

An Assessment of Vulnerable Sectors and EO Data Potential in Vanuatu

Climate Finance Landscape Report



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The Commonwealth

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Abbreviations and Acronyms

ADB	Asian Development Bank
AF	Adaptation Fund
AFD	Agence Française de Développement
BAU	business as usual
CCDRR	Climate Change and Disaster Risk Reduction Policy
CCFAH	Commonwealth Climate Finance Access Hub
CIF	Climate Investment Funds
CO ₂ e	Carbon dioxide equivalent
CSO	civil society organisation
DFAT	Australian Department of Foreign Affairs and Trade
DRR	disaster risk reduction
EO	Earth Observation
EU	European Union
FAO	Food and Agriculture Organization
FCPF	Forest Carbon Partnership Facility
GCF	Green Climate Fund
GDP	gross domestic product
GEF	Global Environment Fund
GGGI	Global Green Growth Institute
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoV	Government of Vanuatu
HSS	Vanuatu Health Sector Strategy 2017–2020
ICT	information and communications technology
IFAD	International Fund for Agricultural Development
IRENA	International Renewable Energy Agency
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
LDCF	Least Developed Countries Fund
MALFFB	Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity

MCCA	Ministry of Climate Change, Change Adaptation, Meteorology, Geo-Hazards, Environment, Energy and Disaster Management
MDB	multilateral development bank
MFAT	New Zealand Ministry of Foreign Affairs and Trade
MIPU	Ministry of Infrastructure and Public Utilities
MOET	Ministry of Education and Training
MOH	Ministry of Health
MOL	Vanuatu Ministry of Lands and Natural Resources
NAB	Vanuatu's National Advisory Board on Climate Change
NDC	Nationally Determined Contribution
NERM	National Energy Road Map 2016–2030
NGO	non-governmental organisation
NSDP	National Sustainable Development Plan
NWMPCS	Vanuatu National Waste Management and Pollution Control Strategy 2016–2020
OECD-DAC	OECD Development Assistance Committee
RE	renewable energy
REDD+	Reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
SDGs	Sustainable Development Goals
SPC	The Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SRS	satellite remote sensing
tCO ₂ e	Tonnes of carbon dioxide equivalent
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollar
VBRC	Vanuatu Business Resilience Council
VMGD	Vanuatu Meteorology and Geo-Hazards Department
VISIP	Vanuatu Infrastructure Strategic Investment Plan 2015–2024
WB	World Bank
WHO	World Health Organization

Foreword

Pacific Small Island Developing States (SIDS) like Vanuatu are disproportionately affected by climate change due to their unique geographical and socio-economic characteristics that increase their vulnerability. The region is already experiencing the devastating impacts of climate change including sea level rise, lowland and coastal erosion, increased extreme weather events, drought, loss and damage of coastal infrastructure and insecure food production. It is therefore important that Vanuatu and all Pacific Island States take action to adapt and build resilience to current and future impacts of climate change. It is in this regard, that Pacific SIDS are leading the fight, setting ambitious mitigation and adaptation targets. To meet these priorities and targets Pacific SIDS including Vanuatu require access to adequate financial and human resources to enhance the ability of key sectors to bear the brunt of climate change.

This report gives an overview of the climate finance landscape in Vanuatu highlighting the funding gaps in priority sectors identified by Vanuatu and the potential to use earth observation data to support access to much needed adaptation and mitigation finance for these sectors.

Earth Observation (EO) data and information has emerged as an important tool in supporting evidence-based decision making particularly for climate action, providing accurate, reliable and timely information on the status of many climatic and environmental parameters. The Commonwealth Secretariat through the IPP CommonSensing Project is driving and advocating for the increased use of EO data and information to strengthen the evidence base and climate rationale of funding applications.

The IPP CommonSensing Project¹ is an innovative partnership between the governments of Fiji,

Solomon Islands and Vanuatu and a consortium of international partners²; to provide actionable satellite-based information services and data around disaster and climate risks to inform planning, climate action and increased access to climate finance. The Commonwealth Secretariat through its flagship programme, the Commonwealth Climate Finance Access Hub (CCFAH) is spearheading the climate finance component of the CommonSensing Project. Through CCFAH Commonwealth National Climate Finance Advisers have been deployed in Fiji, Solomon Islands and Vanuatu and are providing technical assistance to the three countries in utilising the geospatial based CommonSensing platform for enhanced access to climate finance.

An Assessment of Vulnerable Sectors and EO Data Potential in Vanuatu therefore builds on the Commonwealth's body of work under the IPP CommonSensing Project to support Pacific SIDS to mobilise climate finance to convert their commitments and targets into action. By highlighting the key sectors that still require funding and matching those against sectors with highest potential for the application of EO data in climate finance applications, the Commonwealth Secretariat hopes to increase the use of such data and information in Vanuatu to push forward funding in these areas.

We hope this resource makes a difference for Vanuatu and other partners to deliver the ambitious NDC targets and aspirations of the Island's people.

Unnikrishnan Nair

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- 1 The IPP CommonSensing Project is generously funded by the UK Space Agency's International Partnership Programme (IPP) and the Global Challenges Research Fund (GCRF).
 - 2 United Nations Institute for Training and Research (UNITAR - UNOSAT), Commonwealth Secretariat, Catapult Satellite Applications, Devex, Met Office, Sensonomic, Spatial Days and the University of Portsmouth.

Executive Summary

Pacific island countries (PICs) face serious threats from climate change, particularly due to increasingly severe extreme weather events, sea-level rise and impacts on agricultural production. While PICs have extremely low per capita greenhouse gas emissions (GHGs), governments from across the region have also prioritised the reduction of GHGs through their updated Nationally Determined Contribution (NDC), especially in relation to energy, transport and waste sector targets.

Transitioning PICs to a low-carbon climate-resilient development pathway will require a wide array of adaptation and mitigation measures, strengthened institutional frameworks and improved data collection and utilisation. Achieving these outcomes exceeds the financial capacity of most PICs, and the mobilisation of public and private sources of climate finance is therefore crucial for achieving climate change priorities, targets and commitments.

While there is a significant amount of funding available from dedicated climate funds, multilateral organisations, bilateral donors and other sources, PICs face challenges in accessing and deploying climate finance. Flows of climate finance need to be aligned with both the climate change and development goals of countries to ensure that funding results in inclusive development outcomes and delivers strong environmental, social and economic co-benefits.

The objective of this report is to identify the climate financing and Earth Observation (EO) data and information gaps, opportunities and barriers for Fiji, Solomon Islands and Vanuatu. This report is focused on Vanuatu and provides an overview of the baseline climate action needs of Vanuatu, highlighting the key vulnerable sectors and the related climate finance requirements based on nationally agreed targets and ambitions.

The Climate Finance Landscape Report: An assessment of vulnerable sectors and EO data potential in Vanuatu has been published as part of the International Partnership Programme (IPP) CommonSensing project, which is a partnership between Fiji, Solomon Islands and Vanuatu, and a consortium of international partners including the Commonwealth Secretariat, working together to support and build climate resilience and enhance

decision-making through the use of satellite remote sensing technology and facilitating access to climate finance.

This report is aimed at informing the basis for future targeting of climate finance in line with the national and sectoral strategies and priorities, including the NDC. It will also be used to guide the Commonwealth Secretariat's support under the IPP CommonSensing project and beyond on enhancing capacities to access climate finance and utilising Earth Observation (EO) data and information to strengthen the evidence base in climate finance applications.

The report is structured as follows:

- **Chapter 2: Review of national plans and strategies.** This section provides a summary of the key national and sectoral plans and strategies identifying any key climate change priorities, targets or required actions for Vanuatu's development.
- **Chapter 3: Climate finance overview.** This section summarises the approximate amount of climate finance received by Vanuatu between 2016 and 2018 mapped against 11 sectors. This information has been obtained from relevant climate fund and development partner websites and the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD).
- **Chapter 4: Data access and utilisation.** This section provides an overview of space applications and geospatial technology, and the potential of this data and information for strengthening the design, implementation and monitoring of climate change projects.
- **Chapter 5: Sector assessment.** This section discusses the status of climate finance utilisation in each sector/thematic area. The climate finance projects are qualitatively assessed in relation to the climate change-related national and sectoral plans, targets and goals. This section also discusses potential data utilisation and applications for enhancing climate financed projects in relation to each sector.

- Chapter 6: Recommendations for attracting climate finance.** The final section puts forward a number of solutions and recommendations to strengthen access and deployment of climate finance. These recommendations are focused on institutional strengthening, capacity building and increasing technical capabilities, increasing information and data utilisation, increasing access to finances, increasing involvement in private sector activities and increasing wider stakeholder engagement.

Vanuatu has successfully developed and adopted a number of key national and strategic plans that outline the country's progress, priorities and future activities for addressing climate change. Key plans and strategies are the Nationally Determined Contribution, National Sustainable Development Plan 2016–2030, Climate Change and Disaster Risk Reduction Policy 2016–2030, Vanuatu National Policy on Climate Change and Disaster-Induced Displacement 2018 and the Climate Finance Roadmap 2016–2020.

By reviewing the actions and priorities of climate-relevant plans and mapping these against the flows of climate finance received between 2016 and 2018, climate financing gaps were identified. This assessment concluded that the ecosystems, forests and land-use and health sectors in Vanuatu received the least amount of financial flows between 2016

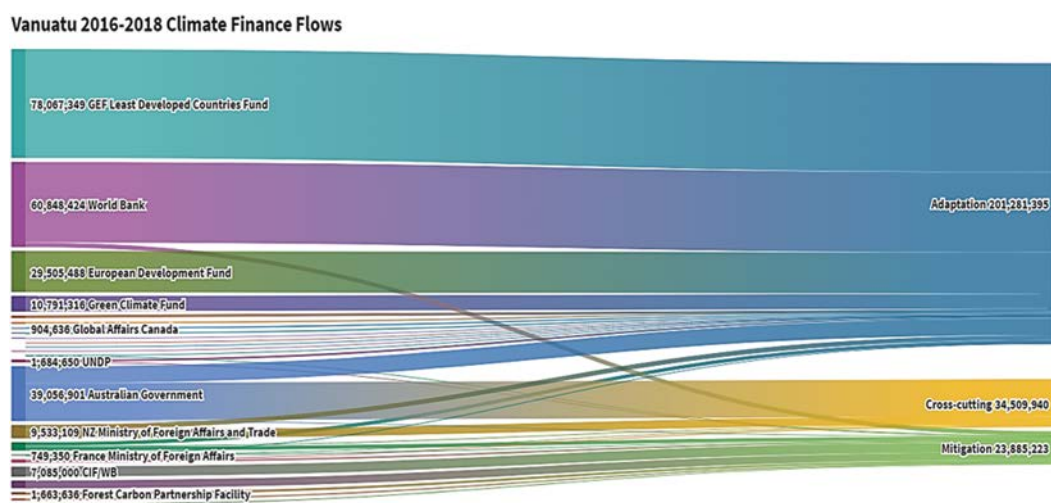
and 2018. According to the analysis, approximately USD259 million of climate finance was received by Vanuatu throughout 2016 and 2018 through approximately 84 projects (as shown in Figure 1).

In line with the priorities of the CommonSensing project, this report outlines the potential for satellite remote sensing (SRS) applications to help build climate resilience and enhance decision-making. This report outlines that with current technology the potential for adopting SRS is high across most sectors, however, it may be more difficult to utilise SRS data for climate finance (CF) projects in the waste sector and biodiversity and the natural environment thematic area (as shown in Table 1.1).

In Chapter 6, recommendations are suggested for strengthening Vanuatu's access to climate finance, building capacity, strengthening institutions and improving private sector engagement. At a high level these include:

- Clearly outlining the roles and responsibilities of stakeholders, and developing processes and incentives to ensure strengthened co-ordination and collaboration (see section 6.1).
- Strengthening capacity and capabilities of government agencies to implement climate action, including through development of a training programme and the provision of long-term embedded models of technical assistance (see section 6.2).

Figure 1. Summary of Vanuatu climate flow between 2016 and 2018³



3 Diagram is author's own. The source of the data is from the various funding providers websites, and OECD-DAC. The data from OECD-DAC is available here: <https://www.oecd.org/development/stats/climate-change.htm>

Table 1.1 Summary of Vanuatu sectoral financing and SRS application potential⁴

Sector / thematic area	No. of projects	Financing status	SRS data application potential	Past SRS data utilisation
Transport	6	Adaptation projects: Satisfactory progress	High	Limited evidence of utilisation
		Mitigation projects: Limited data		
Energy	14	Mitigation projects: Satisfactory progress	High	Successful utilisation for CF projects
Forests and land use	5	Mitigation/adaptation projects: Limited progress	High	Successful utilisation for CF projects
Waste	6	Mitigation/adaptation projects: Limited progress	Low	Limited evidence of utilisation
Ecosystems and ecosystem services	4	Adaptation projects: Satisfactory progress	Medium	Limited evidence of utilisation
Livelihoods and disaster risk reduction	8	Adaptation projects: Satisfactory progress	High	Successful utilisation for CF projects
Resilient infrastructure	9	Adaptation projects: Satisfactory progress	High	Limited evidence of utilisation
Agriculture	4	Adaptation projects: Limited data	High	Successful utilisation for CF projects
Water supply and wastewater	28	Adaptation projects: Limited data	High	Successful utilisation for CF projects
Health	1	Adaptation projects: Limited progress	High	Limited evidence of utilisation

- Improving the access and utilisation of information and data to improve the project design, implementation and monitoring and evaluation of climate change activities. These recommendations have a strong focus on the use of SRS data (see section 6.3).
 - Strengthening policies, regulations and plans – including through ensuring actions are costed, responsibilities for implementation are defined and financing is identified for implementation (see section 6.4).
 - Overcoming climate finance barriers and mobilising climate finance flows in order to meet current and future needs, particularly with increasing climate change and natural disaster risks. This will require expanded financial instruments and modalities, and strengthened capacity and co-ordination to develop funding proposals (see section 6.5).
 - Strengthening private sector engagement through building awareness and knowledge of opportunities, providing support on accessing climate finance and providing an environment to enable increased flows of private investment (see section 6.6).
 - Improving stakeholder engagement to achieve climate action, which includes engaging with line ministries, provincial administrations, communities, non-governmental organisations (NGOs) and the private sector (see section 6.7).
- The results of the assessment and findings of this report, including the financing gaps, potential sources of climate finance and status of plans and strategies, are summarised in Table 6.3 in section 6.8.

4 Author's own analysis.

1. Introduction

The Climate Change Section of the Commonwealth Secretariat focuses on strengthening the resilience of Commonwealth countries to the negative impacts of climate change. It facilitates capacity development of member countries to access public and private climate funding to implement the Paris Agreement on climate change.

The Commonwealth Climate Finance Access Hub (CCFAH) was established following recommendations arising out of the Commonwealth Expert Group on Climate Change that examined how the Commonwealth can best assist its developing country members to build resilience. Launched in 2016, CCFAH provides long-term capacity development to support improved access to climate finance.

In the last five years, the CCFAH has evolved to become one of the flagship programmes of the Commonwealth Secretariat and extended its technical assistance programme in ten climatically vulnerable countries in Asia, Africa and Caribbean regions with some concrete results in terms of mobilisation of climate finance. The CCFAH is at present expanding in the Pacific region.

A further priority of the Commonwealth Secretariat in the Pacific is the CommonSensing project, which is based on a partnership between Fiji, Solomon Islands and Vanuatu, and a consortium of international partners including the Commonwealth Secretariat. The CommonSensing project is providing innovative support to build climate resilience and enhance decision-making through the use of satellite remote sensing technology and facilitating access to climate finance. The project is funded by the UK Space Agency's International Partnership Programme (IPP) and the Global Challenges Research Fund (GCRF), with the United Nations Institute for Training and Research (UNITAR) as project lead and in partnership with Commonwealth Secretariat, Satellite Applications Catapult, UK Met Office, University of Portsmouth and Sensonomic.

The Commonwealth Secretariat is committed to improving the capacity of each country to access climate finance beyond the lifespan of the CCFAH and IPP CommonSensing project and building local capacity for mobilising finance to implement and accelerate climate action. Moreover, these projects

will aim to provide information and evidence to support and enhance funding proposals in key and climatically vulnerable sectors.

1.1 Objectives of the report

An integral component of the CommonSensing project is to assist countries in accessing climate finance based on information and data collected from remote sensing sources and analysing economic impacts. The objective of this report is to improve targeting of climate finance in line with national and sectoral priorities, plans and strategies, and also contribute to the design of the technical assistance provided under the CommonSensing project.

This report documents findings that consider:

- the climate change needs and priorities of Vanuatu;
- key vulnerable sectors and the status of climate change projects;
- climate finance requirements based on Vanuatu's nationally agreed targets and ambitions;
- assessment of data opportunities and utilisation; and
- requirements for institutional, policy and regulatory strengthening.

1.2 Country context

Vanuatu is regularly ranked as the country most exposed and vulnerable to natural hazards on the planet, including both meteorological and geophysical hazards, which are likely to be exacerbated with the impacts of climate change.⁵ The Republic of Vanuatu is a Melanesian nation made up of roughly 80 islands. The archipelago, which is volcanic in origin, stretches 1,300 kilometres from north to south. Vanuatu is a culturally diverse nation with over 110 language and cultural groups amongst its population of approximately 270,000.⁶

5 Eckstein, D, V Künzel, L Schäfer and M Wings (2019), Global climate risk index 2020.

6 World Health Organization (no date), 'Vanuatu', available at: <https://www.who.int/countries/vut/en/>

Vanuatu's economy is based on tourism, agriculture, fishing and offshore financial services, of which farming and fishing activities provide a living for the vast majority of the population. Vanuatu's principal domestic exports include copra, coconut oil and kava.

Vanuatu contributes only 0.0016 per cent of global greenhouse gas (GHG) emissions, yet is embracing ambitious emission reduction targets in line with the Paris Agreement.⁷ This includes aiming for 100 per cent renewable energy in the electricity sector by 2030.⁸ The Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) reported that Vanuatu emitted 585,000 tCO₂e (tonnes of carbon dioxide equivalent) in 2000. This comprised of 502,000 tCO₂e from agriculture, 70,000 tCO₂e from energy and 12,000 tCO₂e from waste.⁹

The impacts of climate change are already evident. The sea surface temperature changes around Vanuatu have increased at approximately 0.09°C per decade from 1970 to present and ocean acidification has also measurably increased. The sea-level rise in Vanuatu measured by satellite altimeters since 1993 is about 6 mm per year, larger than the global average of approximately 3.2 mm per year.¹⁰ Air temperature and sea surface temperature are projected to continue increasing throughout this century. The intensity and frequency of extreme weather events (such as cyclones and heavy rain events) are projected to increase, whereas the frequency of drought is anticipated to remain reasonably constant.¹¹ Vanuatu's built environment, natural environment

and economy are at risk due to a number of climate change hazards. Climate change will also result in impacts to human development, including through affecting health outcomes and livelihoods.

This report provides a high-level overview of Vanuatu's climate change risks and the sources of GHG emissions across key sectors. The specific priorities and climate finance needs are also listed, which is based on the priorities outlined in national and sectoral plans and analysis and past assessments undertaken.

Addressing climate change in Vanuatu could also be affected by the COVID-19 pandemic. As a tourism-driven economy, the pandemic has resulted in severe economic impacts to Vanuatu, including a large reduction in government revenue and gross domestic product (GDP)¹² – in 2020, GDP declined by 8.5 per cent. Vanuatu has been earning revenue in recent years from citizenship schemes, and the surpluses from these schemes means that the debt-to-GDP is expected to decline towards 2022.¹³

Inflows of climate finance to Vanuatu may be affected by reductions in aid budgets in developed countries, and downstream impacts to other providers of climate finance, such as dedicated climate funds. In addition, the provision of technical support on achieving climate action has also been impacted by COVID-19. A number of projects funded by climate finance providers are likely to be delayed, and financing could potentially be redirected away from climate-related activities to short-term needs, such as the humanitarian and health impacts from COVID-19.

7 Government of Vanuatu (2014), The Second National Communication to the United Nations Framework Convention on Climate Change.

8 Ibid.

9 Ibid.

10 Australian Bureau of Meteorology and CSIRO (2011), 'Climate Change in the Pacific: Scientific Assessment and New Research', Volume 2: Country Reports.

11 Government of Vanuatu (2014), The Second National Communication to the United Nations Framework Convention on Climate Change.

12 Asian Development Bank (no date), 'Vanuatu and ADB', available at: <https://www.adb.org/countries/vanuatu/main>

13 Development Policy Centre (2020), 'Bigger than aid: Vanuatu's citizenship schemes', available at: <https://devpolicy.org/bigger-than-aid-vanuat-us-citizenship-schemes-20200904>

2. Review of National and Sectoral Planning Frameworks, Commitments, and Targets

In this section, a review of the key national plan and strategies and associated climate change priorities, commitments and targets is undertaken. The future mobilisation of climate finance should be aligned to these plans and strategies, particularly the Nationally Determined Contribution (NDC), and the sectoral/thematic priorities and targets outlined in these frameworks are assessed in further detail in Chapter 5 of this report.

