Vanuatu

Post-Disaster Needs Assessment

Tropical Cyclone Pam, March 2015

Government of Vanuatu

Government of Vanuatu

Vanuatu Prime Minister's Office
PMB 9053, Port Vila, Vanuatu

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Currency unit = vatu (VT)
VT 108.04 = US$1[1]
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[1] Exchange rate on March 16, 2015 (Reserve Bank of Vanuatu).

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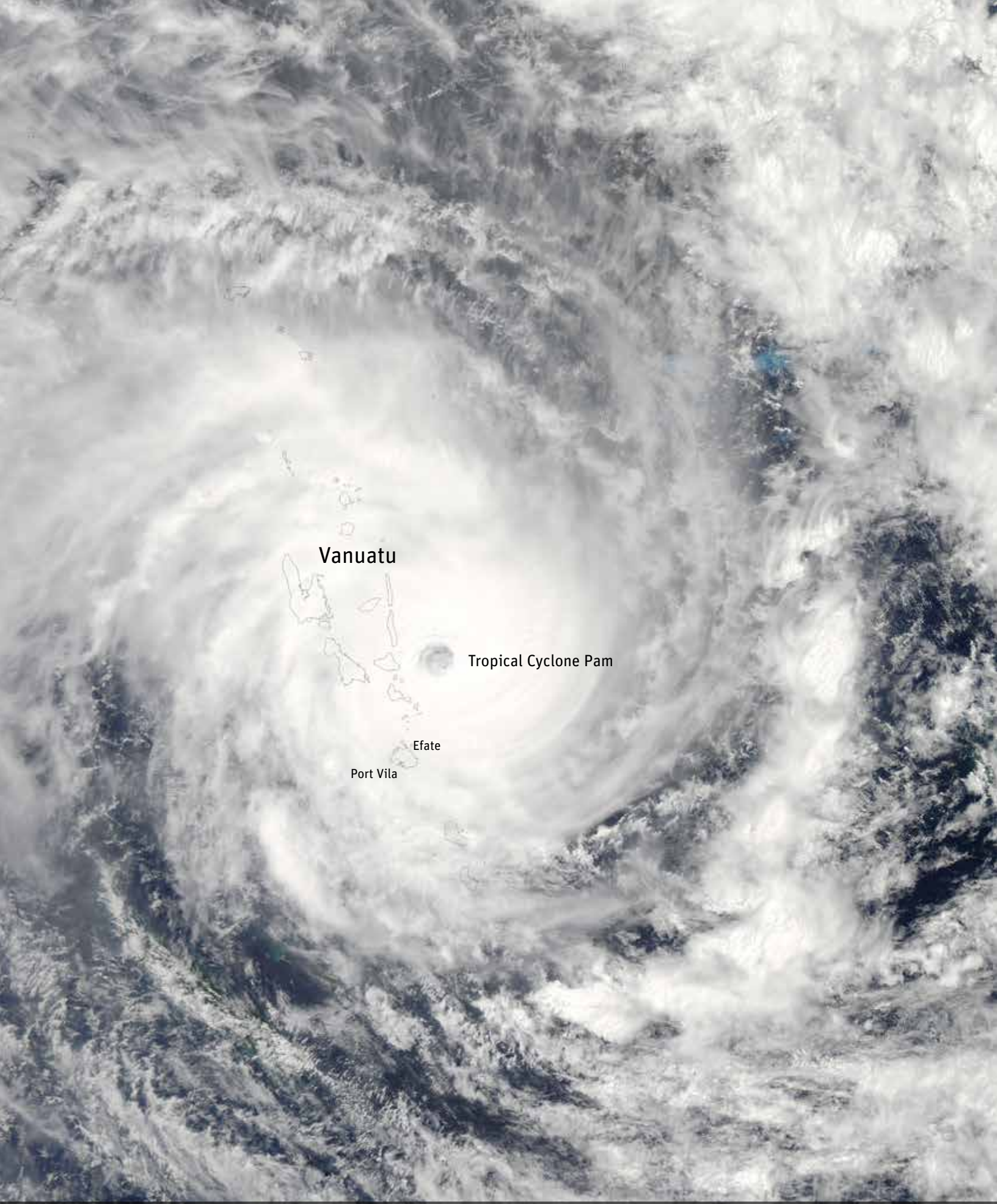

Tropical Cyclone Pam, March 2015. (***Source:*** © NASA/Jeff Schmaltz. Reproduced with permission; further permission required for reuse.)

