p>	<p>The approach should be consistent with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization of the Convention on Biological Diversity and recent work of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).</p>	<p>Project staff; VMGD; indigenous peoples expert</p>	<p>This activity should be approached sensitively and only moved towards the intended output after considerable community consultation and the prior informed consent.</p>

¹⁴ <https://www.cbd.int/traditional/outcomes.shtml>

<p>3.2. Developing CIS tools and information products for target end-users</p>	<p>Decision support tools are developed and in use by sectors and communities – (j) At least five CIS decision support tools developed, tested and utilised in the five target sectors for target user communities</p>	<p>As these decision support tools are intended to be online and interfaced with the Vanuatu National Advisory Board and Pacific Climate Change portals, the environmental impacts are expected to be minimal. If the tools are actually used in the target sectors during the project, however, there may be (undefined) environmental and social impacts.</p>	<p>Once these tools are developed and are available online, the project should monitor their application in the field and identify any related environmental or social implications that may need to be addressed.</p>	<p>Project staff, VMGD, sector agencies</p>	<p>Any environmental or social impacts from application of these decision support tools are not likely to be observed until close to the end of the project or subsequently.</p>
<p>3.3. Implementing knowledge management, engagement and outreach across sectors/communities</p>	<p>CIS tools and information used to strengthen sectors and communities to climate change impacts – (j) 40 campaigns to promote CIS to next / end-users</p>	<p>This activity will involve developing outreach materials and information packages, as well as travelling to communities. The main environmental concern will be disposal of posters and other printed material after use.</p>	<p>Care should be taken to ensure that posters or other printed material is removed from the locations of the outreach campaigns and appropriately recycled.</p>	<p>Project staff</p>	<p>After every outreach event.</p>
<p>4.1. Institutional capacity to implement CIS across sectors strengthened</p>	<p>Sector staff are trained and are using CIS in their decision-making</p>	<p>Capacity building for sector staff is unlikely to have any significant environmental impacts, but standard attention to office environmental plans is needed.</p>	<p>Completion and adherence to office-based environmental management plans.</p>	<p>Sector agency managers and staff</p>	<p>Continuous throughout the project</p>
<p>4.2. Training of personnel for strengthening of institutional capacity</p>	<p>Capacity and knowledge of climate change and CIS is improved within VMGD and targeted sectors</p>	<p>Training programs need to follow sound environmental practices like dealing with waste, not using plastic water bottles, and following good hygiene procedures.</p>	<p>Standard environmental practices for training venues in relation to waste and good hygiene.</p>	<p>Project staff, VMGD, and consultants</p>	<p>At all training events</p>

In addition to the environmental risks and mitigation measures, several important social issues need to be addressed (Table 7).

Table 7. Social risks and suggested mitigation measures

Social risks		Mitigation measures		Responsibility		Timeframe	
1	Reliance on overseas equipment suppliers may hinder subsequent repair and maintenance	Where possible use local equipment suppliers and train local staff in repair and maintenance	PMUs	From the equipment specification stage			
2	Unannounced entry into villages to install equipment may create conflict	Follow local traditional greetings with the village chief and elders based on local kastom	PMUs	On first and subsequent visits to the villages			
3	Use of 'outside' work force may create social tensions	Use local employment in construction and installation activities	Local contractors	For all construction activities where specialist skills are not needed			
4	Customary natural resource usage rights may be restricted by project activities	Detailed understanding of usage rights, benefit sharing from project interventions, and possible compensation	PMUs, sector agencies	Prior to implementing the sector case studies			
5	Access to land for installation of equipment needs to be negotiated, agreed, and documented	Preference should be to locate equipment on government-owned land, but compensation may need to be agreed and tightly documented, with documents retained by SPREP/IA	PMUs, VMGD	Prior to installation of all equipment			
6	Local villagers may not understand the purpose of the equipment installed and may not protect it from damage	Socialisation is necessary in all locations of the hydro-meteorological equipment to explain that the purpose is gather data for early warnings and to save lives	VMGD, PMU	Continuously, and through the Community Climate Centres and local 'climate champions'			
7	The project can contribute to local employment, especially for women	Use local employment, especially women, in operations like manual confirmation of rain gauge readings, simple repairs, or repurposing waste materials	VMGD, PMU	From 2021-2022 but also consider continuing such employment after project completion			
8	Timing and location of outreach events may not be convenient	Find convenient times when most people (including women) are available and avoid using nakamals if women are excluded	PMUs	From 2021-2022			
9	Free, prior and informed consent may not always be obtained in a timely manner	Consent covers use of land for demonstrations, access to and use of traditional knowledge, activities in taboo areas, and any involvement of children	PMUs	For all field level activities			
10	Women may be excluded from certain project interventions, as they are in male-dominated sectors	Ensure that women are fully engaged in developing decision support systems, demonstrations of the CIS tools for each sector, and evacuation plans and drills, and equally represented on the management agencies and committees	VMGD, sector agencies, PMUs	Continuous 2021-2022 and arrangements made for continuation of these practices post-project			

11	The tourism sector case study is focused on the needs of tourism operators	Staff working for tourism operators, who would be at the frontline of any climate-related emergency, should participate in gender-differentiated training	PMU, Department of Tourism	From 2021-2022
12	Language differences may hinder responses to awareness raising and to early warnings	Outreach material, should help to keep local languages alive, while recognising that Bislama is becoming the lingua franca	PMUs	Continuous
13	Traditional knowledge may be used inappropriately and without benefit to the custodians	Access and use of traditional knowledge should be controlled and cleared by the Malvatumauri Council of Chiefs	PMUs, VMGD, sector agencies, Council of Chiefs	From 2021-2022
14	Grievances and complaints may not be treated seriously	A staged grievance redress mechanism needs to be in place and the avenues to access project problem solving support should be widely disseminated	PMUs, Office of the Ombudsman, SPREP	Urgent in 2021
15	Social risks like sexual harassment, bullying, bribery, corruption etc. may emerge during project implementation. Also, occupational health and safety issues may arise in offices and in the field.	Steps need to be taken to (i) identify potential hazards to workers; (ii) provide preventative and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) train staff and workers; (iv) document and report on occupational accidents, diseases and incidents; and (v) ensure emergency preparation, preparedness and response arrangements	PMUs, VMGD, sector agencies	From 2021-2022

Annex 1 Re-screening of environmental and social safeguards

Potential risks and impacts related to Environmental and Social Policy and Standards

		Risk Rating (see below)				
	Yes, No, n/a, TBD	Potential issues, and specify activities causing this	Likelihood	Consequence	Risk Significance	Comments, additional observations
Principle 1: Human Rights						
1	yes	Potential use of traditional knowledge and creation of taboo areas could affect some groups if not handled sensitively	Moderately likely	Moderate	Medium	Free, prior informed consent is needed before making any traditional knowledge public or using it to change access to resources (e.g., tabu areas)
2	yes	Some vulnerable communities will receive project support which could be perceived as discriminatory by those who don't receive equivalent support	Moderately likely	Minor	Medium	Project outreach campaigns will need to stress that demonstration sites at selected locations are intended to provide evidence of improved early warning systems to be rolled out to the entire population.
3	yes	Gender equality is still an issue in Vanuatu and women and girls may not have equal access to project decision making. People with disabilities may not be able to attend information sessions at Community Climate Centres.	Highly likely	Moderate	Medium	Greater attention needs to be paid to the measures provided in the Gender Action Plan to ensure that women and girls have equal access to decision making. Specific plans need to be put in place to reach disabled people in the project locations, as they may be severely disadvantaged in extreme weather events.