The governance arrangements, capacity and technical needs, and policy and regulatory reforms required for mobilising climate finance, achieving climate action and engaging the private sector are also outlined in national plans and strategies. These recommendations are assessed and collated in Chapter 6 of this report.

2.1 National planning frameworks, commitments and targets

2.1.1 Nationally Determined Contribution 2015

Under the updated submission of the Vanuatu NDC (2020), Vanuatu has specific targets for 2030 in the energy and transport sectors; agriculture, forestry and land-use; and the waste sector. The 2030 targets for each sector are shown in Table 2.1.

The updated NDC includes an adaptation component, and the Government of Vanuatu (GoV) has contributed to submit an adaptation

communication, which will include its priorities, implementation and support needs, plans and actions through the National Adaptation Plan (NAP). The NAP will outline Vanuatu's contribution towards meeting the adaptation goal set out in the Paris Agreement and the required means of implementation.

2.1.2 National Sustainable Development Plan 2016–2030

Vanuatu's National Sustainable Development Plan (NSDP) 2016–2030, also referred to as 'Vanuatu 2030', is the overarching framework guiding sustainable development in Vanuatu. It replaces the previous 'Priorities and Action Agenda 2006–2015'.

The NSDP sets out a national vision for a stable, sustainable and prosperous Vanuatu, and is built around the three sustainable development pillars of society, environment and economy. The NSDP has undergone extensive consultation at national, provincial and community levels and provides a framework for implementing the Sustainable Development Goals (SDGs) in Vanuatu.

2.1.3 Climate Change and Disaster Risk Reduction Policy 2016–2030

The Climate Change and Disaster Risk Reduction Policy aims to reduce climate change and disaster risks and achieve resilience for communities, the environment and the economy. The policy states

Table 2.1 Mitigation targets in the updated NDC submission (2020)

Sector	2030 target	Remarks
Energy	78.786 Gg CO ₂ e	40% reduction in comparison to energy sector's GHG emissions from the business as usual (BAU) scenario
Livestock	30.977 Gg CO ₂ e	9% less than the GHG emissions in BAU scenario
Forestry	TBC	TBC
Waste	29.335 Gg	56% less than the BAU scenario GHG emissions

that while risks cannot be completely eliminated, this policy provides a framework through which risks can be identified, assessed, reduced and managed. Moreover, the purpose of this policy is to:

- Articulate Vanuatu's vision, principles, strategic goals, priorities and strategies for climate change and disaster risk reduction.
- Provide the framework for mainstreaming climate change and disaster risk reduction into sustainable development processes.
- Improve co-ordination and planning of programmes, projects and funding across ministries, departments, development partners, academia, civil society organisations (CSOs) and the private sector.
- Ensure that stakeholders, including donors, CSOs, the private sector and communities understand and align themselves and their actions with Vanuatu's policy direction.
- Strengthen the ability of governance and financial systems to access additional funds, enabling more equitable sharing in resourcing relative to Vanuatu's high level of vulnerability.

The policy articulates the strategic priorities for achieving systematic outcomes (strengthening governance, finance and knowledge and information systems) and thematic priorities (climate change adaptation and disaster risk reduction, low carbon development and response and recovery). Moreover, the policy puts forward key actions underneath each of these strategic priorities.

2.1.4 National Policy on Climate Change and Disaster-Induced Displacement 2018

The National Policy on Climate Change and Disaster-Induced Displacement aims to help guide emergency and development planners to work together with the Government of Vanuatu (GoV) to address the needs of all communities affected by displacement, including people at risk of displacement, displaced people, internal migrants, people living in informal settlements and host communities. Through strengthening existing planning initiatives, multi-hazards mapping, disaster-risk reduction and climate change adaptation efforts, the policy aims to reduce the triggers of displacement.

The policy proposes 12 strategic priority areas for action to ensure displacement and human mobility considerations are mainstreamed into Vanuatu's planning at national, provincial and local levels, building on existing national policy initiatives. The strategic areas are grouped into systems-level interventions and sectoral-level interventions. Each strategic area has a series of objectives and associated actions and indicative timeframes for carrying out identified actions.

2.1.5 Vanuatu National Environment Policy and Implementation Plan 2016–2030

The Vanuatu National Environment Policy and Implementation Plan 2016–2030 recognises the environment as a national priority and illustrates the GoV's commitment to environmental sustainability under the requirements of the Environmental and Conservation Act. It is also a part of a wider policy framework and aims to address issues outlined in the NSDP. The Plan sets out a series of guiding goals, objectives and principles for seven policy objectives.

2.1.6 Climate Finance Roadmap 2016–2020

The purpose of the Climate Finance Roadmap was to guide the GoV in mobilising climate finance to address national priorities. It focused on increasing access to climate finance, building capacity at all levels of society to adapt to the impacts of climate change and enhancing co-ordination between the GoV and other stakeholders, such as development partners and the private sector.

The six policy objectives of the Climate Finance Roadmap were:

- 1 **Access to climate change finance:** Vanuatu has access to direct and indirect new sources of climate and disaster finances to adapt to and mitigate the impacts of climate change.
- 2 **Capacity building:** National, provincial and community capacity strengthened to manage the impacts of climate change and disasters through new tools, systems, knowledge and approaches.
- 3 **Prioritisation:** Ensuring allocation of resources is based on real vulnerabilities, gaps and needs.

- 4 **Awareness and communication:** Increased awareness on accessing and implementing climate (and disaster) finance at the national, provincial and community levels.
- 5 **Co-ordination:** Enhanced co-ordination with NGOs, CSOs and local communities to access and implement multisectoral, innovative approaches in addressing climate and disaster risks.
- 6 **Project management:** Project Management Capacity at the national and provincial levels was to be strengthened to address multisector & sectoral responses to climate change and disaster risks by end of 2020.

3. Climate Finance Overview

3.1 Summary

The following summarises the approximate amount of climate finance received by Vanuatu between 2016 and 2018. This information has been obtained from relevant climate fund and development partner websites and the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD).

Projects were categorised based on the following sectors and thematic areas:

- Transport
- Energy generation and access
- Waste
- Forests and land-use
- Agriculture
- Water
- Health
- Resilient infrastructure
- Livelihoods and disaster risk reduction
- Ecosystem and ecosystem services
- Climate readiness¹⁴

3.2 Methodology for determining climate finance flows

Climate finance is enshrined in the UNFCCC, with Article 4 of the UNFCCC Convention stating that developed countries, particularly OECD member countries, should assist developing countries with financial resources to meet their climate change obligations. Further, Article 9 (1) of the Paris Agreement also states that 'developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention'. These funds are managed by several multilateral and bilateral institutions.

The DAC OECD Rio markers were used to determine which projects should be included within the climate finance flows as a climate focused project. There are three possible categories for the Rio markers, indicating whether the Rio Convention themes are not targeted, a significant objective or a principal objective of the action.¹⁵ Using this as a guide, projects that had either significant or principal climate objectives were included in the mapping below.

3.3 Mapping of climate finance inflows for 2016–2018

According to the analysis, approximately USD259 million of climate finance was received by Vanuatu throughout 2016–2018 through approximately 84 projects (Figure 3.2). Over this period, adaptation projects have received the greatest amount of funding at approximately USD201 million. The most significant amount of climate finance was directed to Global Environment Fund (GEF) Least Developed Countries Fund (LDCF) projects, followed by the World Bank (WB), Australian Government, and the European Development Fund.

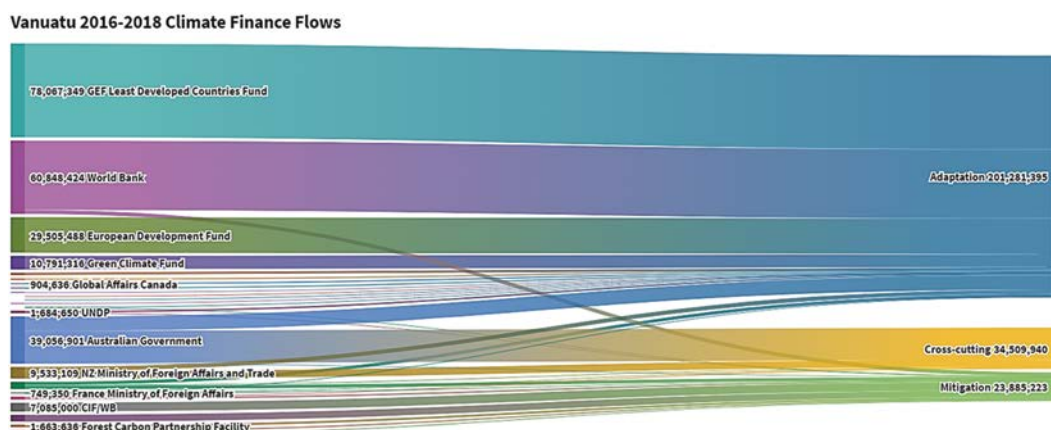
Based on the sectoral categorisation undertaken, of the approximately 84 projects identified between 2016 and 2018, only one project contributed to the health sector, 4 to the ecosystem and ecosystem services and 5 to the forests and land-use sector. There were 28 projects aimed to address livelihoods and disaster risk reduction, 26 aimed to assist with increasing climate readiness and 17 for resilient infrastructure. Table 3.1 provides an overview of the total number of projects between 2016 and 2018 that aimed to address issues across the different sectors.

3.4 Methodology for undertaking gap analysis

The national targets, goals and commitments summarised in Chapter 2 and the sectoral priorities summarised in Chapter 5 provide the baseline for determining the climate financing gaps. In Chapter

14 'Readiness' activities are climate-related actions that support government policy, planning, capacity building and administrative processes associated with climate change activities.

15 EU (no date), 'Short guide to the use of Rio markers', available at: <https://europa.eu/capacity4dev/public-environment-climate/wiki/short-guide-use-rio-markers>

Figure 3.2 Total Vanuatu climate finance flows for the period 2016–2018¹⁶Table 3.1 Number of climate financed projects between 2016 and 2018¹⁷

Total number of climate financed projects per sector between 2016 and 2018	
Sector	No.
Energy generation and access	14
Transport	6
Waste	6
Forests and land-use	5
Resilient infrastructure	17
Agriculture	8
Water supply and wastewater	9
Ecosystem and ecosystem services	4
Livelihoods and disaster risk reduction	28
Health	1
Climate readiness	26
Total Projects	84

Table 3.2 Criteria for assessing climate finance inflows into sectors¹⁸

Status	Criteria
Satisfactory progress	<ul style="list-style-type: none"> Climate finance inflows are sufficient and are aligned to national and sectoral plans, targets and goals. Data is available.
Limited progress	<ul style="list-style-type: none"> Limited climate finance inflows and/or climate finance projects are not aligned to national and sectoral plans, targets and goals. Data is available.
Limited data on progress	<ul style="list-style-type: none"> Limited baseline of projects (e.g. no project pipeline in national/sectoral plans). Limited data on climate finance inflows.

16 Diagram is author's own. The source of the data is from the various funding providers websites, and OECD-DAC. The data from OECD-DAC is available here: <https://www.oecd.org/development/stats/climate-change.htm>

17 A number of projects contributed to multiple sectors. The source of the data is from the various funding providers websites, and OECD-DAC. The data from OECD-DAC is available here: <https://www.oecd.org/development/stats/climate-change.htm>

18 Author's own analysis.

5, the progress in achieving national and sectoral targets, goals and commitments is assessed based on the criteria outlined in Table 3.2.

This assessment is based on a qualitative screening of the climate finance received in a sector (which is summarised in Table 3.1 and is further elaborated in

Chapter 5) in relation to the climate change-related national and sectoral plans, targets and goals.

Based on this assessment, the sectoral investment needs are determined for both mitigation and adaptation actions.

4. Data Access and Utilisation

Space applications and geospatial technology are evolving, and the usage of these geospatial services is expected to dramatically increase in the coming years. Advancement in geospatial services is allowing Pacific island countries to leverage existing geospatial technology and explore emerging applications in geospatial data.

This opens opportunities for Vanuatu to maximise the technology for undertaking climate change actions and designing and implementing projects and programmes. Space applications can contribute to achieving the goals set out in the United Nations Framework Convention on Climate Change, the Paris Agreement, the 2030 Agenda for Sustainable Development, and the Sendai Framework for Disaster Risk Reduction 2015–2030.

The applicability and utilisation of satellite remote sensing (SRS)¹⁹ and Earth Observation (EO)²⁰ data for climate change projects in each sector/thematic area are outlined below in Chapter 5.

The Climate Division of the Vanuatu Meteorology and Geo-Hazards Department (VMGD) is responsible for climate data collection, database management, seasonal forecasting, technical analyses and climate change assessments for Vanuatu.

Despite advances in the availability and quality of space applications and geospatial information, and capacity and capabilities of VMGD, several gaps and challenges remain.

- At present, the utilisation of EO data for project design and implementation has been undertaken in an ad hoc manner, with higher utilisation in the energy, forests and land use, Disaster Risk Reduction (DRR), agriculture and water sectors. The need to develop the capacity to collect, manage and generate climate knowledge is relevant to all of the adaptation and mitigation priorities.
- In general, Vanuatu has limited awareness, capacity and capabilities for using EO data, which restricts the potential for upscaling of EO data applications.
- There is a lack of co-ordination and information sharing between institutions, which acts as a barrier for EO data utilisation.
- Many institutional and financial barriers to data access also exist, including the high cost of data collection and processing and difficulties centralising, securing and sharing different types of data across institutions.
- There are no centralised data storage facilities to access data by different stakeholders. The National Geospatial Data Policy 2020–2030 includes aspects of data centralisation and data sharing, and these have yet to be developed/implemented.

The barriers to accessing and utilising data, and solutions to overcome these challenges, are further described in section 6.3.

¹⁹ A remote sensing satellite carries one or more instruments for recording images of the Earth, which are transmitted to a receiving station using radio waves. Remote sensing is the action of collecting images or other forms of data about the surface of the Earth, and subsequent processing/analysis.

²⁰ Earth observations are observations from above using technologies such as aircraft, satellites and various sensors to create images that are used to study what is happening on or near the surface of the Earth.

5. Sector Assessments

Vanuatu is one of the most vulnerable countries in the world to climate change and natural disaster risks. The island nation suffers from cyclones, drought, extreme precipitation, sea-level rise and associated landslides and flooding. The exposure of Vanuatu to natural hazards will become more intense because of climate change. For example, the rate of sea-level rise in Vanuatu has been on average 6 mm annually over the last two decades based on satellite observations, which has resulted in more damaging storm surges, cyclones, strong winds and tsunamis.

Vanuatu has estimated annual GDP losses of almost 6.6 per cent due to extreme events, which is second of all Small Island Developing States.²¹ Vanuatu is also ranked as the most at risk country globally by the 2019 World Risk Report, due to its location in the 'Pacific Ring of Fire' and Pacific 'cyclone belt', sensitivity to the impact of natural hazards and low levels of adaptive capacity.²²

The absolute levels of CO₂e emissions are very small in Vanuatu at under 0.0016 per cent of global emissions, and per capita emissions (0.6 tCO₂) are also relatively low in comparison to average per capita emissions (1.06 tCO₂) for Pacific small islands states. Greenhouse gas (GHG) emissions in Vanuatu predominantly come from the following sources: energy, transport, agriculture (livestock and soils) and waste. In 2000, when national emission accounts were previously reported, the largest contributor to GHG emissions was the livestock sector amounting to 56.5 per cent of total GHG emissions. GHG emissions are likely growing in Vanuatu, and an updated estimate indicated that the quantity of GHG emissions increased from 585.39Gg CO₂e in 2000 to 720.66Gg CO₂e in 2010.²³

The status of climate finance utilisation in each sector/thematic area is assessed in this section. The climate finance projects are qualitatively assessed in relation to the climate change-related national and sectoral plans, targets and goals.

5.1 Transport

5.1.1 Profile

With its geography and large rural population, developing climate-resilient low-carbon transport options is particularly challenging. Achieving inclusive green growth across the country is constrained by expensive, unreliable and limited transport infrastructure and services. Poor road conditions in particular affect key sectors, especially agriculture and tourism. Given these impacts, development of climate-resilient transportation infrastructure is a priority.

At present, the key modes of vehicle land transport in Vanuatu are private vehicles and buses (private sector-run minibuses), which rely on the country's road network. In recent years, significant investment has been allocated to building, improving and rehabilitating the road system, with a focus on more populated islands (especially Efate, Santo and Tanna). There has been an underinvestment in maintenance of road systems in Vanuatu, with poor road conditions hindering access to services and restricting economic growth in rural areas. The privately run minibuses, which require government permits, are the de facto public transport service in urban areas, but at present there are no bus rapid transit services in Vanuatu.

The existing road system comprises a total 1,800 km of roadways (234 km sealed and 1,542 km gravel and earth), with much of the road network situated on the perimeter of the islands and only a few meters above sea level.²⁴ The land transport network in Vanuatu is highly exposed and vulnerable to climate change hazards and natural disasters, including higher mean temperatures affecting pavements, and heavier rainfall and associated inland flooding and landslides damaging the road network.²⁵ Moreover, the location of transport infrastructure near the coast results in high exposure and vulnerability to coastal climate change hazards, such as sea-level rise, coastal

21 OECD, World Bank (2016), *Climate and Disaster Resilience Financing in Small Island Developing States*, OECD and World Bank, Washington, DC.

22 Bündnis Entwicklung Hilft (2019), *WorldRiskReport 2019*.

23 Government of Vanuatu (2014), *The Second National Communication to the United Nations Framework Convention on Climate Change*.

24 Government of Vanuatu (2015), *Vanuatu Infrastructure Strategic Investment Plan 2015–2024*.

25 Pacific-Australia Climate Change Science and Adaption (PACCSAP) Program (2014), *The Vanuatu Climate Resilient Road Standards Project*.

erosion and storm surges.²⁶ Disruptions of the road network have significant socioeconomic consequences partly because the existing road network has no alternative route in the event of disruptions. Vanuatu's poor road infrastructure condition – part of which is due to high exposure to frequent natural and climate change disasters – also affects road safety.

Maritime and air transport are also key modes of transportation in Vanuatu. There are 29 airports (5 paved and 24 unpaved) and 2 main ports and terminals across the different islands. Vanuatu depends on its airfields for the tourism sector and connectivity between islands. Air transport is potentially at risk due to a number of climate hazards, including flooding, erosion and sea-level rise affecting airfields and extreme weather events disrupting flights. Maritime transport provides a vital link between islands and communities, but limited infrastructure restricts cargo and passenger movement. Most islands in Vanuatu lack modern port facilities and reliable shipping routes, which constrains the domestic trade of goods and services (including agricultural produce) and affects economic development in remote outer-island communities. Ports and maritime transport are potentially at risk due to coastal and maritime hazards, including sea-level rise, extreme weather events and increased cyclone activity.

The transport sector is also a key source of GHG emissions in Vanuatu. The contribution of the transport sector in 2000 was 5.9 per cent of Vanuatu's total GHG emissions; and while more recent data is not available, it is likely that absolute emissions will have increased over the past two decades.

The development of low-carbon climate-resilient transport systems in Vanuatu will result in a number of co-benefits, which include:

- Health co-benefits from reduced GHG emissions in the transport sector include increases in physical activity and reductions in mortality from pollution.²⁷

- Increased asset life and reduced repair and maintenance costs, as preparing for climate change at the outset can avoid the need for costly retrofitting and reduce the risk of the asset becoming damaged due to climate hazards and/or prematurely obsolete.²⁸
- Improved connectivity and reduced risk of climate hazards causing disruption to transport networks. This will result in economic and social benefits from improved mobility and increased access to markets, jobs and public services (such as education and healthcare).

The Vanuatu Infrastructure Strategic Investment Plan 2015–2024 (VISIP) outlines Vanuatu's priorities and plans for major infrastructure. The plan aims to encourage infrastructure development that supports climate-resilient transport. The VISIP identifies the following key challenges across the transport sector for Vanuatu:

- making infrastructure sustainable by identifying resources for maintenance and operation;
- integrating the prioritisation and planning of infrastructure into government's routine public administration;
- aligning development of the pipeline with evolving governmental policy and strategic priorities; and
- guiding development partner assistance to infrastructure in line with strategic priorities VISIP 2015.