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Abbreviations and Acronyms

ACTIV	Alternative Communities Trade in Vanuatu
ADB	Asian Development Bank
ADRA	Adventist Development and Relief Agency
AVL	Airport Vanuatu Limited
BBB	Building Back Better
CRI	Corrugated Galvanized Iron
DCIR	Department of Customs and Inland Revenue
DFAT	Australian Department of Foreign Affairs and Trade
DGMWR	Department of Geology, Mines and Water Resources
DLA	Department of Local Authorities
DoE	Department of Energy
DoL	Department of Labour
DRM	Disaster Risk Management
ECCE	Early Childhood Care Education
ELSP	Employment, Livelihoods, and Social Protection
EU	European Union
FHHH	Female-headed households
FSAC	Food Security and Agriculture Cluster
GDP	gross domestic product
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
GIZ	German Agency for Technical Cooperation
ICT	Information Communication Technology
IDA	International Development Association
IFC	International Finance Corporation
IFRC	International Federation of the Red Cross and Red Crescent Societies
ILO	International Labour Organization
IMF	International Monetary Fund
IOM	International Organization for Migration
IUCN	International Union for Conservation of Nature
LPG	liquefied petroleum gas
MALFFB	Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity
MDRR	Mainstreaming Disaster Risk Reduction
MFAT	New Zealand Ministry of Foreign Affairs and Trade
MHEWS	Multi-hazards Early Warning System
MIPU	Ministry of Infrastructure and Public Utilities
MLNR	Ministry of Lands and Natural Resources
MoET	Ministry of Education and Training
MoF	Ministry of Finance
MoH	Ministry of Health
MSME	Micro-, Small, and Medium Enterprises

MTTCNVB	Ministry of Tourism, Trade, Commerce and Ni-Vanuatu Business
NBV	National Bank of Vanuatu
NDMO	National Disaster Management Office
NGO	Nongovernmental Organization
OGCIO	Office of the Government Chief Information Officer
P&M	Ports and Marine Department
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PDNA	Post-Disaster Needs Assessment
PVMC	Port Vila Municipal Council
PWD	Public Works Department
RBV	Reserve Bank of Vanuatu
R4D	Roads for Development
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Program
TRR	Telecommunications and Radio Communications Regulator
UAV	Unmanned Aerial Vehicles
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
URA	Utilities Regulatory Authority
VANWODS	Vanuatu Women Development Scheme
VAT	Value-Added Tax
VCC	Vanuatu Cultural Centre
VCCI	Vanuatu Chamber of Commerce and Industry
VEMIS	Vanuatu Education Management Information System
VMGD	Vanuatu Metrology and Geo-Hazards Department
VNPF	Vanuatu National Provident Fund
VNSO	Vanuatu National Statistics Office
VOIP	Voice over Internet Protocol
VTCWC	Vanuatu Tropical Cyclone Warning Centre
WASH	Water, Sanitation, and Hygiene

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The Government of the Republic of Vanuatu led this Post-Disaster Needs Assessment (PDNA) supported by the European Union, United Nations agencies, the World Bank Group, and other development partners. The extensive and intensive exercise was conducted over three weeks. Without committed and dedicated government officials and development partners, this could not have been achieved.

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Port Vila waterfront in the aftermath of Tropical Cyclone Pam. © Becky Last, Vanuatu Dept. of Tourism.

Executive Summary

Between March 12 and 14, 2015, Tropical Cyclone Pam struck Vanuatu as an extremely destructive Category 5 cyclone, with estimated wind speeds of 250km/h and wind gusts that peaked at around 320km/h. At approximately 11 p.m. local time, the center of the cyclone passed east of Efate Island, which is home to the capital city of Port Vila, and then continued southward, passing just west of Erromango Island and Tanna Island.

Between March 12 and 14, 2015, Tropical Cyclone Pam struck Vanuatu as an extremely destructive Category 5 cyclone, with estimated wind speeds of 250km/h and wind gusts that peaked at around 320km/h.

Severe and widespread damage was worst on the larger islands of Tanna, Erromango, and Efate, while there was less damage on the smaller islands of Aneityum, Aniwa, and Futuna in the southern region. Eleven fatalities were subsequently confirmed in Tafea and Shefa Provinces. An estimated 65,000 people were displaced from their homes. Approximately 17,000 buildings were damaged or destroyed, including houses, schools, clinics, and other medical facilities. The tropical cyclone destroyed crops on a large scale and compromised the livelihoods of at least 80% of Vanuatu's rural population.