4	Have local communities or individuals, given the opportunity, raised concerns regarding the project during the stakeholder engagement process?	TBD	There is no documented evidence of such concerns at this stage.	Moderately likely	Moderate	Medium	An effective grievance redress mechanism needs to be in place and widely publicised
5	Is there a risk that the project could exacerbate conflicts among and/or the risk of violence to projected affected communities or individuals?	yes	Possibly the greatest risk arises from the fisheries sector activities where previous access to fishing grounds could be impeded and/or illegal fishing in a marine protected area.	Highly likely	Moderate	Medium	More substantial understanding of fishing effort and seasonality in the proposed project sites is needed based on extensive surveys and interviews with current and potential users of these areas. If the potential for conflict is high, new sites may need to be found
Principle 2: Gender Equality							
1	Is there a likelihood that the project would have adverse impacts on gender equality, and/or the situation of women and girls?	yes	Women and girls are often impacted by extreme weather events but have little recognition to date of their special needs	Highly likely	Moderate	Medium	As noted above, the specific measures identified in the gender action plan need to be included in the project budget and acted on as a matter of priority.
2	Have women's groups/leaders raised gender equality concerns regarding the project during the stakeholder engagement process?	TBD	No documentation to that effect at this stage	Highly likely	Moderate	Medium	Women and girls, plus disabled people, need to be made aware of, and have access to, an effective grievance redress mechanism
3	Could the project potentially limit women's ability to access or use natural resources upon which they depend for a livelihood?	yes	Creation of a marine protected area or designation of a tabu area could prevent women from accessing coastal resources, such as shellfish, crabs, and sea urchins	Highly likely	Moderate	Medium	Usage rights in the sites selected for the fisheries case study need to be thoroughly studied prior to implementation. Access denial for women (or any group) needs to be compensated appropriately, or other less sensitive sites selected for the case study

Principle 3: Child Protection						
1	Is the project expected to require direct interaction with children?	yes	In rural Vanuatu it is impossible to avoid interaction with children although it is not 'required' as part of the project design. This interaction will be through the case studies and the Community Climate Centres	Highly likely	Minor	Medium
2	Is there a risk that security checks have not been conducted for the executing partner?	yes	As local contractors will be employed for the case studies and the Community Climate Centres, it is unlikely that they will have been through security checks.	Highly likely	Moderate	Medium
Principle 4: Climate Change						
1	Could the project adversely contribute to climate change impacts, or ability to adapt to climate change, or be otherwise impacted by climate change?	yes	Overall, the project is expected to contribute positively to climate change adaptation but is not able to avoid all climate change impacts, including extreme weather events	Highly likely	Moderate	Medium
Principle 5: Biodiversity and Ecosystem Services						
1	Could the project lead to adverse impacts on biodiversity and priority ecosystem services?	no	The fisheries case study is the most likely component to have impacts on biodiversity and ecosystem services, but these should be positive.	Slight	Minor	Low
						Additional surveys and local observations in the proposed fisheries case study sites should document the baseline biodiversity and ecosystem conditions, so that subsequent monitoring can show that the project has not had any adverse impacts
						The early warning system should assist affected communities by providing advanced warning of potential extreme events and the project should help vulnerable communities to understand the appropriate responses to minimise loss and damage
						Local contractors should be required to check the police records of their workers. The grievance redress mechanism should also allow concerned parents to report suspicious behaviour of workers.

Principle 6: Waste Management

1	Could the project lead to adverse impacts associated with waste generation or disposal?	yes	Waste generation and disposal issues are expected with procurement of equipment (packaging), disposal of batteries, litter at demonstration sites, wastewater disposal at Community Climate Centres, and waste management at project offices.	Highly likely	Moderate	Medium	In some of the more remote project sites, there will be no capacity for recycling solid waste, so waste receptacles should be provided on-site, and the waste returned to Port Vila for recycling. Each project office should have a waste management plan, especially for hard to recycle waste like printer cartridges and e-waste. The proposed Community Climate Centres should have proper sanitation and wastewater disposal systems.
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Safeguard 1: Assessment and Management of Environmental and Social Risks and Impacts

1	Is it likely that sufficient management and human and financial resources will not be available to the project on an ongoing basis to achieve effective and continuous environmental and social performance?	yes	It is likely that funding of VMGD during and after the project will be sufficient but scaling up the case studies will not have sufficient funding or human resources, unless there is a follow-on project	Highly likely	Moderate	Medium	Project evaluation should identify successful outcomes that have potential for replication and scaling up. Towards the end of the project duration, resources should be directed towards preparation of a follow-on project through a pre-feasibility study and environmental and social assessment
2	Are the relevant government agencies not fully involved in assisting SPREP to assess the environmental and social risks and potential impacts?	yes	The Department of Environmental Protection and Conservation (DEPC) has not been fully engaged to date.	Highly likely	Moderate	Medium	DEPC should be given an opportunity to contribute to this ESMP and provided with funding from the project to carry out any project-related responsibilities.

Safeguard 2: Public Participation and Information Disclosure

1	Is there a risk that not all relevant stakeholders have been identified and given opportunities to contribute to project design and implementation arrangements?	yes	Consultation has taken place with community leaders and local government officials. Wider consultation with specific vulnerable groups has not been undertaken to date	Highly likely	Moderate	Medium	Consultations on setting up the Community Climate Centres have taken place but the specific needs of vulnerable groups demand much wider community consultation, focus groups, and online forums, so climate information services are directed to specific needs of end-users.
2	Is relevant project documentation on environmental and social implications of the project not readily accessible in the project area?	yes	As the Community Climate Centres are not yet fully established the information available in project sites is minimal	Highly likely	Minor	Medium	Once the Community Climate Centres are fully operational detailed guidance should be posted on the environmental and social mitigation measures provided by the project, including the grievance redress mechanism.
3	Has relevant documentation not been uploaded to the SPREP website in a timely manner?	no	The draft ESMP is uploaded to the SPREP website	Slight	Minor	Low	The upgraded ESMP should also be uploaded and made available on the VMGD website as there is no information about the project on the VMGD website.
Safeguard 3: Accountability, Grievance and Conflict Resolution							
1	Has any potential source of environmental or social concern or conflict associated with the project been identified at this stage?	TBD	No concerns have been documented to date	Moderately likely	Moderate	Medium	The grievance redress mechanism outlined in this ESMP should be implemented and information on how to submit concerns should be widely disseminated.

2	Has the national environment agency (or other relevant government agency) not been involved in determining the environmental and social risks at this stage?	yes	There is no evidence of the DEPC involvement in determining the environmental and social risks as the project was initially rated as Category C, with minimal impacts	Highly likely	Moderate	Medium	As noted above, DEPC should be given an opportunity to contribute to this ESMP and provided with funding from the project to carry out any project-related responsibilities.
3	Is there a risk if the national government involved doesn't have an effective grievance mechanism and conflict resolution procedure already in place?	yes	The official government conflict resolution avenue is through the Office of the Ombudsman under the Ombudsman Act of 1998 and the Leadership Code. Typically, however, conflicts would first be raised with local leaders.	Moderately likely	Moderate	Medium	As noted above, the grievance redress mechanism outlined in this ESMP should be implemented, starting with problem resolution at the local level before conflicts escalate.
4	Is there a risk if SPREP's corporate level grievance mechanism is not in place and operating effectively?	yes	SPREP is still preparing its corporate level grievance redress mechanism.	Highly likely	Moderate	Medium	Although most conflicts can be resolved locally or at the project level, the availability of escalating the concern to SPREP corporate level (e.g., for corruption concerns) needs to be finalised as soon as possible.
Safeguard 4: Labour and Working Conditions							
1	Will the project potentially require migrant workers to construct or implement works?	no	Local labour is expected to be hired.	Not likely	Negligible	Low	Labour employment laws in Vanuatu should be followed.
2	Will the project be required to provide accommodation services for workers?	no	Temporary accommodation for site visits only	Not likely	Negligible	Low	Local labour will be employed for renovation of Community Climate Centres
3	Is there a risk that the host country has not allowed union activity and permitted workers to bargain collectively?	TBD	Vanuatu's Trade Union Act 1983 provides for registration of unions and collective bargaining.	Not likely	Negligible	Low	The extent to which employers follow the labour laws is uncertain.

4	Is there potential that the project could apply adverse discriminatory practices?	no	The only likely discrimination relates to gender issues and the selection of project sites, both of which are referred to above	Slight	Minor	Low	Any concerns about project practices that discriminate against any group or individual should be dealt with through the grievance redress mechanism.
5	Will the project involve the employment of children?	no	Children may help their parents but there will be no paid employment of children	Slight	Minor	Low	Customary practices of children helping with the work of parents needs to be respected but exploitation of child labour should not be permitted.
6	Is there a risk of child exploitation or abuse linked to the project?	yes	As noted above there will be no paid employment of children but they may be forced to work when they would prefer to be doing something else	Slight	Minor	Low	As above – exploitation of children should not be permitted.
7	Is it likely that the project could present unsafe or unhealthy working conditions?	yes	Travelling to remote areas in Vanuatu always carries an element of risk. That risk is even greater while on board boats.	Highly likely	Moderate	Medium	Possible accidents due to unsafe working conditions (e.g., on a boat in a storm) need to be anticipated and clear instructions available and understood on how to avoid accidents and how to respond if an accident occurs.
	Is the safeguard triggered?	yes					An occupational health and safety guidelines document is needed for all stakeholders in the project
Safeguard 5: Resource Efficiency and Pollution Prevention							
1	Is the project likely to release pollutants?	yes	The project will release small amounts of solid, liquid, and gaseous wastes, some of which can be avoided.	Moderately likely	Minor	Medium	Solid waste from Community Climate Centres and from case study demonstration sites needs to be recycled or appropriately disposed of in a sanitary landfill.