5.1.2 Access to climate finance

The majority of climate change-focused projects in the transport sector have been designed to build resilience. This includes the following projects:

- The Vanuatu Climate Resilient Transport Project, currently under implementation by the World Bank, which is upgrading a key road in Santo and improving economic connectivity and climate resilience.
- The 2016 'Vanuatu Rural Roads Design Guide', funded by the Department of Foreign Affairs and Trade (DFAT), Government of Australia, which includes climate screening

26 ADB (2013), *Climate Change and Transport*, available at: <https://www.adb.org/sites/default/files/publication/30375/climate-change-transport.pdf>

27 Shaw, C, S Hales, P Howden-Chapman and R Edwards (2014), 'Health co-benefits of climate change mitigation policies in the transport sector', *Nature Climate Change*, 4, 427–433, available at: <https://www.nature.com/articles/nclimate2247>

28 OECD (2018), *Climate-resilient Infrastructure*. OECD Environment Directorate.

tools that ensure climate risk is taken into account in road project identification, formulation and execution.

The key financiers at present include the World Bank, Government of Japan, Government of Australia, and Government of China.

Approximately six projects have been funded by climate finance between 2016 and 2018 to address transport issues. These projects are listed in Appendix A. Table 5.1 provides the status of climate finance projects in the transport sector.

There have been limited projects focused on reducing GHG emissions in the transport sector. Given the strong growth in vehicle registrations, which are increasing at 12.8 per cent per year from 2016 to 2018, the growth in transport-sector emissions is also likely. Therefore, this is a priority area for reducing emissions, as outlined in the National Energy Road Map (NERM) 2016–2030 and the updated NDC 2020, and potential projects are outlined in Table 5.2.

Table 5.1 Status of climate finance projects in the transport sector²⁹

Financing priority	Low-emissions transport projects, climate-resilient transport projects, strengthening the enabling environment.
Financing status (adaptation)	Satisfactory progress: Climate finance projects are largely aligned with VISIP 2015–2024.
Financing status (mitigation)	Limited data on progress: Limited baseline for low-emissions transport projects.

Table 5.2 Climate change actions in the transport sector³⁰

Action	NERM 2016–2030	Updated NDC 2020	VISIP 2015–2024	NSDP 2016–2030
Provide equitable and affordable access to efficient transport in rural and urban areas.	✗	✓	✗	✓
Introduce electric vehicles (including for public transportation and the government fleet).	✗	✓	✗	✗
Establish milage and emission standards for vehicles.	✗	✓	✗	✗
Reduce reliance on imported fossil fuels.	✓	✓	✗	✓
Consolidate and expand the use of locally produced bio-fuels (coconut-oil based fuel) as an alternative to fossil fuels for electricity generation and transport.	✓	✓	✗	✗
Carry out a scoping study for the use of coconut oil-based fuel in the land and sea transport sectors.	✓	✗	✗	✗
Explore options for promoting energy efficiency in the transport sector (including in tourism uses) and develop an action plan for cost-effective implementation.	✓	✗	✗	✗
Undertaking road rehabilitation and development in every province.	✗	✓	✓	✗
Undertaking airport and aerodrome rehabilitation and development.	✗	✓	✓	✗
Undertaking rehabilitation and construction of ports and maritime facilities.	✗	✓	✓	✗

²⁹ Author's own analysis.

³⁰ Ibid.

Table 5.3 Key sources of financing for the transport sector³¹

Financing instruments	Grant and loan financing.
Financing sources	Green Climate Fund (GCF), multilateral development banks (MDBs) (e.g. ADB & WB), bilateral donors.

Other potential recommendations could include:

- promotion of fuel and pollution-efficient vehicles, ships and planes (including traditional sailing craft);
- regulation for efficiency & pollution for vehicles;
- developing improved public transportation services (particularly electric buses); and
- upgrading of road network and improved traffic management.

Given the low ability of households to pay for transport options in Vanuatu, and existing minibus services, the viable financing instruments are likely to be grant financing. In addition, Table 5.3 details the key sources of financing for the transport sector in Vanuatu.

5.1.3 Potential data utilisation and application

For climate change adaptation projects, satellite remote sensing (SRS) data could be used as follows:³²

- Earth Observation (EO) data (i.e. Kacific, Sentinel-2, Himawari-8 etc.) can be used to monitor the impacts of climate change stressors or hazards (heavy rainfall and sea-level rise, and associated coastal and inland flooding and landslides and soil erosion) on road networks and bridges over time. This information can be used to inform policymakers of transport infrastructure that is most at risk and in need of maintenance – e.g. EO data can be used to ascertain the condition of roads and bridges, including the presence of transport infrastructure damage and deformation.

- The construction and upgrading of roads, including the viability of constructing roads in inaccessible areas, can be designed, evaluated and monitored cost effectively by EO data. Satellite data can be used to monitor the economic impact of past, current and future transport projects, which could include the benefits to rural communities and farmers from improved connectivity.³³

EO data could also be used for investment decision-making and monitoring for climate change mitigation projects (e.g. NASA's new Orbiting Carbon Observatory-2 space satellite could be used to probe the carbon cycle).³⁴

- If in the future Vanuatu plans to establish a public transport system (e.g. electric buses), EO data could be used to inform route design and infrastructure development.

While SRS data provides numerous opportunities to strengthen decision-making and realise cost efficiencies, conventional methods of data collection are still necessary. It is also important that data collected through surveys are used to inform climate change projects, and this includes the present trip distances per mode of transport and the projected mode shift for users. This data would be required to calculate the potential future demand for particular modes of transport, and therefore the expected economic benefits.

5.2 Energy

5.2.1 Profile

The energy sector is a critical driver of human and economic development, including through providing reliable and efficient lighting and cooking, clean water, sanitation, transport, telecommunication services and health and

³¹ Ibid.

³² Hoppe, E, B Bruckno, E Campbell, S Acton, A Vaccari, M Stuecheli, A Bohane, G Falorni, J Morgan (2016), 'Transportation Infrastructure Monitoring Using Satellite Remote Sensing', *Materials and Infrastructure*.

³³ Goldblatt, R, T Monroe, S Elizabeth Antos, M Hernandez (2019), *Innovations in satellite measurements for development*, available at: <https://blogs.worldbank.org/opendata/innovations-satellite-measurements-development>.

³⁴ NASA (no date), 'Orbiting Carbon Observatory-2' available at: https://www.nasa.gov/mission_pages/oco2/index.html

education services. The energy sector in Vanuatu is characterised by very high dependency on petroleum fuel imports, leading to high energy costs, both for petroleum fuel and electricity. Vanuatu also has considerable domestic renewable energy (RE) resources, coupled with extremely low access to electricity and unreliable and unaffordable energy services, particularly in rural communities.

Only one third of households across the country have access to electricity, most of which are connected to the grids in the two main urban areas (Port Vila and Luganville).³⁵ Yet 76 per cent of Vanuatu's households live in rural areas, where only one in ten homes, under half of the schools (42 per cent) and one in four health facilities have some self-generated electricity (mainly petroleum fuel-based).³⁶

Vanuatu has a high potential for renewable energy development, and increasing energy access is a key priority for GoV. There are resources to support hydro-, wind-, solar-, and geothermal-based electricity generation, which could reduce the reliance on imported fuels. In addition to improving energy security, this would contribute to a more sustainable energy supply.

The NERM was first endorsed in 2013 and updated in 2015. This update included green growth as a new priority area for Vanuatu and the NERM also highlights climate change as one of five priority areas for the energy sector. The NERM's overall vision is to provide secure, affordable, widely accessible, high quality, clean energy services for an educated, healthy and wealthy nation. The NERM identified five priorities for the energy sector: access, petroleum supply, affordability, energy security and climate change. The GoV is also committed to achieving a balance between the level of attention (and resources) given to energy efficiency and renewable energy.³⁷ According to the NERM, the greatest potential for energy efficiency improvements are in (i) cooking and drying; (ii) land, air, and marine transport; and (iii) electricity use in buildings.

Key GoV goals and targets in the energy sector include achieving 65 per cent renewable energy and

60 per cent rural electrification by 2020 and close to 100 per cent renewable energy and electrification by 2030 (as outlined in the NERM and updated NDC). The NSDP also includes a goal to increase access to safe, reliable and affordable modern energy services for all that are increasingly generated from renewable sources and reduce reliance on imported fossil fuels; it aims to prioritise renewable sources of energy and promote efficient energy use.

The development of low-carbon energy systems in Vanuatu will result in a number of co-benefits in addition to GHG emissions reductions, which include:

- Increased access to energy underpins sustainable development. At a basic level, modern energy is used for the provision of clean water and sanitation, and for effective delivery of healthcare as well as educational and knowledge services. Widespread and affordable energy access can help provide reliable and efficient lighting, heating, cooking, mechanical power and transport and telecommunication services.³⁸
- Overall energy security is expected to increase, as the resilience of the energy supply will be strengthened and the exposure to fossil fuel price fluctuations will decrease, which will also result in improved macroeconomic outcomes.
- Increased usage of renewable energy will result in employment opportunities. Over the long term, employment in the energy sector could be considerably higher due to construction and maintenance of renewable energy systems.

5.2.2 Access to climate finance

The GoV has been able to mobilise resources from several development partners in support of energy sector targets, with significant commitments made towards rural electrification. Climate finance has been successfully mobilised for a number of projects in the energy sector, and this includes:

- Rural electrification projects (implemented by Climate Investment Funds [CIF], WB, Asian Development Bank [ADB], Government of Austria and New Zealand Ministry of Foreign Affairs and Trade [MFAT]).

35 Government of Vanuatu (2016), Updated Vanuatu National Energy Roadmap.

36 Government of Vanuatu and United Nations Development Programme (2015), Nationally Appropriate Mitigation Action Design Document: Rural Electrification in Vanuatu.

37 Government of Vanuatu (2016), Vanuatu National Energy Roadmap.

38 Ibid.

- Hydroelectricity and solar projects (implemented by CIF and ADB).
- Support on geothermal energy (implemented by MFAT).
- Establishment and operationalisation of the National Green Energy Fund and mobilisation of finance (implemented by GCF readiness assistance and Global Green Growth Institute [GGGI]).

Approximately 14 projects have been funded by climate finance between 2016 and 2018 to address issues around energy generation and access. These projects are listed in Appendix A. Table 5.4 provides

an overview of the status of climate finance projects in the energy sector.

While significant progress has been made in recent years, additional assistance is needed to achieve the actions outlined in Table 5.5.

In addition, Table 5.6 details the key sources of financing for the energy sector in Vanuatu.

5.2.3 Data utilisation and application

In partnership with UK Space Agency, Vanuatu Government set up an innovative renewable energy analytics platform called RE-SAT to support the transition from fossil fuels to renewable energy.

Table 5.4 Status of climate finance projects in the energy sector³⁹

Financing priorities	Increasing rural access and RE generation, and implementing energy efficiency measures.
Financing status (mitigation)	Satisfactory progress: But additional assistance is needed, and improved data is required for tracking progress against goals and targets.

Table 5.5 Mitigation actions in the energy sector⁴⁰

Action	NERM 2016–2030	NDC 2020	NSDP 2016–2030
Increased RE generation capacity, with a focus on solar photovoltaics, hydro generation capacity, wind, biomass, and geothermal.	✓	✓	✓
Grid extension programmes for rural areas to achieve energy access targets.	✓	✓	✗
Off-grid renewable energy projects, e.g. off-grid solar and micro-grids.	✓	✓	✓
Increase access to safe, reliable and affordable modern energy services for all that are increasingly generated from renewable sources and reduce reliance on imported fossil fuels.	✓	✓	✓
Promote efficient energy use, including mandatory standards and labelling system.	✓	✓	✓
Develop community-based improved water systems powered by renewable energy in areas that have poor water access.	✓	✗	✗
Promote the use of RE to improve outcomes and increase productivity in tourism and agricultural sectors.	✓	✓	✗
Undertaking analysis and studies, including to strengthen data collection, scope the potential of biofuels, and improve delivery of energy services.	✓	✗	✗
Strengthening policies, regulations and legislation and capacity, including public-private partnership frameworks for implementing energy projects, building technical capacity, and improving inter-ministerial co-ordination on energy.	✓	✓	✗

³⁹ Author's own analysis.

⁴⁰ Author's own analysis.

Table 5.6 Key sources of climate financing for the energy sector⁴¹

Financing instruments	Grants, concessional loans, equity and guarantees (potential to mobilise climate change finance from public and private financing sources)
Financing sources	There are a range of finance sources for the energy sector, including climate funds (e.g. GCF, GEF, CIF), MDBs (e.g. ADB, WB), other multilateral agencies (e.g. United Nations Development Programme [UNDP], GGGI, International Renewable Energy Agency [IRENA]) and bilateral donors (e.g. MFAT, DFAT, Japan International Cooperation Agency [JICA])

RE-SAT fuses satellite and in-situ weather data with advanced analytics to provide highly detailed renewable energy information to help users explore and define the best renewable energy mix, locate different renewable energy infrastructure and assess the potential financial viability of renewable energy investments and power production and variability, taking into account seasonal weather patterns.⁴²

SRS data can be used to inform the design and monitoring and evaluation of energy supply and energy access projects. EO data can transform energy exploration, site planning, asset management and infrastructure monitoring. In particular, SRS data could:

- Identify communities that are not connected to the grid, and suitable areas for grid extension. More specifically, satellite data could be used as a resource for identifying unelectrified areas, ideal siting locations for grid expansion and areas suitable for self-sustaining microgrids to help in meeting electrification goals.⁴³ As an M&E tool, satellite data could be used to determine the level of grid access achieved following a project and whether energy access targets and goals are being achieved.
- SRS data could also be used for design of hydroelectricity projects, including assessing water quantity and availability, determination of ideal dam locations and reservoir size, environmental impact from rerouting or damming water and monitoring (such as conducting dam safety assessments). It is

also possible to use satellite data for assessing geothermal resources across large land areas. While SRS data can be used for solar resource mapping and wind resource mapping, accuracy is often better using other methods (such as ground-based assessments and lidar). SRS data can, however, be used for siting of energy installations, environmental impact assessments, and monitoring of construction progress.

Additional data is also required to improve the strategic planning and design of renewable energy and energy efficiency projects – this includes data on household energy access (particularly for remote communities), data on biomass usage (to determine the mix of energy sources) and data on energy efficiency potential (to set realistic targets and begin energy efficiency initiatives). Lastly, data is also required to update targets in the NERM and to determine whether Vanuatu has achieved the 2020 renewable energy and electrification targets.

5.3 Forests and land use

5.3.1 Profile

The national forest coverage of Vanuatu is estimated at 36 per cent, which, based on available data, makes the country a net carbon sink.⁴⁴ Forest resources are an integral driver of livelihoods in Vanuatu, contributing to employment, welfare and economic development. While deforestation in Vanuatu has reduced since the 1980s and 1990s, recent land-use change has been driven by small-scale subsistence activities.

A number of climate change hazards will impact forest ecosystems, including a possible increase in invasive species and diseases and extreme

⁴¹ Ibid.

⁴² Available at: <https://www.re-sat.com/>

⁴³ Leibrand, A, N Sadoff, T Maslak and A Thomas (2019), 'Using Earth Observations to Help Developing Countries Improve Access to Reliable, Sustainable, and Modern Energy', *Frontiers in Environmental Science*, available at: <https://www.frontiersin.org/articles/10.3389/fenvs.2019.00123/full>

⁴⁴ Government of Vanuatu (2014), *The Second National Communication to the United Nations Framework Convention on Climate Change*.

weather events and cyclones damaging forest ecosystems.⁴⁵ Vanuatu's forest ecosystems also offer opportunities for climate change mitigation through conservation (e.g. increasing protected areas), afforestation and reforestation activities and carbon substitution (replacement of carbon-intensive products and fuels with wood products).⁴⁶

The REDD+ readiness process in Vanuatu began in 2007 with the establishment of the Vanuatu Carbon Credits Project (VCCP). Vanuatu has become a participant country of the World Bank's Forest Carbon Partnership Facility (FCPF), and the country has accessed finance from the FCPF Readiness Fund. The next steps will be the development of National REDD+ Strategy (which is being funded by the FCPF) and the implementation of REDD+ demonstration activities (possible REDD+ sites on Santo have been assessed).

The National Forest Policy 2013–2023 promotes the need to adapt to climate change, including through 'integrating climate change adaptation issues into forestry sector planning and activities'. The Forest Policy also draws clear linkages towards climate change mitigation through presenting clear directives and implementation strategies. Based on extensive stakeholder engagement, the policy has identified a number of key issues, challenges and actions – these include:

- introduce and promote climate change-resilient tree species and varieties;
- maintain and enhance food security through agro-forestry systems;
- identify and seek financing for novel and promising forestry adaptation projects and programmes;
- rehabilitate watershed and water catchment areas to secure water supplies;
- systematically assess and continuously monitor the impacts of climate change on forest systems;
- zone development activities and undertake land-use planning to minimise site-specific climate change impacts;

45 Forest Carbon Partnership Facility (2017), available at: <https://www.forestcarbonpartnership.org/system/files/documents/Policy%20Brief%20Drivers%20of%20deforestations%20-%20GoV.pdf>

46 Government of Vanuatu (2013), National Forest Policy 2013–2023.

- develop and regularly update a database of climate change adaptation information in the Vanuatu forest sector; and
- identify, prioritise and implement appropriate and effective strategies for the forestry sector to adapt to climate change.

The implementation of forestry and land-use sector projects in Vanuatu will have a number of co-benefits in addition to GHG emissions reductions, which include:

- Forestry and land-use sector mitigation options can promote conservation of biological diversity, both by reducing deforestation and by using reforestation/afforestation to restore biodiverse communities.⁴⁷
- Forestry sector projects may also support the regulation of the hydrological cycle and protection of watersheds, reduce erosion and improve soil quality and fertility.⁴⁸
- Economic co-benefits could include carbon payments or compensation mechanisms that may provide a new source of finance, particularly for rural communities. Moreover, mitigation payments may help to make production of non-timber forest products (NTFP) economically viable, which would further diversify income at the local level.⁴⁹
- Forestry and land-use projects should be well designed to account for potential adverse side-effects, which could include impacts on land tenure and land-use rights, food security through potential reduction in local food production, water depletion due to irrigation and economic impacts resulting from decreased employment and household income.⁵⁰

47 Smith P, M Bustamante, H Ahammad, H Clark, H Dong, E A Elsiddig, H Haberl, R Harper, J House, M Jafari, O Masera, C Mbow, N H Ravindranath, C W Rice, C Robledo Abad, A Romanovskaya, F Sperling, and F Tubiello (2014), 'Agriculture, Forestry and Other Land Use (AFOLU)', *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O, R Pichs-Madruga, Y Sokona, E Farahani, S Kadner, K Seyboth, A Adler, I Baum, S Brunner, P Eickemeier, B Kriemann, J Savolainen, S Schlömer, C von Stechow, T Zwickel and J C Minx (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

48 Ibid.

49 Ibid.

50 Ibid.

5.3.2 Access to climate finance

The forestry sector has received limited climate finance in recent years, which could be because Vanuatu is still in the process of establishing its REDD+ architecture. The rate of deforestation also remains low in Vanuatu, which could be another reason why limited climate finance has been allocated to forestry projects. Key projects in recent years that have been successful in accessing climate change finance have included:

- Pacific Community (SPC)-Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Regional REDD+ Project, which has supported the Department of Forests to design and train its offices on a new forest inventory protocol, which includes climate adaptation assessments.

- FCPF support on REDD+ readiness and development of the National REDD+ Strategy.
- In addition, there are also ecosystem-based adaptation projects, such as the Pacific Ecosystems-based Adaptation to Climate Change project (implemented by Pacific Region Environment Programme [SPREP]), which have a forestry focus.

Approximately five projects have been funded by climate finance between 2016 and 2018 to address issues in the forest and land-use sector. These projects are listed in Appendix A. Table 5.7 provides an overview of the status of climate finance projects in the forestry sector.

Additional assistance is needed to achieve climate change mitigation and adaptation outcomes in the forestry and land-use sector, as outlined in Table 5.8.

Table 5.7 Status of climate finance projects in the forestry sector⁵¹

Financing priorities	Increasing rural access and RE generation, and implementing energy efficiency measures.
Financing status (mitigation/adaptation)	Limited progress: Additional assistance is needed, particularly at the community level. There is also limited data on baseline projects.

Table 5.8 Actions in the forestry sector⁵²

Action	National Forest Policy 2013	NSDP 2016–2030
Reducing deforestation and degradation of forests, including through prohibiting the conversion of forests.	✓	✗
Implementing afforestation and reforestation programmes.	✓	✗
Integrating climate change adaptation actions into forestry sector planning and activities, including through developing demonstration projects for food security, soil stabilisation, water management and coastal erosion.	✓	✗
Protect vulnerable forests, watersheds, catchments and freshwater resources, including community water sources.	✓	✓
Building awareness, training and capacity-building programmes, particularly at the community level.	✓	✗
Strengthening planning frameworks, policies and regulation, including through developing a prioritised and costed action plan linked to the National Forest Policy 2013–2023.	✓	✗

Source: In addition, Table 5.9 details the key sources of financing for the forestry sector in Vanuatu.

⁵¹ Author's own analysis.

⁵² Ibid.