Summary of Damage and Loss

The total economic value of the effects caused by Tropical Cyclone Pam was estimated to be approximately VT 48.6 billion (US$449.4 million). Of this, VT 29.3 billion (US$270.9 million) is attributable to damage, and VT 19.3 billion (US$178.5 million) is attributable to loss. This is equivalent to 64.1% of the gross domestic product (GDP) in Vanuatu,[2] giving an indication of the scale of impact (see Table 1).[3] Because of data limitations, however, it is likely that these figures underestimate the total impact. Despite highly commendable efforts by the Post-Disaster Needs Assessment team to collect data during the short time frame of this assessment, the team faced difficulties, as in many instances data were either not available or had not yet been processed. Accordingly, this assessment is not a full assessment of total damage and loss, but is rather based on the best available information at the time of writing.

Tropical Cyclone Pam produced different effects across the different economic and social sectors. The sectors that sustained the highest level of damage were the housing sector, which accounts for 32% of the total damage costs, followed by the tourism sector (accounting for 20% of all damage), the education sector (accounting for 13% of all damage), and the transport sector (accounting for 10% of total damage). In contrast, the largest level of economic loss is expected in the agriculture and tourism sectors, which are estimated at 33% and 26% of the total losses respectively. In addition, the environmental sector suffered significant losses to ecosystem services, although these losses are not accounted within the impacts to GDP.

While the destruction of physical assets by the cyclone occurred in March 2015, production losses and associated higher costs of production will linger for some time. The negative impact of the disaster on overall economic conditions in the country will thus be felt for several years to come.

Analysis shows that 69% of the disaster effects fall within private enterprises and individual ownership, while the remaining 31% of effects are within public sector ownership. This breakdown

[2] The 2013 nominal GDP was VT 75.8 billion, according to the Vanuatu National Statistics Office.
[3] All data shown in tables and figures are from the PDNA teams unless otherwise noted.

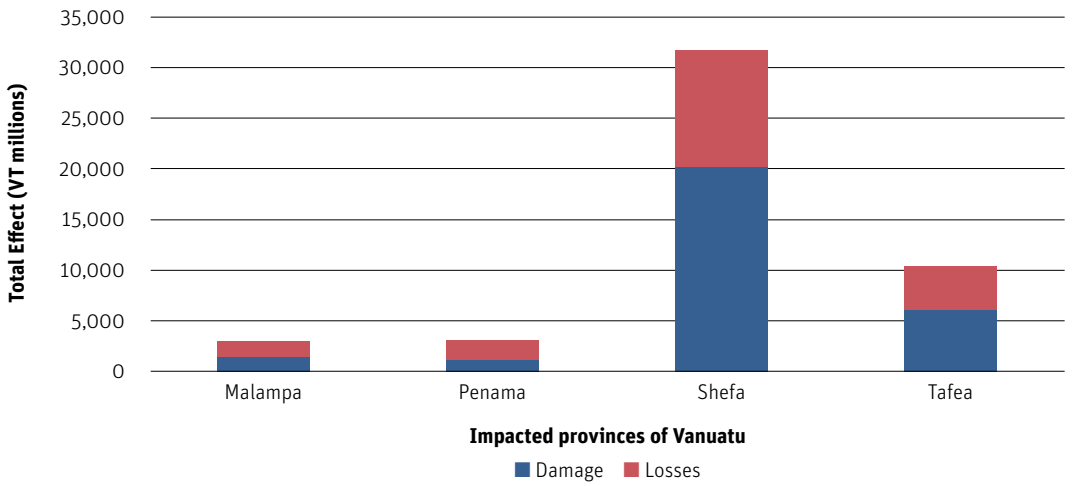
Table 1. Summary of Disaster Effects by Sector