2	Could hazardous waste materials be generated by the project?	yes	As a lot of the climate monitoring system equipment is operational in remote areas, replacement batteries will be needed from time to time. These should not be disposed in the same way as normal waste. In addition, there will be some e-waste that will need to be handled separately.	Expected	Moderate	Medium	Options for dealing with used batteries and e-waste must be identified and cleared by SPREP and DEPC.
3	Are chemical pesticides likely to be used by the project?	yes	Some pesticides or herbicides may be used to ensure that the area surrounding monitoring equipment is kept clear of vegetation and pests. It is important to bring the empty containers back to Port Vila if they can't be safely disposed of at the project site.	Moderately likely	Minor	Medium	Particular care needs to be taken to ensure that the empty herbicide or pesticide containers are not used for some other purpose and are treated as hazardous waste for disposal.
	Is the safeguard triggered?	yes					A hazardous waste disposal plan should be cleared by SPREP and DEPC
Safeguard 6: Community Health, Safety and Security							
1	Will the project require the construction or rehabilitation or any structural components which could pose a risk to affected communities?	yes	Renovation of the Community Climate Centres needs to ensure that the buildings are safe in an extreme weather event, cyclone proof, no asbestos, and with improved sanitation and wastewater disposal.	Highly likely	Moderate	Medium	Renovation plans should be cleared by a qualified engineer and inspected on completion.
2	Does the project involve the construction or rehabilitation of a dam or weir?	yes	The sources of water supplies to the Community Climate Centres need to be checked. Hydrological monitoring stations may need a small concrete weir to be constructed	Slight	Negligible	Low	The project has no plans for any significant dam or weir construction, but care should be taken in installing concrete facilities in hydrological monitoring sites.

3	Is the project likely to increase community exposure to disease (water borne, water based, water related and vector borne diseases as well as communicable diseases)?	no	The only possibility would be failure to improve the sanitation and wastewater management at the Community Climate Centres	Slight	Negligible	Low	Sanitation and wastewater facilities at the Community Climate Centres need to be checked by a competent WASH specialist before finalising renovation plans.
4	If the project retains security workers, is there a risk that security personnel could be responsible for unlawful and abusive acts against affected communities?	no	No security workers will be employed	Not likely	Negligible	Low	Fencing around monitoring sites may need to be checked by someone with security experience.
	Is the safeguard triggered?	yes					The renovation plans for the Community Climate Centres need to be checked by experts and approved by SPREP
Safeguard 7: Involuntary Resettlement							
1	Could the project involve physical relocation of people?	no	No physical relocation of people is planned, but people may need to relocate temporarily during an extreme weather event or flash flood.	Slight	Minor	Low	One of the objectives of the climate information early warning system is to give vulnerable people adequate warning of when to evacuate and/or move to higher ground or a safer building.
2	Could the project require expropriation to resettle people?	no	No resettlement is planned	Slight	Negligible	Low	As a result of future climate change vulnerability assessments people may need to resettle away from hazardous areas, but that is not an objective of this project

3	Is it likely that the project will need to acquire land from individuals and households, causing them to experience economic displacement?	yes	Small amounts of land may be needed for climate monitoring equipment.	Moderately likely	Minor	Medium	Preference is to locate equipment on government land but if there is a need to use private, freehold land or public land that has established use rights, then some financial compensation may be needed
4	Will the project restrict access to natural resources and areas used by affected communities resulting in economic displacement?	yes	The main concern is with the fisheries case study which plans to "support established or new marine protected areas" (e.g., customary local tabu/CBFM areas) and find alternative livelihoods for displaced fisherfolk.	Highly likely	Moderate	Medium	The case study states: "Alternative livelihood activities will be identified and implemented by key line agencies, given that a portion of the immediate fishing ground will be protected". As these alternative livelihood activities are not part of the project design there is a risk of significant social impacts if the Government does not implement these measures.
	Is the safeguard triggered?	yes					An assurance should be sought from the Government that anyone suffering changes to their livelihood as a result of the fisheries case study will be compensated in some way.
Safeguard 8: Biodiversity Conservation and Sustainable Management of Living Natural Resources							
1	Is the project likely to affect biodiversity or ecosystem services?	yes	The fisheries case study is intended to protect coral reef ecosystems in the event of heatwaves due, in part, to climate change. By removing damaging activities, the protected reefs are expected to provide a temperature refuge for fish	Highly likely	Moderate	Medium	The fisheries case study states: "Fishing pressure and activities that damage fisheries habitats, such as reef walking and destructive fishing methods, will be restricted with the aim that these sites will act as a temperature refuge, providing a source of new fish recruits for adjacent impacted reef sites".

2	Is the project expected to impact natural habitats but there are no plans in place to ensure no net loss of biodiversity?	yes	The fisheries case study assumes that a protected reef will provide 'new fish recruits' for adjacent reefs, but there is no evidence that this will offset the expected loss in biodiversity due to coral bleaching.	Highly likely	Moderate	Medium	A more complete understanding of the ecosystem dynamics under heatwave conditions is needed before proceeding with this approach.
3	Is the project expected to affect critical habitat?	yes	The coral reef areas in the fisheries case study may be critical habitats	Moderately likely	Moderate	Medium	As above
4	Is the project located in a legally protected area or internationally recognised area?	yes	The fisheries case study intends to "focus on the development, support and implementation of management plans for MPAs (local tabu/CBFM areas or CCAs) in the pilot sites".	Highly likely	Moderate	Medium	The procedures for establishing a legally recognised protected area in Vanuatu need to be followed, along with documented community support for a community-based fisheries management (CBFM) area.
5	Is the project likely to introduce invasive alien species to the project area?	no	It is unlikely that any invasive alien species will be introduced by the project.	Not likely	Negligible	Low	Climate-adapted agricultural varieties may be regarded as genetically modified living organisms, so government approval will be needed before introduction of any of these varieties
6	Could the project impact on priority ecosystem services?	yes	The fisheries case study is likely to impact coastal ecosystem services.	Highly likely	Moderate	Medium	Current beneficiaries of these ecosystem services need to be identified and consulted before any changes are made
	Is the safeguard triggered?	yes					A detailed ecosystem management plan is required before proceeding with the fisheries case study

Safeguard 9: Indigenous Peoples

1	Is the project likely to affect Indigenous Peoples?	yes	More than 100 languages are spoken in Vanuatu and the original peoples regard themselves as Ni-Vanuatu, with separate cultures and traditions.	Highly likely	Moderate	Medium	A full understanding of the different aspects of Ni-Vanuatu people depending on their island culture and traditions is needed before trying to make significant changes.
2	<p>Is the project likely to:</p> <ul style="list-style-type: none"> Be located on or commercially develop natural resources on lands traditionally owned by Indigenous Peoples, with adverse impacts anticipated? Require the relocation of Indigenous Peoples from lands and natural resources subject to traditional ownership or customary use? Significantly impact critical cultural heritage for indigenous peoples? Use such cultural heritage for commercial purposes? 	yes	Some of the case studies will be on land or sea regarded as significant cultural heritage sites and will need free, prior informed consent before making any changes in land use or use of coastal resources.	Highly likely	Moderate	Medium	The project staff should not assume that local government leaders fully represent the communities in which they work. Effort needs to be taken to identify the true decision makers and custodians of traditional knowledge and practices.
	Is the safeguard triggered?	yes					An indigenous peoples' plan based on the current assessment of traditional knowledge is needed.