Table 5.9 Key sources of climate financing for the forestry sector⁵³

Financing instruments	Grants, REDD+ finance.
Financing sources	Key sources of climate finance could include GCF REDD+ Pilot Programme, GEF, Adaptation Fund (AF), CIF (Forest Investment Program), MDB (e.g. ADB, WB), UN agencies (Food and Agriculture Organization [FAO] and IFAD), and bilateral donors.

5.3.3 Data utilisation and application

SRS data can be used for measuring and mapping deforestation and afforestation/reforestation changes, which would be useful for designing and monitoring land-use change, forestry and REDD+ activities.⁵⁴

- Previous climate finance projects in Vanuatu (including FCPF and SPC-GIZ funded projects) have successfully used SRS to determine forest cover change.
- The use of SRS for forestry and land-use projects will likely increase in the future; and satellite images (e.g. LANDSAT TM, ASTER and ETM satellite data) could play a key role in monitoring progress on targets to increase forest cover and monitor changes (a planned intervention in Vanuatu's NDC is the use of forestry sector measures to maintain its carbon sink and improve sustainable forest management practices).⁵⁵
- Shefa provincial government successfully undertook a land cover assessment for Efate island using EO data in 2018.⁵⁶
- For the estimation of forest biomass for REDD+ reporting, SRS data is less accurate at present but new developments in technology, e.g. accurate satellite-based LiDAR, could improve its prospects.

Other data and research gaps include a lack of assessments on the effects of climate change on the forestry sector in Vanuatu. Based on international research, the forestry sector is at risk due to climate hazards, including extreme weather events, changing rainfall patterns, higher mean temperatures and increased fire weather resulting

in damage and stresses to species and forest ecosystems. This could result in changes to forest ecosystems, including the density and distribution of species, and the ability of forests to sequester carbon emissions.

5.4 Solid waste

5.4.1 Profile

The National Waste Management and Pollution Control Strategy (NWMPCS) and Implementation Plan 2016–2020 included a number of actions for strengthening waste management, but it did not have an explicit mitigation focus.⁵⁷ The updated NDC 2020, however, prioritised actions to reduce emissions from the solid waste sector.

The NWMPCS aimed to promote an environmentally sustainable Vanuatu, in which all types of wastes generated are reduced, collected, reused, recycled and treated by environmentally sound technologies suited to local conditions and waste going to landfill is minimised to the lowest possible amount. In addition, while recycling is currently not undertaken in Vanuatu, there is a private company in Port Vila that collects and exports recyclable waste.

The waste sector is a major source of emissions for Vanuatu, and, in 2000, waste sector emissions accounted for 2.1 per cent of Vanuatu's total GHG emissions. Solid waste disposal accounted for 51 per cent of total waste-related emissions, and domestic wastewater processing accounted for the remainder.⁵⁸ Solid waste emissions are largely from the anaerobic decomposition of food waste disposed in urban areas, whereas rural solid waste is not considered a major cause of emissions. These allow the decomposition of the waste, but sludge

53 Ibid.

54 Source: REDD+ Reducing Emissions from Deforestation and Forest Degradation.

55 UNDP (2020), Satellite data and climate change.

56 SPREP (2018), 'Land Cover Assessment of Efate Island, Vanuatu', Shefa Provincial Government Council.

57 Government of Vanuatu (2016), National Waste Management, Pollution Control Strategy and Implementation Plan 2016–2020.

58 Government of Vanuatu (2014), The Second National Communication to the United Nations Framework Convention on Climate Change.

remains as a by-product that periodically requires collection and disposal. Emissions from incineration and open burning of waste have not yet been estimated in Vanuatu.

Waste management systems are also at risk due to climate change hazards, including heavy rainfall, flooding, sea-level rise and erosion. Landfills and contaminated sites can contaminate receiving environments, including coastal ecosystems and water supplies, which can result in negative impacts on sensitive ecosystems, public health and economic sectors such as tourism.⁵⁹

The NWMPCS 2016–2020 was aligned along with the National Environment Policy and Implementation Plan 2016–2030, the NSDP 2016–2030, the SAMOA Pathway and the Sustainable Development Goals. The NWMPCS 2016–2020 had nine objectives under seven thematic areas, which covers impacts from urbanisation, rural development, growing populations, climate change and increased demand from industry and agriculture. One of the key principles of the strategy was ensuring that waste management and pollution control approaches involve multiple sectors (such as climate change, biodiversity, health, tourism, biosecurity, customs and agriculture) in order to improve the success and effectiveness of interventions.

Moreover, the Vanuatu Climate Change and Disaster Risk Reduction Policy 2016–2030 prioritises an action in relation to reducing waste sector emissions – the action is ‘exploring opportunities for partnering with the private sector for investment in climate change and disaster risk reduction, including in renewable energy and waste management’. The NDC does not have any specific waste sector-related actions or targets, but the NDC does state that the Government of Vanuatu (GoV) is aware that waste management is an area that needs attention.⁶⁰

The implementation of waste projects in Vanuatu will have a number of co-benefits in addition to GHG emissions reductions, which include:

- achieving broader environmental objectives, such as preventing pollution, mitigating odours, preserving open space and maintaining air, soil and water quality; and⁶¹
- green jobs may increase due to recycling, but absolute increases in job numbers are expected to be small.

5.4.2 Access to climate finance

There have been limited climate change projects in the waste sector in Vanuatu, which presents a key gap.

Approximately six projects have been funded by climate finance between 2016 and 2018 to address issues in the waste sector, but these have had a limited focus on reducing waste sector emissions. These projects are listed in Appendix A. Table 5.10 provides an overview of the status of climate finance projects in the waste sector.

Key options for reducing waste sector emissions and building resilience could include the actions outlined in Table 5.11.

Other potential recommendations could include:

- assessing climate risks to the waste sector, and developing climate-resilient waste management systems; and
- promotion of biogas technology.

Table 5.10 Status of climate finance projects in the waste sector⁶²

Financing priorities	Reducing waste emissions, strengthening climate resilience of waste systems.
Financing status (mitigation/adaptation)	Limited progress: Additional assistance is needed, particularly at the community level. There is also limited data on base-line projects.

59 Brand, J, K Spencer, F O’Shea and J Lindsay (2018), ‘Potential pollution risks of historic landfills on low-lying coasts and estuaries’, *WIREs Water* 5, e1264.

60 Government of Vanuatu (2015), Nationally Determined Contribution.

61 Bogner, J, M Abdelrafie Ahmed, C Diaz, A Faaij, Q Gao, S Hashimoto, K Mareckova, R Pipatti, T Zhang (2007), ‘Waste Management’, *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B Metz, O R Davidson, P R Bosch, R Dave, L A Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY.

62 Author’s own analysis.

Table 5.11 Actions in the waste sector⁶³

Action	NWMPCS 2016–2020	Updated NDC 2020
Development of solid waste management infrastructure.	✓	✗
Adopt and implement a 3R policy, which outlines incentives for achieving improved waste management and controls the type of packaging material entering the country.	✓	✗
Promotion of improved waste management (reduce, reuse, recycle).	✓	✓
By 2030, develop and implement National Plastics Strategy.	✗	✓
Landfill or composting of solid waste (including municipal organic waste) along with an awareness campaign to reduce the burning of waste.	✓	✓
By 2030, implement waste to energy plant for municipal solid waste: (a) Waste to energy plant for Port Villa; (b) Waste to energy plant for Luganville; and (c) Waste to energy plant for Lenakel.	✗	✓

Table 5.12 Key sources of climate financing for the waste sector⁶⁴

Financing instruments	Grants, concessional loans.
Financing sources	Key sources of climate finance could include EU/SPREP (Pacwaste), ADB, World Bank and bilateral donors (e.g. JICA).

In addition, Table 5.12 details the key sources of financing for the waste sector in Vanuatu.

5.4.3 Data utilisation and application

In 2018, a solid waste audit was undertaken for Efate and Santo that outlined the type of waste and estimated volumes of waste disposed.⁶⁵ GoV has also established a thorough database for chemicals and waste-related information, including chemical inventories, waste recycling, disposal and export activities. This database can allow Vanuatu to implement evidence-based policies and programmes on chemical management as part of ongoing efforts for environmental protection.⁶⁶ There remains a need to better understand the sources of wastewater emissions. In addition, it was recommended that an investment plan, linked National Waste Management and Pollution Control

Strategy and Implementation Plan 2016–2020, was developed that included a pipeline of bankable climate change projects.

While it is possible to calculate methane emissions from landfills using SRS data, this technology is nascent, highly technical and is not widely used.⁶⁷ In the future, it may be cost effective to use SRS data for determining the highest emitting waste sources, waste disposal patterns and level of plastic pollution in the ocean. This data could then be used for allocating climate finance and evaluating progress in reducing waste emissions.

5.5 Biodiversity and the natural environment

5.5.1 Profile

Vanuatu's largest ecosystem by area is tropical forest (66 per cent), which is comprised of low forest (22 per cent), medium forest (18 per cent), thickets (24 per cent) and shrubs (2 per cent). The coastal ecosystems (coral, mangroves and seagrass) are the second largest ecosystem with

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Pacific Region Infrastructure Facility (2019), Waste Audit Methodology. A step-by-step manual to conduct comprehensive waste audits in SIDs, available at: https://www.theprief.org/sites/default/files/documents/prif_waste_audit_methodology_final_report_03-06-20.pdf

⁶⁶ National Waste Management Strategy and Action Plans for 2011–2016, Vanuatu.

⁶⁷ Delkash, M, B Zhou and R Singh (2016), 'Measuring Landfill Methane Emissions using Satellite and Ground Data', Chapman University.

14 per cent of coverage. The value of Vanuatu's ecosystem services to human society are considerable and have been estimated at USD7.3 billion per annum.⁶⁸ The majority of Vanuatu's ecosystem services come from coral reefs and tropical forests.

Vanuatu has some 108 known species of amphibians, birds, mammals and reptiles; of these 21.3 per cent are endemic, meaning they exist in no other country, and 13 per cent are threatened. One of the best-known invertebrate species in Vanuatu is the coconut crab. Vanuatu is also home to at least 870 species of vascular plants, of which 17.2 per cent are endemic. The region is rich in sea life, with more than 4,000 species of marine molluscs.⁶⁹

Vanuatu's ecosystems are under increasing pressures from climate change hazards and environmental change. Key climate change risks could include reduced availability of fresh water, saltwater inundation and intrusion of coastal land and groundwater, and increased incidence of pests and diseases of animals, crops and trees.⁷⁰ Climate change is also likely to result in increased acidification of oceans and warmer water temperatures, which could impact reefs and mangroves and reduce fisheries productivity. Coral reef ecosystems are particularly at risk due to cyclones and heat stress, which can result in coral bleaching, and can take between 15 and 25 years to recover from mass mortality events.⁷¹ The risks to ecosystems and ecosystem services could also result in impacts to the provision of ecosystem services. Cyclone Pam demonstrated that the severe storms could cause catastrophic flooding and erosion, and the presence of living reefs and mangrove ecosystems can provide ecosystem-based coastal defences.

The Vanuatu National Biodiversity Strategy and Action Plan (NBSAP) 2018–2030 is the main implementing strategy for the environment pillar of the National Sustainable Development Goals and Policies 2016–2030 environment goals and policy objectives, including 'a strong and resilient

nation in the face of climate change and risks posed by hazards and natural disasters and improving household production'.⁵³ The NBSAP 2018–2030 details a number of focus areas with associated actions, of which two directly relate to climate change and are summarised below:

- reduce major threats to Vanuatu's coastal and marine ecosystems such as overharvesting, reclamation, unsustainable tourism development, natural disaster impacts, climate change impacts, river dredging and pollution;
- encourage coastal rehabilitation in post-disaster/climate change affected areas by conducting coral reef, mangrove and other marine ecosystems assessments to conduct rehabilitation (coral replanting and mangrove replanting).

The implementation of biodiversity and natural environment projects in Vanuatu will have a number of co-benefits, which include:

- restored natural shorelines with mangroves and protecting coral reefs can form a buffer against storm surges and create nurseries for fisheries;
- protecting groundwater recharge zones and restoring catchments can secure water resources so that entire communities can cope with drought; and
- maintaining ecosystems can also reduce the exposure of assets and systems, such as road networks and agricultural production, to climate hazards including flooding and erosion.

5.5.2 Access to climate finance

In recent years, Vanuatu has successfully accessed climate finance through a number of projects focused on strengthening ecosystems and ecosystem services. This includes the following initiatives:

- Restoration of Ecosystems Services against Climate Change Unfavourable Effects (RESCCUE) project, which is a project run by SPC to support integrated coastal zone management using economic tools.
- Pacific Ecosystem-based Adaptation to Climate Change project, which has built capacity for developing and implementing ecosystem-based adaptation (EbA)

68 SPREP (2017), Vanuatu Ecosystem and Socio-economic Resilience Analysis and Mapping.

69 Government of Vanuatu (2014), The Second National Communication to the United Nations Framework Convention on Climate Change.

70 Government of Vanuatu (2016), Vanuatu National Environment Policy and Implementation Plan 2016–2030.

71 Government of Vanuatu (2018), Vanuatu National Biodiversity Strategy and Action Plan (NBSAP) 2018–2030.

approaches and undertaken studies on mapping EbA, prioritising options, and implementing demonstration projects.

- R2R: Integrated Sustainable Land and Coastal Management project, which tests and implements sustainable and integrated management of forest, land and marine resources to achieve effective ridge-to-reef (R2R) conservation in selected priority watersheds in Vanuatu.

Approximately four projects were funded by climate finance between 2016 and 2018 to address issues in

the ecosystem and ecosystem services sector. These projects are listed in Appendix A. Table 5.13 provides an overview of the status of climate finance projects in the ecosystem and ecosystem services sector.

While Vanuatu has implemented a number of successful projects related to ecosystems and ecosystem services, further assistance is required. Future priorities could include the actions outlined in Table 5.14.

In addition, Table 5.15 details the key sources of financing for the ecosystem and ecosystem services sector in Vanuatu.

Table 5.13 Status of climate finance projects in the ecosystem and ecosystem services sector⁷²

Financing priorities	Building resilience of inland ecosystems, scaling up of demonstration projects.
Financing status (adaptation)	Satisfactory progress: The NBSAP 2018–2030 prioritises projects focused on building climate resilience in coastal and marine ecosystems. A number of the projects implemented align with this focus.

Table 5.14 Actions to achieve biodiversity and natural environment outcomes⁷³

Action	NBSAP 2017–2024	VCCDRP 2016–2030
Build resilience of coastal and marine ecosystems to climate change hazards through upscaling best practices.	✓	✗
Undertaking community conservation and increasing protected areas to increase the supply of ecosystem services.	✓	✗
Strengthen management of coastal fisheries to improve the resilience of coral reefs.	✓	✗
Undertake rehabilitation of degraded and damaged ecosystems, including ecosystems damaged in extreme weather events.	✓	✗
Strengthen existing efforts to provide timely and appropriate support to restore livelihoods, agricultural, fisheries and livestock activities during disaster recovery.	✓	✓

Table 5.15 Key sources of climate financing for the ecosystem and ecosystem services sector⁷⁴

Financing instruments	Grants.
Financing sources	Key sources of climate finance could include GCF, GEF, AF, UNDP, FAO, SPREP, SPC, NGOs (e.g. Conservation International and International Union for Conservation of Nature [IUCN]), and bilateral donors (e.g. EU, France).

⁷² Author's own analysis.

⁷³ Ibid.

⁷⁴ Ibid.

5.5.3 Data utilisation and application

GoV recently implemented the VaBiDa project, which gathered and mobilised biodiversity data, but there remain better opportunities to utilise data more effectively for designing and implementing climate change adaptation projects.⁷⁵

At present there is limited data on the status of ecosystems and ecosystem services in Vanuatu and the potential risks posed by climate change. Further research is required, and this aligns with the priority action in the Vanuatu National Environment Policy and Implementation Plan 2016–2030 to enhance environmental monitoring, evaluation and research with relevant, open and transparent data sharing among relevant agencies.⁷⁶

SRS data is also useful for monitoring and promotion of the protection of ecosystems and biodiversity from climate change impacts. EO data is expected to represent one of the most cost-effective ways to identify ecosystems and biodiversity at risk from changes in climatic conditions.⁷⁷ SRS data can be used to monitor the impact of climate change on particular types of ecosystems, such as forest and riparian ecosystems, including through data such as habitat quality, vegetation indices and estimation of evapotranspiration.⁷⁸ EO data can be used to identify where the most critical changes are taking place, thereby highlighting the biggest threats to ecosystems and biodiversity. This can act as an early warning system and inform where interventions should be focused.⁷⁹

75 GBIF (2018), 'VaBiDa: Gathering, sharing and mobilizing biodiversity data in Vanuatu', available at: <https://www.gbif.org/project/83267/vabida-gathering-sharing-and-mobilizing-biodiversity-data-in-vanuatu>

76 Government of Vanuatu (2016), Vanuatu National Environment Policy and Implementation Plan 2016–2030.

77 Luque, S, N Pettorelli, P Vihervaara and M Wegmann (2018), 'Improving biodiversity monitoring using satellite remote sensing to provide solutions towards the 2020 conservation targets', available at: <https://besjournals.onlinelibrary.wiley.com/doi/10.1111/2041-210X.13057>

78 World Bank (2019), Global Water Security and Sanitation Partnership: New avenues for remote sensing applications for water management, available at: <https://documents1.worldbank.org/curated/en/810581561961939655/pdf/New-Avenues-for-Remote-Sensing-Applications-for-Water-Management-A-Range-of-Applications-and-the-Lessons-Learned-from-Implementation.pdf>

79 Anderson, C (2018), 'Biodiversity monitoring, earth observations and the ecology of scale', *Journal of Ecology Letters*, Vol 21 No 10.

5.6 Livelihoods and disaster risk reduction

5.6.1 Profile

Sudden and slow-onset disasters are increasing features of life in Vanuatu. In 2019, Vanuatu was rated the country most at risk from natural disasters in the World Risk Index report. Disasters can impact livelihoods and the well-being of communities, and can threaten the survival of sociocultural systems. The devastation from Category 5 Tropical Cyclone Pam in 2015, which impacted an estimated 188,000 people and displaced more than 65,000 people, demonstrated the importance of investing in disaster risk reduction and the building of climate-resilient livelihoods.

The displacement of communities, both temporary and permanent, can result in serious impacts on the security, health and well-being of individuals.⁸⁰ Both slow-onset disasters (e.g. environmental degradation and sea-level rise) and sudden-onset disasters (e.g. cyclones and floods) can result in livelihood impacts and community displacement. Displacement often has multiple causes, including climate change hazards, environmental and socioeconomic drivers (e.g. population), and policy and regulatory challenges (e.g. inadequate urban planning). Climate change is expected to result in domestic migration and relocation within Vanuatu – migrants from high-risk areas may move to peri-urban informal settlements, which are also often located in hazard-prone areas.⁵⁹

The majority of livelihoods in Vanuatu are dependent on agriculture and tourism, and both of these sectors are at risk due to climate change hazards. Over 80 per cent of Vanuatu's population is involved in agricultural and fishing activities, including subsistence and smallholder farming. Building climate change resilience of the agricultural sector and associated infrastructure can result in more resilient communities that have increased capacity to recover from disasters. The tourism sector (which previously comprised 40 per cent of GDP) is another key driver of livelihoods. The tourism sector has been deeply impacted by COVID-19, and this demonstrates the importance of investing in resilience and diversification to reduce the impacts of shocks and disasters.

80 Government of Vanuatu (2018), National Policy on Climate Change and Disaster-Induced Displacement.

For a community to be resilient, it needs to know what risks and hazards it is exposed to and develop response plans to address those risks and hazards. Resilient communities are those that can adapt, respond and be quick to recover so that they are environmentally, socially and economically sustainable.

While community, family and kinship are the primary safety nets for ni-Vanuatu people, disasters can overwhelm the coping capacities of all communities. Vanuatu requires strong institutions and governance to reduce and manage the risks posed by disasters. The Vanuatu National Policy on Climate Change and Disaster-Induced Displacement 2018 outlines a number of actions and initiatives to strengthen disaster risk reduction planning, mobilise resources, build institutional capacity, and improve co-ordination between stakeholders.⁵⁹

The implementation of projects that safeguard livelihoods and achieve disaster risk reduction will have wide-ranging benefits, which include:

- Reducing losses of lives and property and minimising environmental damage through expanding the coverage of early warning systems (EWS). Investing in EWS can also result in benefits to the private sector – firms involved in agriculture, power production, aviation and mining all have a large interest in being warned about weather phenomena such as strong wind or lightning, and to maintain regular water flow.⁸¹
- Moreover, interventions in other sectors that reduce the exposure of people, households, buildings and assets to climate hazards may result in wide ranging co-benefits. For example, afforestation of land may reduce risks due to flood and landslides, and this will also have benefits from GHG emissions reductions and the potential of harvesting NTFPs.
- Actions across all sectors should be articulated to benefit the community and livelihoods regardless of how climate change materialises. This is referred to as a 'low regret' intervention, suggesting that there is little or

no regret in implementing an intervention in the future, which will still be beneficial despite climate change and its future implications.