	Disaster Effects (VT millions)			Share of Disaster Effects (%)		Lost Personal Income
	Damage	Losses	Total	Private	Public	VT millions
Productive Sectors	**8,526**	**10,403**	**18,928**	**98**	**2**	**1,607**
Agriculture	1,421	4,641	6,062	93	7	227
Commerce and Industry	1,196	2,152	3,348	100	0	487
Tourism	5,908	3,610	9,518	100	0	983
Social Sectors	**14,339**	**630**	**14,969**	**67**	**33**	**–**
Housing (Private)	9,452	440	9,893	100	0	–
Health	870	107	977	1	99	–
Education	3,908	79	3,987	0	100	–
Culture	109	3	112	100	0	–
Infrastructure Sectors	**6,403**	**2,926**	**9,329**	**51**	**49**	**–**
Transport	3,017	2,137	5,155	43	57	–
Public Buildings	532	12	544	0	100	–
Water	414	284	697	63	37	–
Energy	179	106	285	100	0	–
Communication	2,261	387	2,648	67	33	–
Cross-Cutting Sector	**0**	**5,328**	**5,328**	**0**	**100**	**–**
Environment	0	5,328	5,328	0	100	–
Grand Total	**29,268**	**19,286**	**48,554**	**69**	**31**	**1,607**

provides guidance on the sharing of responsibilities during recovery and reconstruction. The government is expected not only to take care of the issues that fall within its purview, but also to exercise leadership and guidance in relation to the private sector, with special reference to addressing the post-disaster requirements of the poor and those at risk of impoverishment.

Damage was the greatest in Shefa Province, whereas expected losses are the greatest in Tafea Province. Total damage and losses are estimated at VT 31.9 billion (66% of the total) for Shefa Province, VT 10.3 billion (21%) for Tafea Province, VT 3.0 billion (6%) for Penama Province, and VT 2.9 billion (6%) for Malampa Province (see Figure 1).

Figure 1. Combined Damage and Loss by Province



Summary of Macroeconomic Impact Assessment

The overall macroeconomic impact assessment of Tropical Cyclone Pam includes revised projections for GDP, as well as an updated monetary, fiscal, and balance-of-payments outlook. The effect on GDP has been calculated using the existing baseline forecasts, which have been modified to incorporate the estimated losses and reconstruction needs as identified by each sector. Given that Tropical Cyclone Pam struck during the first quarter of 2015, a large proportion of the losses will be felt this fiscal year, with much of the recovery and some reconstruction activity also due to occur in 2015. The remainder of the reconstruction activities are anticipated to be completed during 2016 and 2017.

The losses resulting from Tropical Cyclone Pam are estimated to reduce GDP growth by 5.5 percentage points relative to the 2015 pre-cyclone forecast, bringing the growth rate down to -0.9% and representing a significant slowdown to the Vanuatu economy in 2015. However, taking into account the effect of recovery and reconstruction, GDP growth in 2015 is estimated to be 1.4%. The positive growth figure reflects the scale of the reconstruction activities expected to take place in 2015 and beyond. Thus the GDP growth rate is expected to accelerate in 2016 and 2017, with the majority of activities anticipated to take place in 2016.

The losses resulting from Tropical Cyclone Pam are estimated to reduce GDP growth by 5.5 percentage points relative to the 2015 pre-cyclone forecast, bringing the growth rate down to -0.9% and representing a significant slowdown to the Vanuatu economy in 2015.

The forecast for inflation in 2015 has been revised upward from 3.1% to 3.6%, reflecting the expected increase in the prices of food and housing materials and increased reconstruction activities, particularly in the short term, as well as the expected increase in liquidity associated with the release of significant payments to Vanuatu National Provident Fund members and monetary easing measures.

It is anticipated that the performance of the balance of payments will be affected by exports declining relative to pre-cyclone levels. This will be somewhat moderated because the provinces that provide the majority of cash crop exports were less affected by the cyclone, while imports are expected to rise due to increased demand for reconstruction materials. Tourism earnings are expected to be dramatically affected, with most major hotels closing their doors for three to six months. Cash grants and aid in kind are anticipated to increase significantly compared to previous years.

There will be a number of impacts on the government's fiscal balance. In order to support reconstruction efforts, value-added tax and duty exemptions were introduced in the hardware and agricultural supplies sector on March 14 for a three-month period. This is expected to support reconstruction efforts to the value of VT 145 million. Additionally, the government has spent VT 242.3 million from its VT 248 million Emergency Relief Fund in supporting the immediate humanitarian response. Furthermore, line ministries have redeployed funds from their 2015 budgets for recovery activities, and these will have to be replenished.

General budget support from the European Union totaling VT 359.6 million, as well as a VT 202.0 million insurance payout from the World Bank, has been released into the recurrent budget for financing recovery-related expenditures. At the same time, grant funding for cyclone recovery operations equivalent to VT 667.4 million has been received from donors. Furthermore, estimates of recovery and reconstruction needs in the public sector will have to be accounted for as additional expenditures for 2015 and beyond.