Safeguard 10: Cultural Heritage

1	Is the project likely to affect cultural heritage?	yes	As indicated above, cultural heritage extends across more than 100 language groups, each with their unique history and traditions. The project should respect this heritage and reflect it in information and communication systems	Moderately likely	Moderate	Medium	Cultural heritage issues should be included in the indigenous peoples' plan referred to above. Vanuatu formally recognizes the indigenous languages in its constitution and supports teaching of the mother tongue in elementary schools. The three official languages are English, French and Bislama.
2	Is the project located in a legally protected cultural heritage area or is it likely to impact critical cultural heritage?	yes	The traditional design of the nakamals (meeting places) which has shown significant resilience to extreme weather events has been recognised as a critical cultural heritage	Highly likely	Moderate	Medium	In 2017, the Government launched an environmental sustainability program based on the use of traditional knowledge in climate change adaptation and disaster resilience
	Is the safeguard triggered?	yes					Cultural heritage should be included in the indigenous peoples' plan referred to above

Important considerations

- Project activities are screened for their inherent environmental and social risk before applying mitigation and management measures. Inherent risks are risks prior to mitigation measures having been applied. It is important to form a clear picture of potential inherent risks in the event that mitigation measures are not implemented or fail.
- Screening for potential adverse environmental and social risks and impacts must consider all activities with potential direct and indirect risks and impacts across the Project's Area of Influence.
- A Safeguard may be 'triggered' when a low, medium or high risk is identified through the questions in the table below. Professional judgement will be required by the Project Proponent to determine if a low risk triggers the Safeguard, but in all cases a medium or high risk will trigger the Safeguard. Safeguards #1-3 are mandatory, but #4-10 are only triggered after consideration of each question below. Each question has been worded so that the extent of the risk can be estimated. Insufficient information in the concept note to estimate the risk at that stage should trigger the need for additional information to be collected, possibly adding to the information needed for scoping the ESA and preparing TORs.

When determining the inherent risk, the risk framework described below should be used:

Consequence	Likelihood				
	Not Likely	Slight	Moderately Likely	Highly Likely	Expected
Critical	Red	Red	Red	Red	Red
Severe	Yellow	Yellow	Red	Red	Red
Moderate	Green	Yellow	Yellow	Yellow	Yellow
Minor	Green	Green	Green	Green	Green
Negligible	Green	Green	Green	Green	Green

Green = Low Risk **Yellow** = Medium Risk **Red** = High Risk

Definition of Consequence¹⁵

Critical — Significant adverse impacts on human populations and/or the environment. Adverse impacts high in magnitude and/or spatial extent (e.g. large geographic area; large number of people affected; transboundary impacts; cumulative impacts) and duration (e.g. long-term, permanent, and/or irreversible); areas impacted include areas of high value and sensitivity (e.g. priority ecosystems; critical habitats; critical cultural heritage sites; legally protected areas); adverse impacts to rights, land¹⁶, resources and territories of Indigenous Peoples; involve significant displacement or resettlement; generates significant quantities of greenhouse gas emissions; impacts may give rise to social conflict.

Severe — Adverse impacts on people and/or environment of medium to large magnitude, spatial extent and duration more limited than critical (e.g., predictable, mostly temporary and reversible). The potential risk impacts of projects that may affect the human rights, lands, natural resources, territories, and traditional livelihoods of Indigenous Peoples at a minimum potentially severe.

Moderate — Impacts of low magnitude, limited in scale (site-specific) and duration (temporary) can be avoided, managed and/or mitigated with relatively uncomplicated accepted measures.

Minor — Very limited impacts in terms of magnitude (e.g., small affected area, very low number of people affected) and duration (short), may be easily avoided, managed or mitigated.

¹⁵ Note, this risk format draws heavily upon the approach designed by the UNDP in their Social and Environmental Screening Procedure (2014)

¹⁶ In connection with restrictions on use of land, 'land' is taken to mean both terrestrial and aquatic resources (e.g., coastal fishing grounds).

Annex 2 Detailed project activity description

Activities	Description	Inputs	Description
Component 1: Strengthen the VMGD platform to provide quality climate data and information for CIS			
1.1.1: Improving the currency, functionality and visualization of climate data records for Vanuatu	Activity 1.1.1 focuses upon the improvement and strengthening of climate data within VMGD to support the climate information service portals, CIS tools and applications. The activity will involve lead scientists from the Australian Bureau of Meteorology (BOM) working closely with climatologists within VMGD to update and extend existing high-quality datasets through quality assurance procedures (i.e., homogenization) and to meet the WMO standards.	Technical expertise (BOM) Personnel (VMGD) Equipment IT equipment Travel Consultancies Office supplies Consumables	Salaries for BOM and VMGD personnel International travel for BOM personnel IT equipment for digitisation of data Equipment for establishing workplace for digitisation of hard-copy information Office supplies for storage and archiving of hard copy information Workshop for training of VMGD personnel to digitize data
1.1.2 Building and strengthening user interfaces to support CIS Decision-making	Improving VMGD's capability to provide integrated information via ICT systems to meet sector needs and demand for climate information through the upgrading of the IT Platform, provision of technical support for VMGD in developing CLEWS-based software application development and ground-truthing CLEWS and outreach to next/end-users and developing the Vanuatu Climate Futures Portal for delivery of climate change projections.	Technical expertise (BOM & CSIRO) Personnel (VMGD) Travel Consultancies	Salaries for BOM, CSIRO and VMGD personnel International travel for BOM and CSIRO Consultant to train and mentor Web and App Developer Consultant to review ICT platform and provide recommendations for upgrade IT equipment to improve VMGD ICT platform IT consumables
1.2.1. Upgrading and expanding the Vanuatu observational networks	Aims to fill spatial and temporal gaps in the national observation network by installing meteorological instruments that collect and transmit essential data for developing and validating CLEWS, seasonal forecasts and climate change projections. Training of VMGD staff on installation, operation and maintenance of instruments, acquisition of data and analysis of data is a vital element of this output. Operations Manuals and Standard Operating Procedures (SOP) will be updated or developed to ensure all instruments are correctly operated and maintained in the long-term.	Personnel (VMGD) Consultancies Equipment Travel Workshops / Training Community consultations Awareness materials Local labour	Salaries for VMGD personnel Travel for site visits Consultancies for procurement and installation of equipment Equipment as per budget plan Freight costs to transport equipment to sites Local labour costs for installation and maintenance of grounds for equipment Consultant to undertake CBA of radar weather systems

<p>1.2.2. Improved utility and function of seasonal climate forecasts</p>	<p>Improve the utility and functionality of seasonal climate forecasts through the upgrading of station-based forecasts to a new, state-of-the-art seasonal forecast model ACCESS-S. This will provide new rainfall and temperature forecasts for all areas of Vanuatu, at a higher resolution in both time and space. A key feature increasing the resolution, will be further downscaling this data to provide an even higher level of detail on rainfall and temperature conditions and integrating this information with sector defined CIS.</p>	<p>Technical expertise (BOM) Personnel (VMGD) Travel Workshops / Training</p>	<p>Salaries for BOM and VMGD personnel International travel for BOM personnel Training workshop for VMGD and Sector staff</p>
<p>1.2.3. Long-term projections for key climate variables and climate extremes for Vanuatu</p>	<p>Development of multi-model ensemble of projected changes for temperature, rainfall, drought and tropical cyclones for Vanuatu. The results will be published through CIS; outreach to target Next/End-Users; training and sector-based case study.</p>	<p>Technical expertise (CSIRO) Personnel (VMGD) Travel Workshops / Training</p>	<p>Salaries for CSIRO and VMGD personnel International travel for CSIRO personnel Training workshops Information gathering workshops</p>
<p>1.2.4. Risk-based coastal and other climate hazard analysis and mapping</p>	<p>Synthesise and report coastal inundation probability (hazard) data in the form of CIS for designated coastal 'hot spots' in the context of case studies and related risk assessments for priority sectors, and facilitate outreach to target Next/End-Users</p> <p>Develop current and projected extreme sea level probabilities and associated coastal hazard information as CIS to inform sectoral applications in Vanuatu</p>	<p>Personnel (VMGD) Technical expertise (CSIRO) Travel Workshops / Training</p>	<p>Salaries for CSIRO and VMGD personnel International travel for CSIRO personnel Training workshops Information gathering workshops</p>