5.6.2 Access to climate finance

A large quantum of climate finance has been allocated towards building resilient communities in Vanuatu. The country has successfully accessed climate change finance for strengthening DRR outcomes from a range of sources. This includes the following projects:

- GCF funded Climate Information Services for Resilient Development Planning in Vanuatu (Van-CIS-RDP) project, which is standardising the use of science-based climate information for tourism, agriculture, infrastructure, water management and fisheries.
- World Bank funded Pacific Resilience Program, which is supporting Vanuatu with public financial management of natural disasters and providing parametric catastrophe insurance.
- The GEF Increasing Resilience to Climate Change and Natural Hazards Project, which increased community resilience through supporting climate actions and improving co-ordination of stakeholders at all levels.
- Pacific Risk Resilience Program (PRRP), which provides national, subnational and community level support to strengthen their resilience to natural disasters and climate change-related risk.
- Support provided to protect livelihoods and reduce loss of life associated with natural disasters (such as the construction of evacuation routes in the events of disasters by JICA).
- Humanitarian support is also needed for reconstruction and rehabilitation following Tropical Cyclone Pam.

Approximately 23 projects have been funded by climate finance between 2016 and 2018, to address issues in the livelihoods and disaster risk reduction sector. These projects are listed in Appendix A. Table 5.16 provides an overview of the status of climate finance projects in the livelihoods and disaster risk reduction sector.

Further assistance is required to strengthen livelihood resilience and build disaster risk reduction. This could include the actions outlined in Table 5.17.

81 International Federation of Red Cross and Red Crescent Societies (2013), A guide to mainstreaming disaster risk reduction and climate change adaptation.

Table 5.16 Status of climate finance projects in the livelihoods and disaster risk reduction sector⁸²

Financing priorities	Strengthened early warning systems, improved hydrometeorological forecasting and monitoring, increased support to building climate-resilient livelihoods.
Financing status (adaptation)	Satisfactory progress: Climate finance projects are aligned with the Vanuatu National Policy on Climate Change and Disaster-Induced Displacement 2018 and the Climate Change and Disaster Risk Reduction (CCDRR) Policy 2016–2030.

Table 5.17 Actions to achieve resilient livelihoods and disaster risk reduction⁸³

Action	VCCDRR 2016–2030	NSDP 2016–2030
Strengthen post-disaster systems in planning, preparedness, response and recovery.	✓	✓
Strengthen early warning systems for climate hazards such as tropical cyclones, which was recognised as a priority from the Post-Tropical Cyclone Pam Expert Mission to Vanuatu report and Tropical Cyclone Pam Post Disaster Needs Assessment report.	✓	✓
Support the capacity of humanitarian post-disaster responsiveness, including through improving storage and allocation of food and strengthening access to evacuation centres.	✓	✓
Develop a programme for allocating safe, suitable and available land for displaced populations in need, including climate migrants. Develop affordable, climate/disaster-resilient housing designs.	✓	✗
Strengthen efforts to build climate-resilient livelihoods in vulnerable populations. This should have a focus on tourism, agricultural, fisheries and livestock activities.	✓	
Institutionalise climate change and disaster risk governance, and build institutional capacity and awareness.	✓	✓
Access available financing for climate change adaptation and disaster risk management.	✓	✓

Table 5.18 Key sources of climate financing for the livelihoods and disaster risk reduction sector⁸⁴

Financing instruments	Grants
Financing sources	Key sources of climate finance could include GCF, GEF, AF, CIF, UNDP, World Bank, ADB and bilateral donors (e.g. DFAT and MFAT).

In addition, Table 5.18 details the key sources of financing for the livelihoods and disaster risk reduction sector in Vanuatu.

5.6.3 Data utilisation and application

Vanuatu already uses SRS data for rapid damage mapping, volcanic ash monitoring and other disaster response activities. Kacific Broadband Satellites, a joint project with Vanuatu Government

and TELSAT Pacific, has introduced an exciting rural satellite internet system in the rural Lambubu area on Malekula Island in Vanuatu to provide disaster preparedness and education facilities in the rural schools.⁸⁵

⁸² Author's own analysis.

⁸³ Ibid.

⁸⁴ Ibid.

⁸⁵ Kacific website, available at: <https://kacific.com/>

SRS data can be further utilised to forecast climate hazards, particularly in relation to flooding, extreme events (such as tropical storms and cyclones) and drought. This data can be used to provide early warnings to households, farmers and other stakeholders. The provision of early warnings is beneficial due to reduction in damages and negative impacts (including loss of life) associated with climate change-induced disasters. SRS data can also support the identification of evacuation routes for communities, and evaluate roads and key facilities to confirm their usability post-disaster.⁸⁶

SRS data can support precise post-disaster needs assessments and evaluation of early and long-term recovery needs and priorities. This includes the allocation of humanitarian assistance following a disaster through identifying the most at-need communities, and prioritising infrastructure repair.

Another application is the use of SRS data for index-based drought or flood insurance, where insurance premiums and pay-outs are based on a pre-determined index derived from EO data rather than on actual crop and livestock losses. Index insurance is used as a risk management tool in agriculture, food security and disaster risk reduction and helps stabilise income for smallholders when yields are affected by weather.⁶²

Vanuatu is also building its capacity to collect other forms of data to inform climate action on safeguarding livelihoods and improving DRR outcomes. The GCF funded Van-CIS-RDP project is building the monitoring capabilities of GoV through deploying new weather and climate infrastructure, which will be used to inform communities in high-risk hotspots and agricultural producers. In addition, Vanuatu's communities have a wealth of traditional knowledge to prepare for extreme events, and this information should also be shared among communities to build climate resilience.

5.7 Resilient infrastructure

5.7.1 Profile

Despite recent progress in planning and policy to build resilience, including through the adoption of the VISIP 2015–2024, translating national climate

resilience into infrastructure development remains a significant challenge.

Providing services and building infrastructure in Vanuatu is challenging due to the remoteness of islands, rugged terrain and access to basic utilities. Infrastructure across Vanuatu is potentially at high risk to a range of climate change hazards, including extreme events (e.g. cyclones and heavy rainfall), sea-level rise, inland and coastal flooding, and landslides and coastal erosion. The Category 5 Cyclone Pam in 2015, for example, caused major infrastructure damage, affecting four out of six provinces.

There is a need to integrate climate resilience measures into key infrastructure (including housing and the urban built environment). Resilience is the ability to prepare and plan for, and for infrastructure to absorb and recover from and successfully adapt to adverse events – often more simply put as being able to 'bounce back'.

Particularly vulnerable to climate-induced impacts are Vanuatu's coastal areas where the majority of the country's population are residing, and a large share of infrastructure is being located. Some communities are presently at risk of climate change and natural hazards, which has resulted in relocation of communities, e.g. in the northern island of Tegu. Coastal tourism infrastructure is also increasingly at risk due to coastal erosion and storm surges, which are both intensified and caused by cyclones and sea-level rise.

The VISIP 2015–2024 sets out the strategy for major infrastructure investment in the country and aims to align itself with the NSDP goals. The plan aims to encourage infrastructure development that supports climate-resilient transport and communications (supporting market development), water supply and sanitation (supporting health), least-cost electrification (improving productivity) and facilities supporting productive youth activities. Key sub-tasks include improving resilience to climate change by protecting coastlines and water supplies through reduced pollution and to finalise and implement Vanuatu climate change policy frameworks, sector plans and corporate plans. Infrastructure projects such as transport, shipping, water supply, waste management, energy, telecommunications and information and communications technology (ICT), tourism and health are proposed in the VISIP.

86 European Space Agency, EO4SD Agriculture and Rural Development cluster (2019), Final Report on Earth Observation for Sustainable Development in Agriculture and Rural Development.

The development of resilient infrastructure in Vanuatu will result in a number of co-benefits, which include:

- Increased reliability of service provision. Reliable infrastructure has benefits ex-post, by reducing the frequency and severity of disruption. It also has benefits ex-ante, as it reduces the need for users to invest in backup measures.⁸⁷
- Adaptations can produce development co-benefits in urban areas, including safer, healthier and more comfortable urban homes and environments and reduced vulnerability for low-income groups to disruptions in their incomes and livelihoods.⁸⁸

5.7.2 Access to climate finance

Vanuatu has successfully accessed climate change finance from a range of sources. This includes the following projects:

- DFAT and ADB financed Port Vila Urban Development Project, which is expanding access to basic services in the capital, Port Vila, and surrounding areas in Shefa province. The project will improve drainage, roads and sanitation systems.⁸⁹
- MFAT financed Vanuatu Tourism Infrastructure Project (Sea Front, Faturaru Bay, Port Side), which is focused on enhancing urban design and public amenities, emphasising the quality of products and services, and further developing infrastructure in two of Vanuatu’s key tourist precincts.⁹⁰

87 OECD (2018), *Climate-resilient Infrastructure*, OECD Environment Directorate.

88 Revi, A, D E Satterthwaite, F Aragón-Durand, J Corfee-Morlot, R B R Kiunsi, M Pelling, D C Roberts and W Solecki (2014), in *Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C B, V R Barros, D J Dokken, K J Mach, M D Mastrandrea, T E Bilir, M Chatterjee, K L Ebi, Y O Estrada, R C Genova, B Girma, E S Kissel, A N Levy, S MacCracken, P R Mastrandrea, and L L White (eds.)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, 535-612.

89 ADB (no date), ‘Vanuatu: Port Vila Urban Development Project’, available at: <https://www.adb.org/projects/42391-013/main>

90 Beca (no date), ‘Vanuatu Tourism Infrastructure Project: Helping Vanuatu cruise into its potential’, available at: <https://www.becca.com/what-we-do/projects/transport-and-infrastructure/vanuatu-tourism-infrastructure-project>

- JICA and DFAT financed projects for developing climate-resilient buildings, including key public buildings (hospital and schools).

Approximately 17 projects have been funded by climate finance between 2016 and 2018 to address issues in the resilient infrastructure sector. These projects are listed in Appendix A. Table 5.19 provides an overview of the status of climate finance projects in the resilient infrastructure sector.

Further assistance is required to develop climate-resilient infrastructure, which could include the actions outlined in Table 5.20.

In addition, Table 5.21 details the key sources of financing for the resilient infrastructure sector in Vanuatu.

5.7.3 Data utilisation and application

EO data can provide an improved understanding of the built environment, including urbanisation and settlement trends, population changes, and changing infrastructure and transport needs. This data can provide information on the spatial location of buildings and infrastructure in urban and peri-urban areas, and the impact of heavy rainfall and

Table 5.19 Status of climate finance projects related to resilient infrastructure⁹¹

Financing priorities	Develop climate-resilient infrastructure, flood and coastal defences, hazard mapping, strengthened regulation, innovative financing mechanisms.
Financing status (adaptation)	Satisfactory progress: Climate finance projects are aligned with the Vanuatu National Policy on Climate Change and Disaster-Induced Displacement 2018 and the Climate Change and Disaster Risk Reduction (CCDRR) Policy 2016–2030.

91 Author’s own analysis.

Table 5.20 Actions to achieve climate- resilient infrastructure⁹²

Action	VISIP 2015–2024	VCCDRP 2016–2030
Develop climate-resilient buildings, which includes affordable disaster-resilient housing.	✓	✓
Building climate-resilient ICT and telecommunication systems.	✓	✗
Coastal defences for buildings, assets and infrastructure in areas at risk of sea-level rise and coastal flooding.	✓	✗
Undertake hazard mapping and national land-use planning.	✗	✓
Adopt and enforce a building code, which includes climate-resilience measures.	✓	✗
Develop financial mechanisms to protect infrastructure from climate change risks, such as affordable micro-insurance and 'climate insurance' models.	✓	✓

Table 5.21 Key sources of climate financing related to resilient infrastructure⁹³

Financing instruments	Grants, concessional loans.
Financing sources	Key sources of climate finance could include GCF, GEF, AF, CIF, UNDP, World Bank, ADB and bilateral donors (e.g. DFAT, MFAT and JICA).

sea-level rise and associated inland and coastal flooding and landslides on these assets.⁹⁴

EO data can also measure changes in deformation of buildings and infrastructure, with applications for geophysical monitoring of subsidence and structural stability. Another potential use is determining the area of impervious surfaces, which is related to the risk of urban floods, the urban heat island phenomenon as well as the reduction of ecological productivity.

This data can then be used to inform planning strategies, enable authorities to properly prepare for natural hazards and undertake decision-making on allocation of climate finance to build infrastructure resilience and initiate prevention measures.

5.8 Food security and nutrition

5.8.1 Profile

With about 80 per cent of Vanuatu's population dependent on subsistence agriculture, climate change poses substantial risks to food security and economic development. Vanuatu relies on a narrow range of primary agriculture export commodities

with limited diversification, and is therefore significantly vulnerable to climatological, natural hazard and trade impacts.

Agricultural activities in Vanuatu are particularly susceptible to droughts, extreme weather events and changes in rainfall, and associated floods, reductions in fresh-water availability and wind damage. Agricultural systems are also at risk due to temperature stresses, and associated increases in evapotranspiration. For example, heavy rainfall and floods can damage seedlings and encourage conditions that promote diseases and pests. Droughts and temperature increases, moreover, can add thermal stresses to crops and livestock. There will also likely be water stresses from saltwater inundation and soil salinisation in coastal areas, and water shortages due to droughts and decreased flows.

The agricultural sector in Vanuatu is also a key source of GHG emissions. The largest contributor to GHG emissions in year 2000 was the livestock sector amounting to 56.5 per cent of total GHG emissions, and second largest source of emissions was N₂O from agriculture soils with 29.4 per cent of GHG emissions.⁹⁵ The updated NDC 2020

⁹² Ibid.

⁹³ Ibid.

⁹⁴ World Bank and OECD (2019), World Bank national accounts data, and OECD National Accounts data files, World Bank.

⁹⁵ Government of Vanuatu (2014), The Second National Communication to the United Nations Framework Convention on Climate Change.

prioritised measures for reducing emissions from livestock production.

With the risk and emissions profile of the agriculture sector, key responses are needed from agricultural producers, communities and government agencies. This could include the use of renewable energy and energy-efficient technologies, including solar water irrigation systems and solar dryers. Moreover, promotion of agroforestry initiatives to achieve resilience and mitigation impacts, including achieving carbon sequestration, improving soil quality and achieving erosion control.

The Vanuatu Agriculture Sector Policy (VASP) 2015–2030 identifies areas for the GoV to facilitate sustainable and equitable growth across the sector. The Policy requires assessment of the competing demands on the environment with the impacts of climate change and carbon reduction methods to be taken into consideration when formulating strategies to address the development challenges the sector faces.

This Agriculture Sector Policy, underpinned by social, economic, ecological and cultural principles and sustainable development pillars, is organised around 13 thematic areas. Three thematic areas, namely Research & Development, Production & Market Access and Climate Variability, Climate Change and Disaster Risk Reduction, support all sustainable development pillars. The Climate Variability, Climate Change and Disaster Risk Reduction pillar also states that climate variability, climate change and disaster risk reduction must be mainstreamed by using adaptation and mitigation strategies in all agriculture initiatives and developments.

The implementation of food security and nutrition projects in Vanuatu will result in a number of co-benefits, which include:

- Diversification of the food system, which can reduce risks from climate change, could generate significant health co-benefits from reduced dependence on imported processed food.⁹⁶
- Many livestock-related options could enhance the adaptive capacity of rural communities, in particular of smallholders. Significant

synergies exist between adaptation and mitigation, for example through sustainable land management approaches.⁹⁷

- Changes to land-use and agricultural management can also affect biodiversity, both positively and negatively depending on farming practice – for example, agroforestry could favour biodiversity whilst intensified monoculture farming may lead to a loss of biodiversity.⁹⁸
- Lastly, empowering women can bring synergies and co-benefits to household food security and sustainable land management.⁹⁹

5.8.2 Access to climate finance

Climate finance has been successfully utilised to implement a number of projects in the agriculture sector in Vanuatu. This includes the following projects:

- World Bank funded Increasing Resilience to Climate Change and Natural Hazards Project, which promoted improved technologies for food crop production and resilience to climate change.
- European Union and Government of New Zealand have funded initiatives in the sector, including strengthening climate-resilient value chains.
- United States Agency for International Development (USAID) Climate Change and Food Security Project (implemented by SPC), which evaluated and increased the resilience of land-based food production systems.

Approximately seven projects have been funded by climate finance between 2016 and 2018 to address issues in the agriculture sector. These projects are listed in Appendix A. Table 5.22 provides an overview of the status of climate finance projects in the agriculture sector.

⁹⁷ Ibid.

⁹⁸ Smith, P, D Martino, Z Cai, D Gwary, H Janzen, P Kumar, B McCarl, S Ogle, F O'Mara, C Rice, B Scholes, O Sirotenko (2007), 'Agriculture', in *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O R Davidson, P R Bosch, R Dave, L A Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY.

⁹⁹ IPCC (2019), *Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*.

⁹⁶ IPCC (2020), *Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*, available at: <https://www.ipcc.ch/srccl/>

Further assistance is required to strengthen outcomes in the agricultural sector. This could include the following actions in Table 5.23.

In addition, Table 5.24 details the key sources of financing for the agriculture sector in Vanuatu.

5.8.3 Data utilisation and application

With EO data, improvements in agricultural sector diagnostics, programme monitoring and service delivery can be achieved. EO services are able to provide data and projections of crop biophysical,

Table 5.22 Status of climate finance projects in the agriculture sector¹⁰⁰

Financing priorities	Climate-resilient crops, scale up climate-resilient practices, implement community extension models.
Financing status (adaptation)	Limited data on progress: But climate finance projects that have been implemented are aligned to the Vanuatu Agriculture Sector Policy 2015–2030.

Table 5.23 Actions to achieve food security and nutrition outcomes¹⁰¹

Action	VASP 2015	NSDP 2016–2030	Updated NDC 2020
Mainstream climate variability, climate change and disaster risk reduction using adaptation and mitigation strategies in all agriculture initiatives and developments.	✓	✗	✗
Promote broad-based growth by strengthening linkages between tourism, infrastructure, agriculture and industry in rural areas and diversify the rural economy.	✓	✓	✗
Undertake research to develop climate-resilient crop varieties, introduce new crops and manage pests for climate change adaptation.	✓	✗	✗
Scale up climate-resilient agriculture practices, including diversified farming practices and climate-resilient staple crops such as taro and sweet potato.	✓	✗	✗
Community extension models, which include climate adaptation actions, and decentralisation of technology development.	✓	✗	✗
Monitor, evaluate and report on climate change, climate variability and disaster risk reduction, agricultural issues, initiatives and outcomes.	✓	✗	✗
By 2030, training and capacity building for livestock farming and pasture management.	✗	✗	✓
By 2030, converting pastures to silvopastoral livestock systems.	✗	✗	✓
By 2030, international collaboration to improve livestock efficiency.	✗	✗	✓

Table 5.24 Key sources of climate financing for the agriculture sector¹⁰²

Financing instruments	Grants.
Financing sources	Key sources of climate finance could include GCF, GEF, AF, CIF, FAO, UNDP, World Bank, ADB and bilateral donors (e.g. MFAT, Agence Française de Développement [AFD], USAID).

100 Author's own analysis.

101 Ibid.

102 Ibid.

soil and climate characteristics, and the occurrence, duration and intensity of natural disasters, such as heat stress, droughts and floods that strongly influence agricultural production.¹⁰³ EO data has already been used in Vanuatu for after-disaster damage mapping of agriculture products (e.g. damage to banana, coconut and other crops) – for instance, following Tropical Cyclone Pam, agricultural damage was estimated using EO data. Irrigation potential can also be determined, including land suitability, identifying constraints for irrigation development and quantifying water availability.⁷³ The efficiency of irrigation can also be assessed, and EO data on evapotranspiration and soil moisture can be used to determine which crops/areas are most in need of irrigation.¹⁰⁴

EO data can support integrated ecosystem management by determining the status of agroecosystems, such as impacts on the flow of ecosystem services to and from agroecosystems. EO data is also able to assess impacts of agriculture of particularly vulnerable ecosystems (such as wetlands), and patterns of deforestation and ecosystem loss and degradation.⁷³ For areas identified as having a higher susceptibility of land degradation and soil erosion risk, resources can be allocated to support vulnerable farmers.

SRS data also allows comparisons over time, and can provide effective, near real-time and large-scale agricultural monitoring systems. This data can help to assess the impact of project interventions, assisting the final programme or project evaluation, and also predict expected crop yields.⁷³ Lastly, EO data can map rural infrastructure assets and physical supply chain infrastructures such as the road network, storage facilities and markets. This data can be used to support planning and design of rural infrastructure investments and estimate future land-use demand.

5.9 Water supply and sanitation

5.9.1 Profile

Water is abundant in most islands across Vanuatu, but shortages are common during the dry season.

Water crises during El Niño-driven droughts are becoming increasingly common on smaller and more remote southern atolls that rely primarily on rainwater and have limited harvesting capacity. For some low-lying areas, encroaching sea water has resulted in salinisation of water, especially in shallow freshwater lens and areas where recharge rates are on the decline, forcing communities to look for other sources of potable water.¹⁰⁵

Vanuatu requires better rural water infrastructure. Water is abundant in most islands across Vanuatu but access to reliable and safe water supplies in rural areas is low, compared with urban centres. Hygiene and sanitation continue to be a concern, with the additional challenge of managing sewage without contaminating the ground-water lens. A growing urban population makes meeting demand challenging, particularly in urban centres.¹⁰⁶

A goal under the NSDP is to ensure all people have reliable access to safe drinking water and sanitation infrastructure. Increasing rural water security requires energy, and low-emissions energy supplies can be used to increase water supply and access. For example, solar power (e.g. solar water pumps or solar desalination) can be used to increase water supply and access. Moreover, both rural energy and water systems require ongoing maintenance (including preventive maintenance) and a key constraint to developing sustainable water systems in the Pacific is achieving and financing long-term operational sustainability.

In the two main urban areas of Vanuatu, Port Vila and Luganville, wastewater systems are insufficient and underdeveloped.¹⁰⁷ Untreated wastewater is discharged into receiving environments, resulting in contamination and pollution of coastal areas and freshwater environments.¹⁰⁸ In rural areas of Vanuatu the sanitation system is limited and decentralised, consisting of some basic wastewater systems, including privately managed household and commercial septic tanks for the collection

103 European Space Agency, EO4SD Agriculture and Rural Development Cluster (2019), Final Report on Earth Observation for Sustainable Development in Agriculture and Rural Development.

104 World Bank and OECD (2019), World Bank national accounts data, and OECD National Accounts data files, World Bank.

105 Pacific Climate Change Science Program (2013), Current and future climate of Vanuatu.

106 World Bank (2011), 'Vulnerability, Risk Reduction, and Adaptation to Climate Change: Vanuatu', Climate Risk and Adaptation Country Profile.

107 Massing, A (2019), 'First National Sanitation Board Launched', available at: https://www.dailypost.vu/first-national-sanitation-board-launched/image_6d48824f-611c-55aa-91c8-483024fa8611.html

108 Sleet, P (2019), 'Food and Water Security in Vanuatu', available at: <https://www.futuredirections.org.au/publication/food-and-water-security-in-vanuatu/>

of human waste.¹⁰⁹ The present wastewater disposal processes also result in GHG emissions, and the updated NDC 2020 has identified mitigation measures to reduce GHG emissions from wastewater.

Without investments in resilience, climate change, coupled with increased urbanisation, could exacerbate water and wastewater challenges. Water supply and wastewater systems are potentially at risk due to climate change hazards, including inland and coastal floods, droughts and extreme weather events. Water supply systems could be vulnerable to drought-induced water shortages, and floods and extreme events could damage water infrastructure (including wastewater systems), which could result in declining water quality and increased water insecurity in at-risk communities.

The Vanuatu National Water Strategy (VNWS) 2018–2030 outlines a framework for long-term holistic management over water resources at the national level. The plan takes into consideration sustainable management of water sources and catchments, extraction techniques and delivery of quality water to the communities. It also takes into account new challenges and potential impacts on water resources, such as population growth, development pressures and the risks due to climate change. The overall vision of the plan is to ensure 'sustainable and equitable access to safe water and sanitation for the people of Vanuatu to support improved public health and promote social and economic development.'

The implementation of water supply and sanitation projects in Vanuatu will result in a number of co-benefits, which include:

- Developing climate-resilient sanitation systems (including wastewater treatment) could result in reduced pollution to receiving environments, improved water quality, and economic benefits to fishing, agriculture and tourism sectors.
- Improving water quality could result in health benefits from water-borne diseases, which could also result in additional socioeconomic benefits including poverty reduction and productivity gains.

- Lastly, developing climate-resilient water supplies proactively could also save costs. This is because climate hazards could increase the cost of supplying water in the future, through water shortages, saltwater incursion and damages to infrastructure.

5.9.2 Access to climate finance

In the key urban areas of Vanuatu, water is supplied by GoV and a private concession (for Port Vila), while the rural water supply system is operated and managed by local community committees. Rural water supplies comprise of wells, boreholes, surface water collection and rainwater catchments. There has been limited support provided on developing climate-resilient water supply and wastewater systems, with rural water security being an identified gap. GoV has successfully accessed climate finance from the following projects:

- MFAT funded project to rehabilitate water and sanitation facilities and improve hygiene practices, leading to increased resilience and access.
- World Bank funded Increasing Resilience to Climate Change and Natural Hazards Project, which increased access of rural communities to secure water supplies.
- ADB has proposed a project for improving access to integrated and resilient urban water supply and sanitation services in greater Luganville, although this is yet to be approved.

Approximately nine projects have been funded by climate finance between 2016 and 2018 to address issues in the water supply and wastewater sector. These projects are listed in Appendix A. Table 5.25 provides an overview of the status of climate finance projects in water supply and wastewater sector.

Further assistance is required to achieve water supply and wastewater goals and targets, and future projects could focus on achieving the actions in Table 5.26.

Table 5.27 details the key sources of financing for the water supply and wastewater sector in Vanuatu.

5.9.3 Data utilisation and application

Data utilisation for water and wastewater projects could be strengthened by SRS data. Satellite-based sensors are now capable of making direct and

109 SPC (2007), 'Vanuatu: Status of Water Resources', available at: <http://www.pacificwater.org/pages.cfm/country-information/vanuatu.html>.

Table 5.25 Status of climate finance projects in the water supply and wastewater sector¹¹⁰

Financing priorities	There is limited information on future financing priorities, as the water sector strategy covered 2008–2017. Project ideas are listed below.
Financing status (adaptation)	Limited data on progress – Past climate finance projects are aligned with key planning frameworks, including the Water Strategy for Vanuatu 2008–2017.

Table 5.26 Status of climate finance projects in the water supply and sanitation sector¹¹¹

Action	NSDP 2016–2030	VNWS 2018–2030	Updated NDC 2020
Protect vulnerable forests, watersheds, catchments and fresh-water resources, including community water sources.	✓	✓	✗
All water quality monitored and maintained to meet agreed standards, which involves establishing monitoring standards, enforcing regulation and improve training.	✗	✓	✗
Developing water master plans for each province to meet national goals and targets.	✗	✓	✗
Appropriate and sustainable infrastructure installed to meet domestic, customary use targets and needs for sustainable economic development, including appropriate and sustainable sanitation systems.	✗	✓	✗
Ensure all people have reliable access to safe drinking water and sanitation infrastructure.	✓	✗	✗
By 2030, implement waste water management system in Vanuatu: (a) centralised wastewater collection and treatment system in municipal area including awareness and capacity building.	✗	✗	✓
By 2030, improvements to public and communal toilet facilities including bio-toilets.	✗	✗	✓

Table 5.27 Key sources of climate financing in the water supply and wastewater sector¹¹²

Financing instruments	Grants, concessional loans.
Financing sources	Key sources of climate finance could include GCF, GEF, AF, ADB, WB, UN agencies (FAO and International Fund for Agricultural Development [IFAD]), and bilateral donors (JICA, MFAT, DFAT).

indirect measurements of nearly all components of the hydrological cycle.¹¹³

110 *Author's own analysis.*

111 *Ibid.*

112 *Ibid.*

113 Sheffield, J, E F Wood, M Pan, H Beck, G Coccia, A Serrat-Capdevila, K Verbist (2018), 'Satellite remote sensing for water resources management: Potential for supporting sustainable development in data-poor regions', available at: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2017WR022437>. Water Resources Research, 54.

Vanuatu has used satellite imagery to assess and monitor the coastal water quality of Port Vila. SRS is a useful tool for processing synoptic information that can be used in conjunction with in-situ monitoring and modelling to provide integrated assessments of water quality.¹¹⁴

114 CME, NOC, UK (no date), Integrated water quality assessment for Port Vila, Efate.

Furthermore, SRS data can improve hydrometeorological monitoring and prediction, including monitoring the status of water reservoirs/basins, lakes and large rivers, and predicting impacts of droughts on water supplies.¹¹⁵ SRS data could also indirectly be used to understand groundwater recharge rates through looking at evapotranspiration in riparian and wetland ecosystems and environments. Water quality changes, which are a risk due to climate change, can also be measured based on key parameters, such as vegetation indexes, land-use change observations and algal bloom frequency, which can complement ground measurements.¹¹⁶ SRS data can also be used to better predict and understand flood risk, and the use of satellite data in forecasting and managing flood risk is covered in more detail in the resilient infrastructure and disaster risk reduction sections of this report.

SRS data could be used for planning and monitoring the effectiveness of wastewater systems, which could include monitoring the receiving environments. For example, SRS can be used for monitoring wastewater discharges into coastal waters, which can support decision-makers with determining which areas/communities require investment in developing and improving wastewater systems.

Additional data is also required to improve water supply and wastewater outcomes. Future climate finance projects could focus on strengthening information management and data collection, including mapping of water resources and

identifying catchments and infrastructure at risk; improving information sharing between local water committees, government and private sector providers; and strengthening understanding of community needs.

5.10 Health

5.10.1 Profile

Health is a key sector, and public health outcomes in Vanuatu are at particularly high risk. The marginalised parts of society, which lack access to health facilities, have high vulnerability to climate hazards and associated health impacts.

Climate change will result in direct physical health impacts through increasingly severe and frequent cyclones, increases in extreme daily temperatures and health impacts from inland and coastal flooding. In addition, climate change will also affect the distribution and prevalence of diseases, including waterborne and vector-borne diseases (VBD), and nutritional deficiencies associated with food insecurity. There is some evidence that the area prone to malaria infections is extending southwards.¹¹⁷ Based on a previous risk assessment that was undertaken in 2013, the following health risks were identified (Table 5.28).

Public health outcomes could also decline through impacts on mental health and the delivery of health services. Vanuatu's hospitals and health clinics could be at risk due to climate change hazards, such as flooding, and disruption and damage to

Table 5.28 Assessment of key climate change risks in Vanuatu¹¹⁸

Risk category	Health issue
Extreme	Water-borne diseases, food-borne diseases.
High	Vector-borne diseases, malnutrition, non-communicable diseases, temperature-related illnesses and occupation-related illnesses.
Medium	Respiratory infections, skin conditions, eye diseases, mental health disorders and traumatic injuries and deaths.

115 Trinh, R, B Holt, B Pan, C Rains and M Gierach (2014), 'Satellite Remote Sensing Detection of Wastewater Plumes in Southern California', available at: <https://ui.adsabs.harvard.edu/abs/2014AGUFMOS23C1224T/abstract>. American Geophysical Union, Fall Meeting.

116 World Bank and OECD (2019), World Bank national accounts data, and OECD National Accounts data files, World Bank.

117 Government of Vanuatu (2014), The Second National Communication to the United Nations Framework Convention on Climate Change.

118 Spickett, J T, D Katscherian, L McIver (2013), *Health Impacts of Climate Change in Vanuatu: An Assessment and Adaptation Action Plan*, available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4776772/>

infrastructure could hinder transportation of injured or sick people and affect critical water provision, energy supplies and ecosystem disruption.

The co-benefits from increasing resilience in the health sector include:

- Socioeconomic benefits from building climate-resilient health systems and safeguarding public health include poverty reduction, improved economic productivity and protection of women and children (children under 5 and pregnant women are at heightened risk of VBDs).¹¹⁹
- Improving health is a no-regret option as it provides benefits regardless of climate change. Human health is a key component of adaptation activities across all sectors and a healthy population is a resilient population.
- Adaptation projects also have health co-benefits including flood protection, disaster risk reduction and climate-resilient food systems.¹²⁰

The Health Sector Strategy (HSS) 2017–2020 provides an operational framework for implementing the health sector priorities of the NSDP 2016–2030. The HSS has been established as a guide for all stakeholders working to improve the nation's health services, including government agencies, NGOs and development partners.

The HSS states that the health system needs to become more resilient in the face of the emerging challenges posed by climate change. The HSS includes goals and actions for addressing the impacts of climate change on the health sector.

5.10.2 Access to climate finance

There have been limited projects in the health sector in Vanuatu. The Global Environment Fund is presently financing a project titled Building Resilience of Health Systems in Pacific Island LDCs to Climate Change, which is being implemented by the World Health Organization and United Nations

Table 5.29 Status of climate finance projects in the health sector¹²¹

Financing priorities	Identify and plan for climate change risks in the health sector, control of waterborne and vector-borne diseases, and develop disaster and emergency response plans.
Financing status (adaptation)	Limited progress – Additional assistance is needed, particularly to deliver actions and strengthen capacity.

Development Programme. This project involves the integration of climate information and early warning processes and practices into the national Health Information System, and the National Syndromic Surveillance System, through collaboration with the Vanuatu Meteorological Service.

There have been a number of past successes in other sectors that have co-benefits from achieving health outcomes. Examples of successes include the following projects:

- GCF financed Climate Information Services for Resilient Development Planning in Vanuatu project.
- GEF financed Protecting Urban Areas Against the Impacts of Climate Change in Vanuatu project.

Approximately two projects have been funded by climate finance between 2016 and 2018 to address issues in the health sector. These projects are listed in Appendix A. Table 5.29 provides an overview of the status of climate finance projects in the health sector.

A key outcome of the HSS 2017–2020 was to incorporate potential health impacts of climate change in programme development.¹²² The Vanuatu–WHO Country Cooperation Strategy (CCS) 2018–2022 identifies further strategic activities to achieve climate change adaptation outcomes, as listed in Table 5.30.¹²³

119 Bardosh, K L, S J Ryan, K Ebi, S Welburn and B Singer (2017), 'Addressing vulnerability, building resilience: community-based adaptation to vector-borne diseases in the context of global change', *Infect Dis Poverty* 6, 166, available at: <https://doi.org/10.1186/s40249-017-0375-2>

120 Campbell-Lendrum, D, L Manga, M Bagayoko, J Sommerfeld (2015), 'Climate change and vector-borne diseases: what are the implications for public health research and policy?', *Philos Trans R Soc Lond B Biol Sci.* 5, 370(1665), 20130552.

121 Author's own analysis.

122 Government of Vanuatu (2017), *Health Sector Strategy 2017–2020*, available at: <https://www.dfat.gov.au/sites/default/files/vanuatu-health-sector-strategy-2017-2020.pdf>

123 WHO (2018), 'WHO Country Cooperation Strategy 2018–2022: Vanuatu', available at: <https://apps.who.int/iris/handle/10665/259930>

Table 5.30 Actions to achieve resilient health sector outcomes¹²⁴

Action	CCS 2018–2022	Vanuatu HSS 2017–2020
Ensure universal access to quality assured vector control, malaria diagnosis and malaria treatment.	✓	✓
Develop disaster and emergency response plans.	✓	✗
Form a task force to identify health impacts of climate change and ensure these are addressed in national cross-sectoral forums and programmes.	✗	✓
Build resilience to climate change within the health system through adaptation projects.	✓	✗
Build capacities in responding to and mitigating public health threats and risks posed by humanitarian emergencies and disasters by strengthening the capacity to respond to emerging diseases and public health events.	✓	✗
Form a task force to identify health impacts of climate change and ensure these are addressed in national cross-sectoral forums and programmes.	✗	✓

Table 5.31 Key sources of climate financing for the health sector¹²⁵

Financing instruments	GoV should primarily access grant financing, but for projects that have indirect health outcomes, such as strengthening flood management, concessional loan financing could be accessed on a case-by-case basis.
Financing sources	Financing sources for direct health-related projects will include the GCF, GEF (LDCF), and UN agencies (WHO, UNDP). For indirect health-related projects, the sources of financing will be varied as outlined in sectoral assessments in this document.

In addition, Table 5.31 details the key sources of financing for the health sector in Vanuatu.

5.10.3 Data utilisation and application

At present, the use of SRS data in Vanuatu for the health sector is limited. Recently, some telemedicine activities were conducted in remote islands (i.e. Maewo) through the Vanuatu Inter-Island Telemedicine and Learning (VITAL) Network Project – but this project did not have a climate change focus.¹²⁶

SRS-based data can be used in a cost-effective manner to monitor weather, climate, environmental and anthropogenic factors that influence the spread of VBDs in Vanuatu, including malaria, dengue fever and lymphatic filariasis. As VBDs are linked to climate and environment, this knowledge,

developed using remotely sensed data, could be used to help decision-makers better allocate limited resources in the fight against VBDs.¹²⁷

Vulnerability assessments should first be undertaken to understand current disease control measures, problems related to resistance developed by the mosquitoes, and socioeconomic factors, such as migration of population. Informed by the vulnerability assessment, satellite monitoring can be used to monitor in real time the risks of disease transmission based on climate and environmental factors, including increase in precipitation or in temperature.¹²⁸ Therefore, this

¹²⁴ Author's own analysis.

¹²⁵ Ibid.

¹²⁶ ITU (2016), Vanuatu Inter-Island Telemedicine and Learning (VITAL) Network Project, available at: <https://www.itu.int/net4/wsis/archive/stocktaking/Project/Details?projectId=1486967327>

¹²⁷ Ceccato, P, B Ramirez, T Manyangadze, P Gwakisa and M Thomson (2018), 'Data and tools to integrate climate and environmental information into public health', *Infectious Diseases of Poverty*, available at: <https://idpjournal.biomedcentral.com/articles/10.1186/s40249-018-0501-9>

¹²⁸ Ford, T, R Colwell, J Rose, S Morse, D Rogers and T Yates (2009), 'Using Satellite Images of Environmental Changes to Predict Infectious Disease Outbreaks', *Emerging Infectious Diseases* Vol 15 No 9, 1341-1346, available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2819876/>

can be used as an early warning system for reducing the risk of VBDs.¹²⁹ Once control measures are in place and projects are under implementation, satellite data can be used to assess the efficacy of the intervention.

SRS data can also be used to understand the exposure of communities, and associated health infrastructure, to climate change hazards. SRS data could be used to monitor urban and peri-urban growth, and, in concert with hazard mapping (e.g.

flood hazard and coastal hazard maps), be used to determine the climate change risk for particular communities and inform suitable locations for clinics and hospitals. Given that health outcomes are also driven by reducing climate change risk in the other key sectors, including agriculture, infrastructure and water, the use of satellite monitoring in these sectors could also lead to improved health outcomes.

129 Rogers, D, S Randolph, R Snow and S Hay (2011), 'Satellite imagery in the study and forecast of malaria', *Nature*, 415(6872), 710-715, available at: <https://www.nature.com/articles/415710a>

6. Recommendations for Attracting Climate Finance

While Vanuatu has developed key national planning frameworks and institutional co-ordination mechanisms (as outlined in Chapter 2), and has successfully attracted climate finance to implement sectoral priorities (as outlined in Chapter 3 and Chapter 5), further action is needed to overcome implementation barriers.

The GoV recognises that increased mobilisation of climate finance is needed for achieving its adaptation and mitigation targets. The mobilisation and disbursement climate finance remains a key challenge in Vanuatu due to a lack of scalable, tested and bankable projects capable of attracting investment, and a shortage of trained technical staff capable of developing and delivering a strategic pipeline of projects with appropriate documentation (particularly for multilateral financing sources).¹³⁰

This section outlines the challenges to attracting climate finance and articulates recommendations for addressing these challenges. To attract additional flows of climate finance, and implement the measures outlined in national and sectoral policies, strategies and plans will require improved governance and co-ordination, better utilisation of data, strengthened technical capacity, strong policy and regulatory design and increased private sector engagement.¹³¹

Moreover, the results of this assessment, including the status of plans and strategies, are summarised in Table 6.3 in section 6.8.

6.1 Governance mechanisms

As a cross-cutting challenge, addressing climate change requires strong co-ordination and communication across sectors. Vanuatu has taken a forward-thinking approach with the establishment of strong institutional, policy and regulatory frameworks. GoV has established the Department of Climate Change, under the Ministry of Climate Change, Change Adaptation,

Meteorology, Geo-Hazards, Environment, Energy and Disaster Management (MCCA) and the National Advisory Board for Climate Change and Disaster Risk Reduction (NAB) as the country's national co-ordination mechanism.