<p>1.2.5. Vulnerability mapping of the coastal zone in Vanuatu</p>	<p>Will use a multidisciplinary approach bringing together reef health and ocean chemistry and temperature science with a regionally specific coupled marine biogeochemical-hydrodynamic model to explore when, where and how coral ecosystems in Vanuatu will be impacted, what management options are available, develop key indicators and 'intervention points,' to inform longer-term planning for climate vulnerable/high impact areas and sectors e.g. inshore commercial and subsistence fishing and for marine protected/other management zones of high natural resource, biodiversity, tourism and cultural value. Such data and information will be then delivered to other activities to develop sector specific CIS products to inform relevant sectoral case studies, with particular emphasis on the Fisheries and Tourism sectors.</p>	<p>Personnel (VMGD) Technical expertise (CSIRO) Travel Workshops / Training Equipment</p>	<p>Salaries for CSIRO and VMGD personnel International travel for CSIRO personnel Training workshops Information gathering workshops Equipment e.g. drones, satellite disc etc. as per budget plan</p>
<p>1.2.6. Developing tailored Agro-met predictions for target cropping systems</p>	<p>Activity 1.2.6 will produce key outputs to be developed and operationalized in Vanuatu's Agriculture sector, contributing to the sector's case study activity. Key outputs will include the Crop Climate Diary to assist in collecting and managing agro-met data, and the Vanuatu Climate Services for Agriculture (VaCSA) that will provide primary climate risk management solutions to the agricultural sector in Vanuatu</p>	<p>Professional Services Travel Technical expertise (APCC) Consultancies Workshops / Training Field work e.g. data collection IT equipment</p>	<p>Salaries for APCC and VMGD personnel Professional services for development of App and Web Portal International travel for APCC personnel Costs to establish field plots Data collection costs IT equipment for data collection and App testing Information gathering workshops Training sessions</p>

Component 2: Demonstrating the value of CIS at the sectoral and community levels

<p>2.1.1. Investigating the climate sensitivity, potential impacts and vulnerability of food crops in Vanuatu to secure future food security</p>	<p>This case study will be the first of its kind in Vanuatu and will demonstrate with farmers through field trials with food crops the use of CIS to inform farm-based decisions at the sector and community levels. For example, climate information provided as 3-day and seasonal forecasts can be used to guide farmers as to when to plant certain crops, where to plant, what management practices should be applied at a particular time to reduce climate-related losses and improve productivity in crop production. The decisions made will be complementary with traditional knowledge practices since TK provides a crucial foundation for community base adaptations at the local scales.</p> <p>The case study will also undertake a threshold analysis using a climate model to look at crops (food and cash crops) preferred growing conditions related to rainfall, temperature and other climate variables projected to change under future climate change. This activity will provide access to science and new knowledge on future climate risks for crops to farmers in a non-technical tool.</p>	<p>Personnel (Agriculture Sector) Equipment Field trial costs Travel Office supplies Awareness materials Community consultations Workshops / Training</p>	<p>Salary for Sector Coordinator Travel to sites Costs associated with establishing and maintaining plots e.g., materials, seeds Community consultations and information exchanges Workshops and training for agricultural staff Equipment costs for field plots</p>
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<p>2.1.2</p> <p>Improving food security in Vanuatu by using climate information to prepare for and respond to temperature impacts on coastal fisheries</p>	<p>The fisheries sector case study will demonstrate how communities can use CIS tools to improve food security in Vanuatu to build resilience to climate variability and change. The focus will be on preparing for and responding to future marine thermal stress events (heatwaves caused by elevated sea surface temperatures; SST+) that can cause coastal and nearshore fish to migrate or die and impact coral reef habitats that support coastal fisheries, which collectively impact on food security.</p>	<p>Personnel (Fisheries Sector)</p> <p>Travel</p> <p>Field costs</p> <p>Awareness materials</p> <p>Equipment</p> <p>Consumables</p> <p>Community Consultations</p>	<p>Salary for Sector Coordinator</p> <p>Travel to sites</p> <p>Costs associated with establishing storage facilities</p> <p>Community consultations and information exchanges</p> <p>Workshops and training for fisheries staff</p>
<p>2.1.3</p> <p>Upgrade the standard infrastructure design in the Vanuatu Public Works Department using climate data on low-lying 'hotspot' and coastal erosion areas</p>	<p>The infrastructure sector case study will use data collected on rainfall, bathymetry and tidal levels for the study sites to develop a real-time flood-inundation model with future scenarios. The outputs will help PWD Engineers improve their understanding on how climate variability and change affects infrastructure at the study sites and more broadly, around the country. This climate information will be used by PWD Engineers to design structures specific for local conditions, with the goal of climate-proofing public infrastructure, such as roads and bridges. The flood model will also be used to review existing completed structures to determine whether they are climate resilient. For coastal areas, a tidal model under future projected sea level rise will generate information on the current and future design requirements for coastal infrastructure, i.e., jetties and wharfs.</p> <p>The case study will provide critical information to the PWD Engineers on the design standard for climate resilient design, monitoring and analysis and will be accompanied by training and awareness to staff at the Ministry of Public Utilities in applying the design standard.</p>	<p>Personnel (Public Works)</p> <p>Travel</p> <p>Equipment</p> <p>Workshops / Training</p> <p>Awareness materials</p> <p>Consumables</p>	<p>Salary for Sector Coordinator</p> <p>Travel to sites</p> <p>Equipment costs to take surveys / mapping of infrastructure</p> <p>Workshops and training for Public Works staff</p>

<p>2.1.4 Increasing climate resilience in flood prone areas – Sarakata Flood Plain</p>	<p>The primary objective for the Water Sector is to demonstrate the value of tailored climate information services as outlined in the four proposed action as decision support tools and sector specific information tools.</p> <p>The case study primary outcome of the monitoring flood and ground water is to increase resilience to flood prone areas by supporting and educating communities with flood management/forecast, and water management for its stakeholders in Luganville. The main activities of this case study is to be concentrated on areas with flood history – Sarakata, Solway, Pepsi, and Lausvatu.</p>	<p>Personnel (Water Sector) Travel Equipment Community Consultations Workshops / Training Awareness materials Consumables</p>	<p>Salary for Sector Coordinator Travel to sites Equipment costs to take surveys / mapping of water catchment Workshops and training Sector staff Community consultations and information sessions</p>
<p>2.1.5 Minimizing the impacts of climate variability and change on tourism development through supporting adaptation</p>	<p>The main objective of the case study is to demonstrate the use of CIS at government, sector and tourism operator level in for a strengthened and sustainable tourism business environment to the long- and short-term impacts of climate variability and change. The case study seeks to respond to the main goals of Vanuatu's Sustainable Tourism Policy and the Vanuatu Sustainable Development Plan.</p>	<p>Personnel (Tourism Sector) Travel Equipment Stakeholder Consultations Workshops / Training Awareness materials Consumables</p>	<p>Salary for Sector Coordinator Travel to sites Equipment costs to take surveys / mapping of tourism Workshops and training for tourism operators and Sector staff</p>
<p>2.1.6 Site Assessments</p>	<p>Undertake initial site assessments to develop workplans and budgets under six-month workplan (Second disbursement)</p>	<p>Personnel (Sectors) Travel Community consultations Workshop</p>	<p>Travel to sites to undertake the initial assessments Community consultations Project workshops for findings – analysis etc</p>

<p>2.2.1 Establishing community CIS sites</p>	<p>The project will establish and support a Vanuatu network of community-based CIS 'champions' and Climate Centres to facilitate access and use of CIS by local communities impacted by climate 'hot spots' (e.g., communities that are subject to known climate hazards such as extreme sea level events/storm surge and coastal inundation and erosion, extreme rainfall etc.).</p> <p>This activity will enhance citizen capacity at community levels for the use of CIS and integration with Traditional Knowledge to support resiliency. This will be delivered in the context of support for building capacity at the Provincial level through the Provincial 'Climate Change Community Centres', that were piloted successfully by the Finland-Pacific (FINPAC) project in the Epau community, on Efate Island.</p>	<p>Personnel (Community Coordinator)</p> <p>Personnel (Climate Champions / Vanuatu Volunteer Network)</p> <p>Travel</p> <p>Building supplies</p> <p>Equipment</p> <p>Community consultations</p> <p>Awareness materials</p> <p>Office supplies / consumables</p> <p>Workshops / Trainings</p> <p>Freight</p>	<p>Employ a Community Coordinator to manage the activity and ensure integration with Project team</p> <p>Establish climate centres e.g., renovations, materials and equipment</p> <p>Vanuatu Volunteers Network for engagement activities</p> <p>Awareness materials</p> <p>CIS tools and products</p> <p>Community consultations and information sessions</p> <p>Office supplies e.g., stationery, materials etc.</p> <p>Freight for equipment and information for Centres</p> <p>Travel for Coordinator and for Climate Champions / VVN</p>
<p>2.3.1. Undertake a socio-economic benefit analysis for Vanuatu using the customized Pacific CIS Cost-benefit Framework</p>	<p>Small Island Nations, their population, economic systems, infrastructure, and ecosystems are vulnerable to climate shocks to the population, economic sectors, infrastructure, and natural assets. In attempting to quantify all the costs and benefits of climate services, this Activity will take a 'triple bottom' line approach and aim to deliver three perspectives on return on investment in climate information services</p>	<p>Technical expertise (CSIRO)</p> <p>Personnel (VMGD)</p> <p>Travel</p>	<p>Salary for CSIRO personnel</p> <p>International travel for CSIRO personnel to Port Vila</p>