To build on Vanuatu's progress, future activities could include:¹³²

- Develop partnerships to formulate proposals and concept notes through establishing a Project Preparation Unit (the support to establish this unit will be funded by GCF Readiness Assistance). This will help to overcome the lack of absorptive capacity to deliver sustainable and long-term impacts and the experience of project 'overload'.
- While the establishment of the NAB has improved co-ordination and governance for climate change and disaster risk reduction, there is a need to develop additional co-ordination mechanisms on the ground. Co-ordination needs to be further strengthened among ministries, local authorities, and also with communities and civil society organisations, the private sector and development partners. In order to achieve these recommendations, climate change focal points and units could be established in the relevant ministries, local government agencies, and at the community level to strengthen co-operation and co-ordination and catalyse climate action.
- The Government developed a Climate Finance Roadmap 2016–2020 (CFR or 'Roadmap') – the GoV should continue to implement the recommendations in the CFR, which is based on the recommendations of the 2016 CCDRR Policy, the NDSP and ongoing consultations with key stakeholders.
- Develop open and transparent climate change decision making and climate governance reporting. In relation to climate change funds, it is particularly important that a transparent

130 GIZ (2018), Vanuatu Climate Change Finance Review.

131 Ibid.

132 Ibid.

selection of project beneficiaries and project implementing agencies is demonstrated.

Moreover, key stakeholders involved in the governance of climate change are described below, and are also listed in Table 6.3 in section 6.8.

6.1.1 Department of Climate Change

The MCCA brings together a number of departments and units. There is a Department of Climate Change under the ministry, which has staff dedicated to implementing climate change-related projects.

Effective information sharing and engagement between the Department of Climate Change and other key stakeholders is crucial for achieving climate change action. The collaboration between the Department of Climate Change and sectoral ministries should include support to access climate finance, sharing climate information that is fit-for-purpose to the specific sector, and ensuring that sectoral activities are contributing to achieving climate change commitments, goals and targets.¹³³

The Department also has a Project Management Unit (PMU), which requires strengthening to ensure it can efficiently and effectively co-ordinate, share information, monitor and evaluate projects and develop project pipelines.

6.1.2 National Advisory Board

The NAB is a key entity for climate change co-ordination in Vanuatu. The NAB is a high-level advisory body, which convenes monthly, and is supported by its Secretariat.

The NAB oversees four working groups, including a Climate Finance Working Group (chaired by the Prime Minister's Office), a UNFCCC Task Force, a Project Screening Committee and an Information, Educational and Communication Materials Working Group. These working groups provide the platform for more technical-based discussion on specific issues related to the work of the NAB.

The NAB's interaction and alignment with other entities, including the Department of Finance and Treasury, Department of Strategic Policy Planning and Aid Coordination (DSPPAC) and line ministries, are integral to its effective functioning. Current challenges exist around the clarification of roles of each of these agencies and the need to streamline

processes to capture the required information and reduce duplication – to strengthen co-ordination and effectiveness it is recommended that the personnel represented on the NAB from agencies are consistent.¹³⁴ Overall, there is a need to position climate change governance processes and institutions as entities that add value, and benefit the broader development agenda.

The NAB provides a case study of good practice for the Pacific region in successfully establishing dedicated processes for co-ordination at the national level.

6.2 Capacity development

Vanuatu continues to be constrained by capacity and technical barriers, and strengthening capacity is a national priority for Vanuatu. A key challenge is the lack of staff to effectively fulfil responsibilities of the Department of Climate Change, NAB and other line ministries.

The following actions are recommended for building technical capacity:¹³⁵

- Capacity building and awareness/advocacy initiatives should be focused and relevant to national, local and community contexts. To overcome systemic capacity challenges, such as poor institutional memory and a high turnover of staff members, GoV should explore options to provide additional incentives for attracting strong expertise and retaining human capacity.
- Staff involved in climate change projects should be provided training, which is linked to a formal professional development strategy. The NAB could provide national training sessions to build knowledge and support line ministries and other key stakeholders with proposal development. The NAB and Department of Climate Change could also engage and draw on technical expertise from different line ministries. This would build technical expertise related to climate change, including best practices for designing, implementing and monitoring projects and programmes, and help with the development of competitive proposals for climate change funds.

133 Ibid.

134 Ibid.

135 Ibid.

- Capacity building should be conducted on the application and utilisation of satellite data. The establishment of an interoperable centralised data storage system for EO and other forms of data would also strengthen planning, access to relevant climate finance and decision-making.
- Capacity development should be provided through long-term in-country initiatives, rather than short-term, ad hoc and piecemeal support. The CCFAH and Global Green Growth Institute models of embedded support should be expanded, including to key line ministries and local government as possible.
- Climate change information should be easily accessible to stakeholders and be presented in a format that is user friendly (e.g. translated into local languages and utilising online resources such as the NAB portal).

At present, a number of development partners are providing support to Vanuatu on overcoming capacity barriers and technical challenges. This includes support from the GCF Readiness and Preparatory Support programme on the accreditation of the Ministry of Finance & Economic Management (MFEM) as a GCF Direct Access Entity.

6.3 Information and data utilisation

A key challenge is a weakness in policies, procedures and guidelines for acquiring, sharing and utilising EO services. Existing procedures are often not harmonised between agencies that need to co-operate, such as national and subnational governments during disasters. Recently developed strategies and plans contain minimal references on the potential use of EO data, either for designing interventions or completing monitoring and evaluation of implementation progress. This could be because these plans and strategies were led by sectoral ministries and central agencies, which at present do not have strong capacity or capabilities in EO data application.

While a number of pilot activities have been undertaken and there are examples of successful EO data utilisation, the benefits and potential of these activities need to be demonstrated to other sectors. There is a greater need for effective, user-friendly and tailored tools to bridge the gap

between departments and officials with a strong understanding of EO data – such as the National Disaster Management Office (NDMO) – and other end users in MCCA and sectoral agencies. Expanding the use of EO data in climate finance projects will be a strong lever for expanding awareness on the benefits of using EO data, strengthening climate action and building support for incorporating the use of EO in sectoral and national plans and strategies.

Undertaking capacity building and training on EO data applications, processing and utilisation are also key priorities. At present, Vanuatu does not have a critical mass of people who can utilise, analyse and interpret SRS/EO data and geospatial information at the country level. Processing geospatial information into a form that can be effectively used for accurate and evidence-based decision making can be very time consuming and errors can easily be made.¹³⁶

Previously, trainings have been undertaken in Vanuatu on the use of SRS and geospatial information. For example, VMGD has received training on the use of data from the Himawari-8, a Japanese meteorological satellite, for monitoring and forecasting severe weather in the region, such as tropical cyclones and heavy rainfall. A national DRR Workshop from CommonSensing was also held, which communicated possible solutions and products to key stakeholders and sought feedback in terms of usefulness and priorities.¹³⁷

Future trainings should be undertaken to build capacity and awareness of all potential users, including central government agencies and sectoral ministries, and could focus on data needs for specific sectors and reporting approaches. In particular, training should be provided to MCCA officials on the capabilities of EO and how it could be utilised for climate change projects. MCCA should also consider hiring a staff member to champion the use of EO data in the design, implementation and M&E of climate change projects and programmes. Capacity building has largely been conducted by development partners and regional

136 UN ESCAP (2018), *Good practices and emerging trends on geospatial technology and information applications for the Sustainable Development Goals in Asia and the Pacific*, available at: https://www.unescap.org/sites/default/files/SAS%20Technical%20Paper%20Reviewed%20%20final_Feb2019.pdf

organisations, and there is also scope for VMGD to undertake trainings for national stakeholders.

Additional recommendations for strengthening the processing and utilisation of EO data include:

- Collecting and maintaining inventory information on communities, buildings, and infrastructure will assist in quantifying the impacts of natural hazards. The location, purpose, value and condition of existing coastal protection assets should also be catalogued. Such information is important for asset maintenance and upgrade programmes, and for decisions on future expenditure.
- Develop a standardised data management system within MCCA to support evidence-based policy making and prioritisation, developing M&E processes and more efficient reporting.¹³⁸
- Clarification on the role of different entities and how each is capturing and sharing data and information will be necessary to inform more aligned and effective information management processes.¹³⁹
- Incorporating data analysis into planning and decision-making processes, and prioritising highly vulnerable communities and individuals with special needs.¹⁴⁰
- Quantitative indicators, such as mandating sex disaggregated data collection across all ministries should also be a priority. Qualitative indicators could include women's representation in consultative processes and assessments to be applied across all three pillars of the NSDP.¹⁴¹
- Data should be stored, maintained and secured centrally as an important resource for Vanuatu. A programme to maintain and update data in the database should be financed, given that assets and populations change over time.
- Where possible, data initiatives should capitalise on existing institutions and technical architecture for knowledge management.

137 UNITAR (2019), 'Common Sensing DRR Workshop (Vanuatu)', available at: <https://www.unitar.org/event/full-catalog/common-sensing-drr-workshop-vanuatu>

138 GIZ (2018), *Vanuatu Climate Change Finance Review*.

139 Ibid.

140 Ibid.

141 Ibid.

6.4 Climate change policies, strategies and plans

As outlined in Chapter 2, the GoV has developed a number of climate change plans and strategic frameworks in recent years, including the NDC 2015, Climate Change and Disaster Risk Reduction Policy 2016–2030, National Policy on Climate Change and Disaster-Induced Displacement 2018, Vanuatu National Environment Policy and Implementation Plan 2016–2030, and the Climate Finance Roadmap 2016–2020.

Over the past decade, Vanuatu has developed and adopted a number of important climate change plans and strategies. Table 6.1 below provides a review of national and sectoral frameworks in relation to best practices, and Table 6.2 outlines the criteria for reviewing climate change components.

In most, but not all, national and sectoral frameworks, climate change is strongly reflected. While significant progress has been made in recent years, the following actions are suggested to strengthen the design, development and implementation of climate change policies, strategies and plans.

- While Vanuatu has developed and endorsed a number of key sectoral and national policies, including the Climate Change and DRR Policy 2016–2030, there remain limited resources and capacity to convert policy into tangible actions on the ground.¹⁴² Therefore, implementing actions to develop capacity, which are outlined in section 6.2, are a priority.
- Vanuatu has made strong progress over the last few years in developing regulations and legislation, which are needed for enabling climate change action and securing private sector investment. Regulatory gaps across sectors should be addressed, and increased resources should be allocated towards enforcement of regulations and standards that are in place.
- Strengthening sectoral strategies and plans to enhance access, delivery and reporting on climate finance. As shown in Table 6.1, the majority of plans and strategic frameworks do not include a costed implementation plan, which results in difficulties mobilising financing and prioritising actions. In addition, some

142 GIZ (2018), *Vanuatu Climate Change Finance Review*.

Table 6.1 Review of plans, strategies and policies¹⁴³

Plan	Climate change component	Defined actions / outcomes	Costed actions / outcomes	Responsibility allocated	M&E framework ¹⁴⁴
National					
Nationally Determined Contribution 2015	Strong	✓	✗	✗	✗
National Sustainable Development Plan 2016–2030	Strong	✓	✗	✗	✓
Climate Change and DRR Policy 2016–2030	Strong	✓	✗	✗	✗
National Policy on Climate Change and Disaster-Induced Displacement 2018	Strong	✓	✗	✓	✗
Vanuatu National Environment Policy and Implementation Plan 2016–2030	Strong	✓	✗	✓	✓
Sectoral					
Vanuatu Infrastructure Strategic Investment Plan 2015–2024	Strong	✓	✓	✓	✓
National Energy Roadmap 2016–2030	Strong	✓	✓	✓	✓
Vanuatu Agriculture Policy 2015–2030	Strong	✓	✗	✓	✗
Water Strategy for Vanuatu 2008–2018	Inadequate	✓	✗	✗	✗
National Biodiversity Strategy and Action Plan 2018–2030	Moderate	✓	✗	✓	✓
National Forest Policy 2013–2023	Strong	✓	✗	✓	✓
National Waste Management and Pollution Control Strategy and Implementation Plan 2016–2020	Inadequate	✓	✓	✓	✓
Health Sector Strategy 2017–2020	Strong	✓	✗	✓	✗

plans and frameworks do not adequately allocate responsibilities and roles, which is particularly important for cross-sectoral actions and initiatives such as the NDC. M&E systems are weak or non-existent in most ministries and agencies, and therefore the CCDRR achievements may not be adequately reported. The current corporate, strategic and business planning processes of different ministries and departments are also inadequate, with many agencies not having

plans. To strengthen these frameworks, sectoral agencies should be supported with developing plans and strategies that are costed, with responsibilities allocated and strong M&E systems established.

¹⁴³ Author's own analysis.

¹⁴⁴ A number of plans include a high-level results framework, but lack indicators and sources of verification. A number of plans also state that a separate monitoring and evaluation framework will be developed to track progress.

Table 6.2 Criteria for reviewing climate change components of planning frameworks

Status	Criteria
Strong	Provides an overview of mitigation/adaptation opportunities and barriers, and includes defined actions/outcomes to address mitigation/adaptation.
Moderate	Provides a limited overview of mitigation/adaptation opportunities and barriers, and/or includes limited actions/outcomes to address mitigation/adaptation.
Inadequate	Provides an inadequate overview of mitigation/adaptation opportunities and barriers, and/or includes inadequate actions/outcomes to address mitigation/adaptation.

- The effectiveness and climate relevance of plans are shown in Table 6.1 – for those plans and strategies which have moderate/inadequate climate change components, a sectoral action plan could be developed to advance climate change actions and measures. It is recommended that MCCA/NAB provide guidance on integrating climate change into sectoral planning frameworks.
- There is a lack of strategic national adaptation planning, particularly in relation to community resilience and health activities. GoV should prioritise the development of the National Adaptation Plan.

Vanuatu is currently accessing finance from the GCF Readiness and Preparatory Support programme to assist with strengthening policy, regulatory and legislative development, implementation and enforcement. This includes promoting opportunities for new public-private partnerships with a particular focus on tourism and agriculture.

6.5 Strengthening financial frameworks

Climate finance flows are not meeting current or future needs, particularly with increasing climate change and natural disaster risks. To overcome these challenges and strengthen access and deployment of climate finance, the following recommendations are suggested:¹⁴⁵

- Vanuatu is accessing a significant amount of funding relevant to climate change objectives as loans and concessional loans. This could be an issue if the Government is accessing loans to implement adaptation activities, noting that Vanuatu's contribution to the global greenhouse gas emissions is negligible.

A related issue is mobilising co-financing available for climate change projects, in particular GCF funded projects. As many of the Accredited Entities to the GCF are multilateral development banks, there is a risk that co-financing will primarily be in the form of loans, which could result in unmanageable debt levels.

- Government must remain flexible and not limit its options on the kind of instruments that it can access for climate change.¹⁴⁶ New or significantly expanded financial instruments and support are needed (including risk mitigation instruments, equity, insurance products and incremental financial support) for implementing, monitoring and enforcing national plans, strategies and policies and engaging the private sector. For example, implementing the energy sector actions in the NERM is estimated to be USD250 million between 2016 and 2030, which will require mobilising international mitigation funding.¹⁴⁷ Vanuatu requires further assistance to design, implement, and capitalise expanded financial instruments and modalities.
- Mobilising private sector investment is a priority, including the identification and development of financing modalities to support private sector uptake of commercial proven measures at scale. In order to implement the climate change measures prioritised in strategies and plans, the private sector will have to provide a significant contribution to reach required investment levels. To engage the private sector, formal arrangements (e.g. public-private partnerships) between government and the private sector should be strengthened.

¹⁴⁶ Ibid.

¹⁴⁷ Government of Vanuatu (2016), Vanuatu National Energy Roadmap.

¹⁴⁵ Ibid.

- Climate finance is often delivered as 'off-budget' aid and is not adequately tracked by GoV financial systems. Tracking adaptation and mitigation measures would be greatly facilitated if budgetary processes were updated so that climate change and environment-related initiatives could be accounted for and tracked in budgetary processes. This could include an online tool or potentially tools developed by development partners – such as the Climate Finance Tracking Prototype for Solomon Islands and Vanuatu developed by the Pacific Community. This tracking tool could also utilise geospatial and remote sensing data to provide enhanced tracking capabilities.
- GoV is receiving support from development partners to overcome financial barriers, including strengthening financial access for rural communities, but long-term support is required given the systemic nature of these challenges. Therefore, the CCFAH technical assistance, with its model of long-term embedded support, will be appropriate and beneficial for the GoV.

Vanuatu is receiving support from development partners to overcome these financial barriers, but long-term support is required given the systemic nature of these challenges. Therefore, the CCFAH technical assistance, with its model of long-term embedded support, will be appropriate and beneficial for GoV.

6.6 Private sector activities

Up until recently, private sector engagement in the climate change space has been minimal in Vanuatu. This is due to a number of challenges, including limited access to finance, the private sector being largely small and medium enterprises, and private sector entities seeing limited return on investment over the short term.

Recent actions have improved the engagement of the private sector within the climate change space in Vanuatu. This includes the launching of the Vanuatu Business Resilience Council (VBRC), and GCF readiness support focused on developing a VBRC Project Preparation Unit and the identification of local business needs. The engagement of the private sector in government processes has also increased, and targeted training

workshops are being provided to local businesses on climate-related best practices.

To further improve the engagement of the private sector within the climate change space in Vanuatu, the following actions are recommended:

- Provide a conducive and enabling commercial environment (including through providing tax incentives and strengthening regulatory frameworks) to make a good business case for adaptation and mitigation projects – this will lead to further mobilisation of private finance.
- Building capacity of the private sector to respond to climate change – e.g. strengthening awareness, knowledge and technical capacity to implement waste-to-energy initiatives.
- Supporting private sector entities to access climate finance through identifying opportunities (and building knowledge of available technologies and market opportunities) and supporting with proposal development/bureaucratic requirements, which would result in reduced transaction costs.¹⁴⁸ Establishing the Project Preparation Unit will support with achieving this recommendation – support is being provided to establish this unit by GCF Readiness Assistance.
- In addition, the development of climate-resilient infrastructure should be prioritised, which will foster market development and strengthen economic connectivity. Land disputes could also impact on potential site development for climate projects, including renewable energy projects, and therefore comprehensive consultation with communities throughout the project design stage and strong safeguards are vital.

6.7 Stakeholder engagement

Strong stakeholder engagement is vital for achieving climate action, and this includes engaging with line ministries, provincial administrations, communities, NGOs and the private sector. To strengthen stakeholder engagement, the following actions are recommended:

¹⁴⁸ GIZ (2018), Vanuatu Climate Change Finance Review.

- Engagement with line ministries in climate change processes is vital for achieving sectoral goals and targets, ensuring climate finance is allocated towards achieving specific sectoral needs, co-financing opportunities are realised and the expertise present in line ministries is effectively utilised in project design and implementation.¹⁴⁹
- Engagement with provincial administrations is required to build capacity and strengthen understanding of climate change financing opportunities and requirements for developing and implementing low-carbon climate-resilient activities.
- Strengthen INGO/NGO and private sector engagement with the NAB or within the NAB's technical working groups, to further the dialogue and exchange of information between the Government and these partners.¹⁵⁰ The Vanuatu Association of NGOs (VANGO) and the Vanuatu Climate Action Network (VCAN) could be key partners.
- It is crucial that the most appropriate organisations are engaged in climate change projects, and this includes the CSOs/NGOs

sectoral expertise, its footprint in the project area and its ability to advocate on behalf of communities and other project beneficiaries.

- Communities have established Community Disaster and Climate Change Committees (CDCCC), which should be engaged as appropriate throughout the planning, policy and project cycle. Community beneficiaries should also be engaged in the design and implementation of climate change projects.
- Vanuatu has made substantial progress in engaging the private sector in recent years, and, as noted above, strengthened engagement of the private sector is crucial for mobilising private sector finance, delivering transformational outcomes at scale, and ensuring sustainable project delivery.

6.8 Summary: Assessment of climate finance by sector

The results of the assessment are summarised in Table 6.3. The criteria used for undertaking this assessment are also described below in Table 6.4 and Table 6.5.

149 Ibid.

150 Ibid.

Table 6.3 Result summary of the climate finance sector specific assessment¹⁵¹

Sector / thematic area	Number of projects	Financing status	Financing priorities based on national plans, policies and commitments	Potential financing instruments	Potential sources of climate finance	SRS data application potential	Past SRS data utilisation	Status of planning institutions ¹⁵²	Key GoV agencies ¹⁵³
Transport	6	Adaptation projects: Satisfactory progress	Low-emissions transport projects	Grant and loan financing	GCF, MDBs, bilateral donors	High	Limited evidence of utilisation	Strong	MIPU, MCCA, NAB
		Mitigation projects: Limited data							
Energy	14	Mitigation projects: Satisfactory progress	Increasing rural access and RE generation, and implementing energy efficiency measures	Grants, concessional loans, equity and guarantees	GCF, GEF, CIF, MDBs, other multilateral agencies (e.g. UNDP, GGGI, IRENA), bilateral donors (e.g. MFAT, DFAT, JICA)	High	Successful utilisation for CF projects	Strong	MCCA, NAB
Forests and land use	5	Mitigation/adaptation projects: Limited progress	Increasing rural access and RE generation, and implementing energy efficiency measures	Grants, REDD+ finance	GCF REDD+ Pilot Programme, GEF, AF, CIF, MDBs, UN agencies (FAO and IFAD), and bilateral donors	High	Successful utilisation for CF projects	Strong	MALFFB, MCCA, NAB
Waste	6	Mitigation/adaptation projects: Limited progress	Reducing waste emissions, strengthening climate resilience of waste systems	Grants, concessional loans	EU/SPREP (Pacwaste), MDBs (ADB & WB), and bilateral donors (e.g. JICA)	Low	Limited evidence of utilisation	Inadequate	MIPU, MCCA, NAB

(Continued)

¹⁵¹ Author's own analysis.¹⁵² In relation to the climate change component of sectoral/thematic plans and strategies (see Table 5.1 for further information).¹⁵³ Key government agencies responsible for implementing climate change projects are listed in this column. The engagement of wider stakeholders will be necessary for achieving improved outcomes in sectors/thematic areas, as outlined in section 5.7. This includes other government agencies (e.g. PMO & MIA), provincial governments, CSOs/NGOs, communities, private sector entities, and development partners.