Component 3: Development of CIS tools and engaging with stakeholders through outreach and communication

<p>3.1.1</p> <p>Integrating Traditional Knowledge into CIS tools and information</p>	<p>By expanding and digitizing (and verifying) TK data this will support the Vanuatu Rainfall Network (VRN) to monitor TK indicators that can be incorporated into CIS tools and products.</p> <p>Furthermore, integrating climate science with traditional knowledge with updates on climate science and climate processes current products such as the ENSO handbook can be updated and enriched with the added value of TK and provide sector specific examples that can feed into the 'case studies' (Activity 2.1.1 – 2.1.5) and other climate information services/products. Local communities (farmers and fishers) apply a lot of traditional knowledge to their activities. To enrich the new CIS and science to be more meaningful for this audience – TK has to be incorporated into the new science CIS products. This is part of the 'tailoring' part of the work to be undertaken by the project.</p> <p>The outputs from this activity will inform other activities such as seasonal forecasting and be incorporated in training and workshops delivered within these. This work will also inform other activities within the project.</p> <p>These activities will provide a framework that can be used by VMGD to develop future CIS as well as broader communication material and facilitate stronger engagement between VMGD and Vanuatu communities.</p>	<p>Technical expertise (SPREP & BOM)</p> <p>Personnel (VMGD)</p> <p>Travel</p> <p>Workshops / Trainings</p> <p>Equipment</p> <p>Community consultations</p> <p>Awareness materials</p>	<p>Salaries for BOM personnel</p> <p>Salaries for two TK officers</p> <p>International travel for BOM and SPREP personnel</p> <p>Workshops and trainings for Vanuatu-based personnel</p> <p>Collection and analysis of TK i.e. fieldwork</p> <p>Community consultations to gather information</p> <p>Awareness materials on TK & climate science (linked to CIS tools and products)</p> <p>Printing of reports</p> <p>Equipment e.g. digital recorder, camera, laptop etc</p> <p>Registration fees</p>
<p>3.2.1.</p> <p>Developing CIS tools and information products for target end-users</p>	<p>On-line CIS outputs including more customized access for Decision Support System tools and processes will be developed. This will be focused on / include delivery and access, via the VMGD Warning Information Dissemination Platform, and complimentary sector specific 'Climate Watches' (as referred by the VFCS). These resources will be appropriately interfaced with the Vanuatu National Advisory Board (NAB) Portal and Vanuatu content of Pacific Climate Change Portal. This activity will support enhanced access to key project (and other) CIS products and support tools for use (in particular) by government agencies, the private sector and other development sectors.</p>	<p>Technical expertise (BOM)</p> <p>Personnel (VMGD)</p> <p>Travel</p> <p>Professional Services</p> <p>IT equipment</p> <p>Workshop / Training</p>	<p>Salaries for VMGD and BOM personnel</p> <p>International and local travel</p> <p>Professional services for development of tools and products</p> <p>IT equipment e.g. display screens</p> <p>Training workshops / information sessions on CIS tools and products in Provinces</p>

<p>3.3.1 Knowledge management, communication and outreach</p>	<p>Establishes the knowledge management & communication / outreach platform for the Project, and will lead the KM, engagement and outreach activities designed to promote behaviour change, decision-making and learning amongst the Project beneficiaries. This activity will coordinate across all components and activities to build and communicate the Project's results and information outputs into appropriate formats for the audiences identified in the knowledge management, communication and outreach strategy.</p>	<p>Personnel (SPREP) Consultancies Professional Services Awareness materials and tools Travel IT equipment Office supplies / consumables Community activities</p>	<p>Salaries for communication / knowledge management specialist Consultancies to develop materials and information packages, work with communication specialist Development of materials Local travel costs IT equipment e.g. laptop, printer Office supplies e.g. stationery etc Activities to be undertaken with communities as part of Citizen Science</p>
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**Component 4:
Strengthening the institutional capacity for long-term implementation of CIS in decision-making**

<p>4.1.1. Strengthening CIS coordination and response mechanisms for target sectors</p>	<p>The review of existing Vanuatu Government policy, planning and associated institutional and governance arrangements aims to strengthen policies and institutional arrangements through the incorporation of climate information services (CIS) into national and provincial governance and sector policies and plans to support decision-making.</p>	<p>Consultancies Travel Workshops / Training Office supplies</p>	<p>Consultancies to undertake review and develop institutional coordination mechanisms International travel for consultants Project committee meetings to integrate information across Sectors and strengthen CIS across Sectors Workshops and trainings Office supplies</p>
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<p>4.1.2 Building institutional and project capacity in Monitoring and Evaluation, Environmental and Social Safeguards and Gender</p>	<p>Deliver technical assistance to government, sectors and communities to develop the sustainable use of CIS tools in sectors. Activities will gather feedback and views from the different levels (government through to stakeholders to gauge the effectiveness of the project's activities and progress to ensure the project is delivering on its objective).</p> <p>This activity aims to ensure the project is not only delivering on producing outputs but that its interventions are also mobilizing the desired change within Vanuatu Government's desire for their Climate Information Service to be strengthened and to support people to be more resilient to the impacts of climate change. It also seeks to ensure that project activities promote gender equality and is incorporating environmental and social safeguards.</p>	<p>Technical expertise Travel Workshops / Training Data collection</p>	<p>Consultancies for technical expertise on ESS, Gender and M&E i.e. develop plans, training of project staff etc</p> <p>International and local travel</p> <p>Workshops and trainings to understand and implement plans, and develop capacity of project team</p> <p>Undertake data collection e.g. surveys etc for baselines and tracking of progress</p>
<p>4.2.1 Training packages building knowledge and skills in meteorology and climate tools</p>	<p>Develop and provide technical training and opportunities for Vanuatu Government staff to develop, apply and extend their knowledge of CIS. This activity will also provide learning and training opportunities in CIS for the next generation of ni-Vanuatu meteorologists and sector workers.</p>	<p>Consultancy Travel Professional Services Workshops / Training</p>	<p>Consultancy to develop 'train-the-trainer' package</p> <p>International travel for VMGD and Sector staff to undertake training and secondments</p> <p>Development of course materials and facilitation of courses</p>
<p>4.2.2 Establishing a mentoring program to strengthen capacity and knowledge</p>		<p>Training Secondments Travel Awareness materials</p>	<p>International travel for VMGD and Sector staff to undertake training and secondments</p>

Annex 3 Climate Information Services provided in Vanuatu

Climate information services	Intended purpose and benefits to communities and sectors
Vanuatu Climate Update	Provides seasonal prediction guidance for rainfall, temperature for at least 8 stations across Vanuatu. It also provides a short summary on the status of the El Niño Southern Oscillation (ENSO)
Vanuatu Oceans Outlook	Provides guidance on current ocean conditions such as (i) sea level; (ii) sea surface temperature; (iii) coral bleaching; and (iv) chlorophyll and other parameters. It also provides a forecast and alerts on oceanic changes that could impact communities.
Early Action Rainfall Watch	Available every month and provides an assessment of rainfall deficiency for 8 climate stations across Vanuatu. It combines this rainfall assessment with a prediction to provide guidance on community, individual and sectoral responses.
Vanuatu Monthly Climate Summary	A monthly assessment report on current climate trends and risks associated with ENSO and influence of climate change. The summary evaluates all climate parameters such as rainfall, air temperature, wind strength, wind direction, atmospheric pressure, relative humidity and ocean conditions.
Vanuatu Seasonal Climate Summary	A quarterly assessment of climate at three-monthly intervals.
Vanuatu Annual Climate Summary	Annual assessment of the climate and the main drivers of the trends observed. The report also provides guidance on climate extremes and impacts recorded in the communities across Vanuatu.
ENSO Reports	El Niño Southern Oscillation reports give a near real time assessment of the atmospheric and oceanic drivers of Vanuatu's climate. It provides an ENSO Dial which is very useful to indicate whether Vanuatu is under a La Nina, El Niño or ENSO Neutral phase. It is important that ENSO is monitored as at each end of the ENSO scale different impacts are associated with La Nina (wetter than average conditions) and El Niño (drier than average conditions) are experienced.
ENSO Media Release	A public declaration of the arrival and departure of an ENSO phase and key messages on what to do (household and community levels) to minimize the impacts and climate risks.
Dry Season Media Release	Media release for public awareness with regards to the potential impacts of a dry season approaching and the key messages on what to do at that time.
Tropical Cyclone / Wet Season Media Release	Normally issued in October prior to the Tropical Cyclone season. The release provides guidance on the risks of the upcoming cyclone season. A very popular CIS that is often reported in the media (print and social outlets)
ENSO SMS	A targeted service for all mobile users and provides very specific information on the ENSO and its likely impacts.
Dry/Wet Season SMS	As above
Drought Warning	Drought warnings are issued when the assessment of the drought index for a particular station, drops below the 25% mark. This is issued when a climate station experiences meteorological drought. If this persists, then observed impacts on water and agriculture follow.