Table 6.3 Result summary of the climate finance sector specific assessment (*Continued*)

Sector / thematic area	Number of projects	Financing status	Financing priorities based on national plans, policies and commitments	Potential financing instruments	Potential sources of climate finance	SRS data application potential	Past SRS data utilisation	Status of planning institutions ¹⁵²	Key Gov agencies ¹⁵³
Ecosystems and ecosystem services	4	Adaptation projects: Satisfactory progress	Building resilience of inland ecosystems, scaling up of demonstration projects	Grants	GCF, GEF, AF, UNDP, FAO, SPREP, SPC, NGOs (e.g. CI, IUCN), and bilateral donors (e.g. EU, France)	Medium	Limited evidence of utilisation	Moderate	MCCA, NAB
Livelihoods and disaster risk reduction	8	Adaptation projects: Satisfactory progress	Strengthened EWs, improved hydrometeorological forecasting/monitoring, climate-resilient livelihoods	Grants	GCF, GEF, AF, CIF, UNDP, MDBs (e.g. WB, ADB), bilateral donors (e.g. DFAT and MFAT)	High	Successful utilisation for CF projects	Strong	MCCA, MOET, NAB
Resilient infrastructure	9	Adaptation projects: Satisfactory progress	Develop climate-resilient infrastructure and coastal defences, hazard mapping, building code, innovative financing mechanism	Grants, concessional loans	GCF, GEF, AF, CIF, UNDP, MDBs (WB, ADB) and bilateral donors (e.g. DFAT, MFAT and JICA)	High	Limited evidence of utilisation	Strong	MIPU, MCCA, NAB

(Continued)

Table 6.3 Result summary of the climate finance sector specific assessment (Continued)

Sector / thematic area	Number of projects	Financing status	Financing priorities based on national plans, policies and commitments	Potential financing instruments	Potential sources of climate finance	SRS data application potential	Past SRS data utilisation	Status of planning institutions ^{1,5,2}	Key GoV agencies ^{1,5,3}
Agriculture	4	Adaptation projects: Limited data	Climate-resilient crops, scale up climate-resilient practices, implement community extension models	Grants	GCF, GEF, AF, CIF, FAO, UNDP, MDBs (e.g. WB, ADB) and bilateral donors (e.g. MFAT, AFD, USAID)	High	Successful utilisation for CF projects	Strong	MALFFB, MCCA, NAB
Water supply and wastewater	28	Adaptation projects: Limited data	There is limited information on future financing priorities, as the water sector strategy covered 2008–2017	Grants, concessional loans	GCF, GEF, Adaptation Fund, MDBs (ADB, WB), UN agencies (FAO and IFAD), and bilateral donors (JICA, MFAT, DFAT)	High	Successful utilisation for CF projects	Inadequate	MOL, MIPU, MCCA, NAB
Health	1	Adaptation projects: Limited progress	Identify and plan for climate change risks in the health sector, control of water-borne and vector-borne diseases, and develop disaster and emergency response plans	Grants	GCF, GEF, and UN agencies (WHO, UNDP). For indirect health-related projects, the sources of financing will be varied	High	Limited evidence of utilisation	Strong	MoH, MCCA, NAB

Table 6.4 Criteria for assessing SRS data application potential

Status	Criteria
High	Based on current technology and applications, there is a high potential for using satellite data to improve climate change outcomes.
Medium	Based on current technology and applications, there is a moderate potential for using satellite data to improve climate change outcomes.
Low	Based on current technology and applications, there is an inadequate potential for using satellite data to improve climate change outcomes.

Table 6.5 Criteria for assessing the status of planning institutions

Status	Criteria
Strong	Defined actions/outcomes, costed pipeline of projects, responsibility allocated, M&E framework.
Moderate	Contains some but not all of: defined actions/outcomes, costed pipeline of projects, responsibility allocated, M&E framework.
Inadequate	Poorly designed and/or minimal actions/outcomes, costed pipeline of projects, responsibility allocated, M&E framework.

Appendix A: Climate Finance Projects

Table 6.6 Climate change projects (2016–2018)¹⁵⁴

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and eco-system services	Health	Climate Readiness	2016	2017	2018	Total
Green Climate Fund	Adaptation	Climate Information Services for resilient development in Vanuatu							✓						5,327,000	5,327,000	10,654,000
Green Climate Fund	Adaptation	Strategic Frameworks support for Vanuatu through SPREP											✓			137,316	137,316
GEF Least Developed Countries Fund	Adaptation	Building Resilience of Health Systems in Pacific Island LDCs to Climate Change										✓		4,571,076	4,571,076	4,571,076	13,713,227
GEF Least Developed Countries Fund	Adaptation	Protecting Urban Areas Against the Impacts of Climate Change in Vanuatu					✓		✓					10,596,000	10,596,000	10,596,000	31,788,000

(Continued)

154 The source of the data is from the various funding providers websites, and OECD-DAC. The data from OECD-DAC is available here: <https://www.oecd.org/development/stats/climate-change.htm>

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
GEF Least Developed Countries Fund	Adaptation	Increasing Resilience to Climate Change and Natural Hazards					✓		✓					1,655,000	1,655,000	1,655,000	4,965,000
GEF Trust Fund	Mitigation	Barrier Removal for Achieving the National Energy Road Map Targets of Vanuatu (BRANTV)	✓													2,612,771	2,612,771
GEF Trust Fund	Adaptation	Third National Communication and First Biennial Update Report to the UNFCCC											✓		223,000	223,000	446,000
GEF Least Developed Countries Fund	Adaptation	R2R: Integrated Sustainable Land and Coastal Management				✓			✓		✓				4,006,248	4,006,248	8,012,495

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
GEF Trust Fund	Adaptation	Mainstreaming Global Environmental Priorities into National Policies and Programmes											✓	1,077,649	1,077,649		2,155,298
GEF Trust Fund	Cross-cutting	R2R: Testing the Integration of Water, Land, Forest & Coastal Management to Preserve Ecosystem Services, Store Carbon, Improve Climate Resilience and Sustain Livelihoods in Pacific Island Countries				✓			✓	✓	✓			85,714	142,143	142,143	370,000
GEF Least Developed Countries Fund	Adaptation	Adaptation to Climate Change in the Coastal Zone in Vanuatu							✓						9,794,313	9,794,313	19,588,627

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total	
GEF Trust Fund	Cross-cutting	Building National and Regional Capacity to Implement MEAs by Strengthening Planning, and State of Environment Assessment and Reporting in the Pacific Islands											✓		212,500			212,500
GEF Special Climate Change Fund	Adaptation	PACC Country Project: Enhancing resilience of coastal infrastructure and community assets					✓		✓									-
SPREP/BMUM (German Govt.)	Adaptation	Pacific Ecosystem-based Adaptation to Climate Change							✓		✓				450,833	450,833	901,667	901,667

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
SPREP/SPC	Adaptation	Climate and Oceans Support Program in the Pacific							✓		✓				2,980	2,980	5,961
UNDP	Mitigation	Vanuatu Low Emissions Capacity Building Phase II	✓												79,460	335,190	414,650
CIF/ADB	Mitigation	Energy Access Project (Small Hydropower Project)	✓											1,887,500	1,887,500	1,887,500	5,662,500
World Bank	Mitigation	Rural Electrification Project Stage I	✓											783,333	783,333	783,333	2,350,000
CIF/WB	Mitigation	Rural Electrification Project Stage II	✓											2,361,667	2,361,667	2,361,667	7,085,000
World Bank	Adaptation	Pacific Resilience Program Project							✓					550,000	550,000	550,000	1,650,000
World Bank	Mitigation	Energy Sector Development Project	✓											550,000	275,000		825,000

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
World Bank	Adaptation	Mainstreaming Disaster Risk Reduction							✓					546,000			546,000
ADB	Adaptation	Vanuatu Cyclone Pam Disaster Response Project							✓					357,143			357,143
ADB	Mitigation	Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific	✓													32,951	32,951
UNDP	Adaptation	Youth in organic agriculture in Fiji						✓	✓					423,333	423,333	423,333	1,270,000
ADB	Adaptation	Cyclone Pam Road Reconstruction Project		✓										1,909,103			1,909,103
Australian Government	Adaptation	United Nations Development Programme Pacific Sub Regional Centre											✓	100,378			100,378

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	Pacific Risk Resilience Program (PRRP) is Australia's Pacific multi-country disaster risk management programme.												1,057,379			1,057,379
Australian Government	Adaptation	Civil Society Water, Sanitation and Hygiene Fund					✓			✓				453,904			453,904
Australian Government	Adaptation	The Community-based Climate Change Action Grants support community-based adaptation and mitigation activities in developing countries in partnership with non-government organisations.											✓	371			371

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	The Governance for Growth (GfG) programme was established in 2006 as a partnership between the Government of Australia (GoA) and Government of Vanuatu (GoV), with the goal of supporting the GoV to achieve its objectives under the Priorities and Action Agenda 2006–2015, namely to create an educated, healthy and wealthy Vanuatu.											✓	2,941,952			2,941,952

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Cross-cutting	The state of urban infrastructure and services is a major impediment to the sustainable urban development and economic growth in Vanuatu.			✓		✓						✓	6,796,154			6,796,154
Australian Government	Cross-cutting	The Vanuatu Transport Sector Support Program (VTSSP) will be a long-term, 10 to 15 year sector-based programme delivered through a number of phases.		✓			✓							4,431,938			4,431,938

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	On 13 March 2015, Tropical Cyclone Pam struck Vanuatu, affecting 195,000 people and causing damage and losses equivalent to 64% of the island state's GDP.					✓		✓					922,523			922,523
Australian Government	Adaptation	Funding under this investment supports the deployment of 3 Australian Civilian Corps (ACC) specialists to work with the Government of Vanuatu.					✓		✓					122,947			122,947

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
France Ministry of Education, Higher Education and Research	Mitigation	Recherche pour gérer et développer des systèmes de cultures rizicoles pluviaux adaptés aux zones des hautes terres et enjeux régionaux de la sûreté sanitaire des aliments et du développement territorial dans l'océan indien.						✓						235,417			235,417

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
GGGI	Mitigation	Over 2015–2016, GGGI assisted the Government of Vanuatu with strengthening the implementation capacity of the Department of Energy and developing projects that utilise energy as a driver of inclusive green growth and employment in rural communities.	✓											351,659			351,659
Japanese International Co-operation Agency	Adaptation	TC AGGREGATED ACTIVITIES											✓	6,219			6,219

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
NZ Ministry of Foreign Affairs and Trade	Adaptation	Rehabilitated water and sanitation facilities and improved hygiene practices lead to sustainable and equitable access and a healthier and more resilient ni-Vanuatu population.					✓		✓	✓				108,534			108,534
NZ Ministry of Foreign Affairs and Trade	Cross-cutting	Increased economic opportunity and income for ni-Vanuatu farmers and agribusinesses.						✓						723,561			723,561
Swiss Agency for Development and Co-operation	Adaptation	VANUATU, GIZ, LIVELIHOOD REHAB. CYCLONE PAM												248,390			248,390

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
World Bank	Adaptation	Vanuatu Infrastructure Reconstruction And Improvement Project		✓										53,012,881			53,012,881
Australian Government	Adaptation	The Climate and Oceans Support Program in the Pacific (COSPPac) provides support to National Meteorological Services (NMSs).											✓		32,413		32,413
Australian Government	Adaptation	Funding under this investment represents Australia's contribution to RedR Australia to provide emergency assistance to communities devastated by conflict or major natural disasters.													97,619		97,619

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	The United Nations Development Programme (UNDP) Pacific Sub Regional Centre (PSRC) promotes effective and efficient collaboration among UN organisations to support development in the Pacific.											✓		193,971		193,971
Australian Government	Adaptation	Pacific Risk Resilience Program (PRRP) is Australia's Pacific multi-country disaster risk management programme.							✓				✓		328,004		328,004

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total	
Australian Government	Adaptation	The Civil Society Water, Sanitation and Hygiene (WASH) Fund is a global grant programme for civil society organisations to deliver activities that improve access to water, sanitation and hygiene for approximately 1.8 million people across Africa, Asia and the Pacific.			✓					✓			✓		233,477			233,477

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total	
Australian Government	Adaptation	The Governance for Growth (GfG) programme was established in 2006 as a partnership between the Government of Australia (GoA) and Government of Vanuatu (GoV), with the goal of supporting the GoV to achieve its objectives under the Priorities and Action Agenda 2006–2015.											✓		3,641,727	3,641,727		3,641,727
Australian Government	Cross-cutting	The state of urban infrastructure and services is a major impediment to the sustainable urban development and economic growth in Vanuatu.													5,726,599	5,726,599		5,726,599

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total	
Australian Government	Cross-cutting	The Vanuatu Transport Sector Support Program (VTSSP) will be a long-term, 10 to 15 year sector-based programme delivered through a number of phases.		✓											4,432,723			4,432,723
Australian Government	Adaptation	On 13 March 2015, Tropical Cyclone Pam struck Vanuatu, affecting 195,000 people and causing damage and losses equivalent to 64% of the island state's GDP.					✓		✓						93,344			93,344

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	Funding under this investment supports the deployment of 3 Australian Civilian Corps (ACC) specialists to work with the Government of Vanuatu.					✓		✓						264,095		264,095
France Ministry of Education, Higher Education and Research	Mitigation	Recherche pour gérer et développer des systèmes de cultures rizicoles pluviaux adaptés aux zones des hautes terres et enjeux régionaux de la sûreté sanitaire des aliments et du développement territorial dans l'océan indien.						✓							153,452		153,452

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
France Ministry of Foreign Affairs	Adaptation	Volontariat international – ONG basee dans un pays donneur – Vanuatu – 16 volontaires envoye(s).											✓		293,855	293,855	293,855
GGGI	Mitigation	Vu 2 gcf readiness	✓												131,995	131,995	131,995
GGGI	Cross-cutting	Vu 1 – mobilizing finance for green energy projects in vanuatu	✓												730,876	730,876	730,876
Japanese International Co-operation Agency	Adaptation	TC AGGREGATED ACTIVITIES											✓		5,591	5,591	5,591
NZ Ministry of Foreign Affairs and Trade	Cross-cutting	Technical Assistance Support on Geothermal Energy for the Government of Vanuatu.	✓												104,864	104,864	104,864

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
NZ Ministry of Foreign Affairs and Trade	Cross-cutting	The Vanuatu Rural Electrification Programme (VREP) meets an escalating consumer demand for affordable electricity solutions in remote off-grid areas.	✓												3,495,478		3,495,478
NZ Ministry of Foreign Affairs and Trade	Adaptation	Rehabilitated water and sanitation facilities and improved hygiene practices lead to sustainable and equitable access and a healthier and more resilient ni-Vanuatu population.		✓					✓	✓					1,398,191		1,398,191

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total	
NZ Ministry of Foreign Affairs and Trade	Cross-cutting	Increased economic opportunity and income for ni-Vanuatu farmers and agribusinesses.						✓							978,734	978,734		978,734
World Bank	Adaptation	Vanuatu aviation investment project		✓			✓								2,464,543	2,464,543		2,464,543
Australian Government	Adaptation	The United Nations Development Programme (UNDP) Pacific Sub Regional Centre (PSRC) promotes effective and efficient collaboration among UN organisations to support development in the Pacific.											✓			63,255	63,255	63,255

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	The Climate and Oceans Support Program in the Pacific (COSPPac) provides support to National Meteorological Services (NMSs) in Pacific island countries through a group of activities implemented by the Australian Bureau of Meteorology.											✓			24,011	24,011
Australian Government	Adaptation	Pacific Risk Resilience Program (PRRP) is Australia's Pacific multi-country disaster risk management programme.							✓				✓			478,707	478,707

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	The Civil Society Water, Sanitation and Hygiene (WASH) Fund is a global grant program for civil society organisations to deliver activities that improve access to water, sanitation and hygiene for approximately 1.8 million people across Africa, Asia and the Pacific.			✓					✓			✓			29,337	29,337

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	The Governance for Growth (GfG) programme was established in 2006 as a partnership between the Government of Australia (GoA) and Government of Vanuatu (GoV).											✓			701,245	701,245
Australian Government	Cross-cutting	The state of urban infrastructure and services is a major impediment to the sustainable urban development and economic growth in Vanuatu.			✓		✓						✓			3,510,869	3,510,869

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Cross-cutting	The Vanuatu Transport Sector Support Program (VTSSP) will be a long-term, 10 to 15 year sector-based program delivered through a number of phases.		✓			✓									1,899,990	1,899,990
Australian Government	Mitigation	The Pacific Public Administration Governance Initiative is a consolidation of three activities, which is targeted at strengthening Pacific Island Countries (PIC) public administration and financial management systems.														174,488	174,488

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Australian Government	Adaptation	Tropical Cyclone Pam struck Vanuatu, affecting 195,000 people and causing damage and losses equivalent to 64% of the island state's GDP.					✓		✓							303,481	303,481
Austria FM of Sustainability and Tourism	Mitigation	The project is based on the NAMA Rural Electrification in Vanuatu.	✓													1,003,187	1,003,187
Global Affairs Canada	Adaptation	Markets for Change Pacific Islands / Markets for Change Îles Pacifiques											✓			904,636	904,636

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
European Development Fund	Adaptation	As per NIP 2014–2020, intervention aims at rural development through support to the value chains of coconut, beef and fruits & vegetables.						✓								29,505,488	29,505,488
France Ministry of Foreign Affairs	Cross-cutting	Fonds Pacifique – P209 – Vanuatu – Avec l'objectif de favoriser le développement durable de la région.											✓			265,549	265,549
France Ministry of Foreign Affairs	Mitigation	Volontariat International – P209 – Vanuatu – ONG Françaises.											✓			189,946	189,946

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
France Ministry of Education, Higher Education and Research	Mitigation	Recherche pour gérer et développer des systèmes de cultures rizicoles pluviaux adaptés aux zones des hautes terres et enjeux régionaux de la sûreté sanitaire des aliments et du développement territorial dans l'océan indien.						✓								240,765	240,765
GGGI	Mitigation	Vanuatu - mobilizing finance for green energy projects in vanuatu	✓													757,806	757,806
Japanese International Co-operation Agency	Adaptation	TC AGGREGATED ACTIVITIES					✓			✓						13,800	13,800

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
NZ Ministry of Foreign Affairs and Trade	Adaptation	Rehabilitated water and sanitation facilities and improved hygiene practices lead to sustainable and equitable access and a healthier and more resilient ni-Vanuatu population.			✓				✓	✓						1,893,642	1,893,642
NZ Ministry of Foreign Affairs and Trade	Cross-cutting	Increased economic opportunity and income for ni-Vanuatu farmers and agribusinesses.						✓								830,105	830,105
The Swedish Research Council	Adaptation	Malaria elimination in Vanuatu.										✓				149,590	149,590

(Continued)

Table 6.6 Climate change projects (2016–2018) (Continued)

Funding Source	Focus	Project Name	Energy generation and access	Transport	Waste	Forests and land-use	Resilient Infrastructure	Agriculture	Livelihoods and DRR	Water	Ecosystems and ecosystem services	Health	Climate Readiness	2016	2017	2018	Total
Swiss Agency for Development and Co-operation	Adaptation	Vanuatu, Giz, Livelihood Rehab. Cyclone Pam					✓			✓						77,299	77,299
Swiss Agency for Development and Co-operation	Adaptation	Vanuatu, Giz, Livelihood Rehab. Cyclone Pam														180,365	180,365
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	Adaptation	Natural solutions to climate change in the Pacific islands region: Implementing ecosystem-based adaptation				✓								278,131	278,131	278,131	834,394
Forest Carbon Partnership Facility	Mitigation	REDD+ readiness and development of the National REDD+ Strategy.			✓								✓	554,545	554,545	554,545	1,663,636
Total		86	14	6	6	4	17	8	23	9	4	2	25	99,700,402	70,053,266	89,922,893	259,676,561

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