Coral Bleaching Warning	Coral bleaching warnings are part of the Vanuatu Oceans bulletin but provides guidance on which areas of Vanuatu's Exclusive Economic Zone are susceptible to coral bleaching events.
Madden-Julian Oscillation (MJO) Outlook	MJO outlook is available on the VMGD website and provides guidance on whether there will be an amplification of weather conditions as the MJO comes closer to the Vanuatu region. During the cyclone season, the MJO can provide ideal conditions for tropical cyclones to develop or severe rainfall downpours that are normally associated with flash flooding and inundation.
Seasonal Rainfall Forecasts	In advance three-monthly forecasts for rainfall and air temperatures that are very useful for farming and fishing communities for planning and responding to climate risks.
Traditional Knowledge Seasonal Calendars	A calendar of environmental indicators, based on traditional knowledge, that are specific to a community, region or island. These indicators are environmental signs of an adverse climate hazard or climate opportunity that is approaching. This TK knowledge is kept and practiced by the communities in their farming and fishing activities.
Vanuatu Climate Change Projections	The climate change projections for Vanuatu are the only available CIS that are presented for the longer climate change timescale. The projections are available for rainfall, air temperature, sea level, ocean acidification, extreme hot days, extreme hot nights, droughts and tropical cyclones. There are projections for all emission scenarios (low, medium and high) for 2030, 2050, 2070 and 2090 with a varying degree of skill.
Crop Climate Diary (CCD)	<p>The Crop Climate Diary tool is an ICT extension of the Vanuatu Climate Services for Agriculture tool that provides climate information relevant to the agriculture sector.</p> <p>The main objectives of the CCD tool is to:</p> <ol style="list-style-type: none"> Collect agriculture data and geospatial information using state-of-the-art Artificial Intelligence technology. Analyse the collated data by linking with climate data and notable trends. Visualise the collected agricultural data on maps for effective data management. <p>Information collected by CCD include (a) crop, variety, grower and cropping type; (b) planting, flowering, harvesting dates and final crop yields; and (c) GIS Information with a map (coordinates included).</p>
Vanuatu Climate Services application for Agriculture (VaCSA)	<p>The agriculture information generated by the Vanuatu Climate Services for Agriculture (VaCSA) will provide the Department of Agriculture and Rural Development (DARD) with climate information-based information relevant for the agriculture sector.</p> <p>This increases DARD's ability to provide national agro-climate advisories to help the national agriculture sector. However, VaCSA will not only increase DARD's capacity and ability to provide science-based information to their stakeholders, but also be available to the public for local farmers to use.</p> <p>Local farmers, with VaCSA, will have access to information such as expected yield according to planting date, a decision support system based on traditional knowledge, probability of crop disease, and more.</p> <p>The roll out of VaCSA in farming communities will involve awareness programs and CIS sessions in the Community Climate Centres where demonstration of the use, functionality and application of VaCSA can be implemented.</p>

Annex 4 **Gender Equality, Disability, And Social Inclusion (GEDSI) Action Plan For Climate Information Services For Resilient Development In Vanuatu (Van Kirap)**

A Roadmap to Promoting Gender Equality, Disability and Social Inclusion in Climate Information Services in Vanuatu.

This gender equality, disability, and social inclusion (GEDSI) action plan has been developed for SPREP for the Climate Information Services for Resilient Development in Vanuatu (Van KIRAP) project.

Following the United Nations Climate Change Gender Action Plan, this gender, disability, and social inclusion action plan sets out outcomes and outputs under five priority areas that aim to advance knowledge and understanding of gender and inclusion-responsive climate action and mainstreaming.

1. Capacity building, knowledge management and communication
2. Gender balance, inclusive participation, and inclusive leadership
3. Coherence
4. Gender and inclusive-responsive implementation and means of implementation
5. Monitoring and reporting

Capacity building, knowledge management and communication

Facilitate outreach, knowledge-sharing and the communication of activities undertaken to enhance gender responsive climate action and its impacts in advancing women's leadership, achieving gender equality, and ensuring effective climate action.

Gender balance, inclusive participation, and inclusive leadership

To achieve and sustain the full, equal, and meaningful participation of women in all Van-KIRAP project activities and process.



Coherence

To strengthen the integration of gender considerations within the work the Van-KIRAP project and its stakeholders towards the consistent implementation of gender-related mandates and activities.

Gender and inclusive-responsive implementation and means of implementation

To ensure the respect, promotion and consideration of gender equality and the empowerment of women in the implementation of the Van-KIRAP project.

Monitoring and reporting

To improve tracking of the implementation of and reporting on gender, disability, and social inclusion under the Van-KIRAP work programme.

The main project outcomes of the GEDSI action plan are:

- Increased understanding of climate change impacts upon men and women across the five sectors
- Strengthened resilience to climate vulnerabilities
- Empowerment of women and overcoming gendered stereotypes within Vanuatu
- Education/ Training
- Improved communication
- Connecting multiple sectors
- Budgeting
- Monitoring and Evaluation
- Emerging Issues and Opportunities
- Adherence to women's roles as agents of change
- Building the capacity of women to access resources
- Building technical capacities of stakeholders to implement gender-responsive plans
- Review progress of objectives
- Mobilise adequate resources
- Highlight the significance of female involvement at all levels of decision making, the importance of land rights and equality in land ownership and resource access, as well as woman-to-woman training.
- Gender responsive sectors

PRIORITY AREA 1: Capacity building, knowledge management and communication

Project Outcome	Output / Activity	Implementation Level
1.1. Strengthened capacity of government sectors (VMDG, climate change, water, fisheries, agriculture, tourism, and infrastructure) and other national/ government level stakeholders in mainstreaming GEDSI, in formulating, monitoring, implementing, reviewing, and reporting on, as appropriate, national climate change, agriculture, water, tourism, fisheries and infrastructure policies, plans, strategies and action	1.1.1 Implementation of capacity building for developing GEDSI responsive climate information services (CIS) across five sectors	National Regional
	1.1.2 Workshop to clarify the role of a national CIS GEDSI focal point, including the provision of capacity-building, tools, and resources, sharing experience and best practice, workshops, knowledge exchange, peer-to-peer learning, mentoring, and coaching	National
	1.1.3 Appointment of a woman as CIS GEDSI focal point to ensure women are central to the delivery of CIS in communities, included at all stages and levels of decision making and that special training days and resource development focus particularly on women	National
	1.1.4 Appointment of a second CIS GEDSI focal point to ensure young people and those with disabilities are included.	National Regional Local
	1.1.5 Provision of capacity-building opportunities, tools, and resources across all five sectors, including specifically for women	
1.2. Enhanced capacity of government sectors and other relevant stakeholders to collect, analyse and apply sex, disability, and age-disaggregated data and GEDSI analysis in the context of climate information services, where applicable	Provision and promotion of tools, guidelines and training developed in consultation with the GEDSI focal points	National Regional
1.3. Strengthened evidence base and understanding of the differentiated impacts of climate change on men, women and the LGBTQI community, disabled people, and youth, the role of women and youth as agents of change, and of opportunities for women, disabled people, and youth	Design and develop factsheets specific to each sector that include the dimensions and examples of the gendered, disability, youth differentiated impacts of climate change, the impacts of climate change on Indigenous populations, and the role of women and youth as agents of change.	National Regional
	Promote through relevant networks opportunities for participation, training, and/or employment for women, disabled people, and youth	National Regional Local
1.4. Strengthened access to climate information services for Indigenous women, the disabled, youth, LGBTQI across all sectors – agriculture, tourism, infrastructure, water, and fisheries.	At the community level, disseminate climate information in Bislama by word of mouth and with visual aids, e.g., posters at community consultations where women, people living with disabilities, youth and LGBTQI+ individuals have been invited to attend and given adequate notice to do so. Ensure transport is provided for people living with disabilities to attend community CIS meetings and activities. Ensure that information is also distributed house to house in an emergency	Local

1.5. Promotion of the use of social media, web resources and innovative communication tools to effectively communicate to communities the work and implementation of the Van-KIRAP project and sector specific climate information services, in particular reaching out to women, disabled people, youth and LGBTQI+ individuals.	Provide training in the use of social media and sector specific apps for effective CIS for women, youth, and PLWD. Effective CIS communication through social media, web resources and innovative communication tools.	Local
1.6. Increased access to and control of technology for women, the disabled, youth, and the poor.	1.6.1 Ensure that women are central to CIS operations and are employed for data collection and distribution tasks 1.6.2 Provide CIS specific technology training for women, young people and PLWD	Local

PRIORITY AREA 2: Gender balance, inclusive participation, and inclusive leadership

Project Outcome	Output / Activity	Implementation Level
2.1. Strengthened leadership capacity of women, disabled people, youth, and LGBTQI+	Promote initiatives for capacity-building in leadership, negotiation, and facilitation of negotiation for women delegates, including through webinars and in-session training to enhance women's participation in the UNFCCC process Workshops, capacity-building initiatives, webinars	National Regional Local
2.2. Increased meaningful participation of women, disabled people, youth, LGBTQI+ and Indigenous peoples in all Van-KIRAP project activities	Informed women of participatory events days ahead of the event to ensure they can organise their time appropriately to enable meaningful participation. Promotion and mobilization of travel/ transport funds as a means of supporting the equal participation of women, the participation of disabled people, youth and LGBTQI+, where required, to increase participation in the Van-KIRAP project. Dialogue: Invite local communities, Indigenous women's, youth, disability and LGTBQI+ networks to a dialogue to discuss climate change mitigation/ adaptation solutions as well as advancing the leadership of Indigenous women's, youth, LGBTQI, and disabled people, and highlighting ways of enhancing their effective participation in climate information services and national climate policy and action, within existing resources. Dialogue report	National Regional Local Local Local

2.3. Widened access to economic opportunities and social services for Indigenous women, the disabled, youth, and LGBTQI+ individuals	Income opportunities generated for women in the rolling out of the project and in ongoing CIS data distribution tasks. Employ a woman as part of the ongoing team in each of the project sites Wage differentials between men and women in climate information services narrowed	Local
2.4. Increased recruitment of Indigenous women, the disabled, youth, and LGBTQI+ to lead on project activities	Recruitment of women for early warning systems and networks Recruitment of women in TK monitoring	Local

PRIORITY AREA 3: Coherence

Project Outcome	Output / Activity	Implementation Level
3.1. Strengthened understanding and vertical integration of national, regional and international gender, disability, youth and Indigenous rights related mandates, including the 2030 Agenda on Sustainable Development, into Van-KIRAP project work	Ensure that members of the Van-KIRAP project team across all five sectors are introduced to the importance of gender and inclusion responsiveness.	National Local
	Ensure that members of the Van-KIRAP project team across all five sectors introduced to gender, disability youth and Indigenous peoples-related mandates and to the relevance of gender, disability, youth and Indigenous inclusion in the context of their work in a consistent and systematic manner	National Local
	Compilation of good practices for integrating GEDSI into the work of the Van-KIRAP project	National
	Integrate GEDSI-responsive decision making into Van-KIRAP project work across all sectors	National Local
3.3. Strengthened coordination of GEDSI considerations between the work of VMDG, the five sectors and SPREP	Dialogue to promote coherence reflecting multidimensional factors	National
3.4 Support for GEDSI project management	Provide dedicated GEDSI consultant and financial resources for GEDSI implementation	National
	Ensure gender-inclusive monitoring, evaluation, and reporting with sex-disaggregated data in project management and information system. Report impact on female shop owners and women in labour contracting societies.	National Local
3.5. Strengthened gender, disability, and youth inclusion networks	Identify and include in community consultations existing local government agencies, NGOs, community-based organisations, and women's associations or groups whose work focuses on gender, disability, youth and/or LGBTQI+ inclusion.	Local
	Allocate funding to strengthen existing gender, disability, and youth inclusion climate information services networks.	Local
	Where networks do not already exist, develop community gender, youth, disability and LGBTQI+ CIS networks.	Local

PRIORITY AREA 4: GEDSI responsive implementation and means of implementation

Project Outcome	Output / Activity	Implementation Level
4.1. Strengthened understanding of GEDSI budgeting, including on the integration of GEDSI-responsive budgeting into national budgets to advance gender-responsive climate policies, plans, strategies and action, as appropriate	Capacity development training on GEDSI responsive budgeting Dialogue to share experience of GEDSI budgeting in forum	National Regional
4.2. Raised awareness of the financial and technical support available for promoting the strengthening of gender integration into climate information services, climate policies, plans, strategies, and action, as appropriate, including good practices to facilitate access to climate finance for grass-roots women's organizations and Indigenous peoples and local communities	4.2.1 Host webinars, develop communication materials, and run in-session workshops	National Regional Local
4.3. Promoted GEDSI-responsive technological solutions to address climate change, including strengthening, protecting, and preserving local, indigenous and traditional knowledge and practices in different sectors and for improving climate resilience, and by fostering women's and girls' full participation and leadership in science, technology, research and development	Workshops, capacity building initiatives, webinars, community consultations	Local
4.4. Supported the collection and consolidation of information and expertise on GEDSI and climate change in sectors and thematic areas as well as identifying experts on GEDSI and climate change, as needed, and enhance knowledge platforms on GEDSI and climate change	Knowledge and expertise platforms on GEDSI and climate change in sectors	National
4.5. Engaged Indigenous women's groups, LGBTQI groups, disability groups and youth groups in the process of developing, implementing and updating Van-KIRAP project activities and national climate policies, plans, strategies and action, as appropriate, at all levels	Engagement of Indigenous women's groups, LGBTQI groups, disability groups and youth groups in developing and implementing climate policies, plans, strategies, and action, as appropriate Peer-to-peer exchange on country experience and needs Open call for submissions to share experience	National Regional Local

4.6. Exchanged information on lessons learned among national level stakeholders who have integrated GEDSI into national policies, plans, strategies and action, as appropriate (e.g., information on results, impacts and main challenges), and on the actions that these stakeholders are taking to mainstream GEDSI in any updates thereto, as appropriate	Submissions on GEDSI lessons learned from national stakeholders In-session workshop on lessons learned and actions taken in any updates Informal workshop report Workshops, dialogues, training expert meetings	National
4.7. Enhanced the availability of sex-disaggregated data for GEDSI analysis, taking into consideration multidimensional factors, to better inform GEDSI-responsive decision making in the implementation of climate information services and future climate policies, plans, strategies and action, as appropriate	Develop a national system for the management of sex, age, disability, and ethnicity disaggregated data for GEDSI analysis Manage national system of sex, age, disability, and ethnicity disaggregated data	National National
4.8. Increased employment of women in VMDG technical teams	4.8.1 Employment of at least two woman per sector at the national level	National

PRIORITY AREA 5: Monitoring and Reporting

Project Outcome	Output / Activity	Implementation Level
5.1. Strengthened the monitoring and reporting on women and LGBTQI in leadership positions within climate information services	Monitor and report on gender composition in leadership Monitor and report on the implementation of gender-responsive climate information services activities Provide case studies of gender composition in leadership in project activities and the implementation of gender-responsive climate information services activities	National Regional Local
5.2 Strengthened the monitoring and reporting on disabled people and youth in leadership positions with climate information services	Monitor and report on disability and youth composition in leadership Monitor and report on the implementation of inclusion-responsive climate information services activities Provide case studies of gender composition in leadership in project activities and the implementation of gender-responsive climate information services activities	National Regional Local



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