Men salvaging equipment in Port Vila Following Cyclone Pam. © Becky Last, Vanuatu Dept. of Tourism.

Human and Social Impacts

The cyclone has seriously harmed the livelihoods of over 40,000 households, severely limiting their capacities to generate income and resulting in losses of around VT 1.6 billion in personal income.

Tropical Cyclone Pam affected communities and individuals in a number of ways that will require support, intervention, and monitoring. The cyclone has seriously harmed the livelihoods of over 40,000 households, severely limiting their capacities to generate income and resulting in losses of around VT 1.6 billion in personal income (see Table 1). Tropical Cyclone Pam also extensively damaged or destroyed community infrastructure, disrupting daily life and—at a time when incomes have been lost—requiring extra expenditures to pay for repairs or replacement.

Low-income individuals and those depending on subsistence livelihoods are suffering in the post-disaster period due to reduced incomes and food sources. Among all agricultural households located in disaster-affected provinces, 50% have lost all or part of their crops, and they will require support in the short term to meet minimum needs. The impact on subsistence farming, in which women feature prominently in the division of labor, means that the ability of women to generate income to provide food, nutrition, and other basic needs for their families has significantly decreased. Enabling households to recover their productive and income-generating activities and increasing the resilience of livelihoods to future shocks must be a key component of the reconstruction and recovery process.

The destruction of critical infrastructure has the potential to impact all people, but vulnerable groups in particular. Disaster events can also create new vulnerabilities by impacting employment and livelihood-generating abilities, personal safety, public health and sanitation, household efficiency, and food production. Accordingly, restoration of health facilities, water supply systems, schools, and housing is considered a priority in order to minimize the social and human impacts of Tropical Cyclone Pam.

Summary of Recovery and Reconstruction Needs

Table 2 provides a summary of the estimated costs for recovery and reconstruction. Total recovery and reconstruction is estimated at VT 34.1 billion (US$316 million). Of this amount VT 10.3 billion (US$95 million) is focused over the short-term (12 months to four years).

Table 2. Recovery Needs by Sector

	Recovery Needs (VT million)			Share of Recovery Needs (%)	
	Short-term needs (0-1 years)	Medium- to long-term needs (2-4 years)	Total needs (0-4 years)	Private	Public
Productive Sectors	**4,510**	**1,321**	**5,832**	**79**	**21**
Agriculture	651	1,162	1,813	73	27
Commerce and Industry	2,280		2,280	97	3
Tourism	1,579	159	1,738	60	40
Social Sectors	**1,236**	**18,729**	**19,964**	**53**	**47**
Housing	325	11,931	12,256	86	14
Health	774		774	0	100
Education	100	6,749	6,849	0	100
Culture & Religious Buildings	36	49	85	44	56
Infrastructre Sectors	**3,574**	**2,610**	**6,184**	**13**	**87**
Transport	2,189	1,734	3,923	20	80
Public Buildings	297	295	592	0	100
Water Supply Sanitation	365	571	936	0	100
Energy	3	10	13	100	0
Communications	720		720	0	100
Cross Cutting sector	**38**	**90**	**128**	**0**	**100**
Environment	38	90	128		100
Social and Houshold	**694**	**844**	**1,539**	**30**	**70**
Employment, Household and Community Livelihoods	694	844	1,539	30	70
Disaster Risk Management	**275**	**203**	**478**	**0**	**100**
Disaster Risk Management	275	203	478		100
TOTAL	**10,326**	**23,798**	**34,124**	**48**	**52**

Way Forward

Going forward, there is a need to prioritize the sectors for recovery and reconstruction based on the findings of this Post-Disaster Needs Assessment and the available financial envelope. A criteria-based prioritization of recovery needs across competing intersectoral priorities will be required. The principles of prioritization would include the following:

- Potential for direct and widest humanitarian impact
- Potential to generate sustainable livelihoods
- Inclusive (pro-poor and pro-vulnerable strategies)
- Balance between public and private sector recovery
- Restoration and rebuilding of critical infrastructure and services

The recovery program, while implemented under the government's leadership, is anticipated to work in close and collaborative partnership with the private sector and civil society of the nation as a whole, and should be guided by a detailed recovery framework that incorporates consideration of the following:

- The rehabilitation and financing of the public sector will come from public financing, with the support of the traditional donors of the country. At this stage it is difficult to know the amount of public resources available. Public funding will probably be a mix of grants, credits, loans, and contribution from the budget.
- The rehabilitation and refinancing of the private sector will come from savings, debt, grants, subsidies, or duty waivers. Those who can borrow from banks will be faced with repair bills and diminished income, or have extra working capital needs to fund the reconstruction. While the Reserve Bank of Vanuatu has eased monetary policy and made available short-term facilities, there is still a significant demand for funding to meet the VT 17 billion (US$157) million shortfall on insured damage.
- Taking into account Tropical Cyclone Pam's impacts on the population and all sectors, it should be noted that some groups are more impacted than others by the associated shocks and stresses; these include youth, women in general, women heads of households, and persons living with disabilities. Other sectors and groups are less vulnerable, have more resources at their disposal, and will proceed to self-recover more easily. Therefore, government should consider strategically allocating some of its funds and those of donors to directly assist the more vulnerable groups.
- In a country as vulnerable to natural hazards as Vanuatu, which faces frequent extreme weather events and geohazards, the longer-term reconstruction strategy should recognize the the importance of strenthening resilience of communities and individuals and should seek to enhance existing coping mechanisms. There is a role to be played by the government in ensuring that individuals and communities are provided with necessary technical and social support throughout the reconstruction phase, and that the most vulnerable are targeted.

1 Introduction

Aerial view of storm surge damage and undercutting of the ring road on North Efate. *Source:* © X-craft. Reproduced with permission; further permission required for reuse.

1.1 Disaster Risk Profile of Vanuatu

Vanuatu is considered to be the world's most vulnerable country to natural hazards. This is due to a combination of Vanuatu's exposure to both geophysical and hydrometeorological hazards, and its limited financial and technical capacity to prepare for and respond to the associated risks. Geographically, Vanuatu is located in the Pacific Ring of Fire and at the center of the Pacific cyclone belt. This results in a relatively high frequency of volcanic eruptions, cyclones, earthquakes, tsunamis, storm surges, coastal and river flooding, and landslides. In addition, the country suffers from extreme events associated with climate variability, including sea-level and temperature extremes and droughts (UNU-EHS 2014).

Consequently, Vanuatu is expected to incur, on average, US$48 million per year in losses due to earthquakes and tropical cyclones. In the next 50 years, Vanuatu has a 50% chance of experiencing a loss exceeding US$330 million, and a 10% chance of experiencing a loss exceeding US$540 million.[4]

1.2 Socioeconomic Context of Vanuatu

Vanuatu is expected to incur, on average, US$48 million per year in losses due to earthquakes and tropical cyclones.

Vanuatu is an archipelago of 83 volcanic islands (65 of them inhabited) covering a total area of about 12,200km^2, of which approximately a third is land. Vanuatu's population of approximately 253,000 people is almost evenly distributed among the six administrative provinces: Malampa, Penama, Sanma, Shefa, Tafea, and Torba. An estimated three-quarters of households engage in primarily subsistence livelihoods in rural areas.

Vanuatu faces many of the geographic and structural challenges common to other countries in the Pacific. Remoteness, in conjunction with small size and internal dispersion, imposes additional costs of trade and transportation, and means that domestic markets tend to be too small for industries to benefit from economies of scale. The same factors also push up the cost and complexity of providing public services and fulfilling the basic functions of government.

Despite these challenges, Vanuatu has taken advantage of opportunities to support growth and private sector development in recent years. It has become one of the faster-growing economies in the Pacific region, with growth mainly driven by tourism, construction, and aid inflows. However, Vanuatu remains vulnerable to external shocks (due in part to its narrow economic base) and natural disasters. Moreover, the cost of basic infrastructure services remains relatively high, which adversely affects the environment for doing business and reduces connectivity. While extreme hardship is very rare in Vanuatu, the challenge of ensuring that the benefits of growth are distributed broadly across the population is ongoing. Gross domestic product (GDP) per capita is estimated at around US$3,300, which is below the average for Pacific Island countries.

Because of the high cost structure, low tax revenues, and limited space for additional borrowing, Vanuatu has found it difficult to provide substantial funding for basic public services and infrastructure. However, the government has recently embarked on a new infrastructure development program financed with a mix of development grants and loans. The government's focus on infrastructure investments and better access to basic services should help relax some of the binding constraints to economic growth, while also directly benefitting the population.

[4] The calculation is based on modelling from PCRAFI (2011).

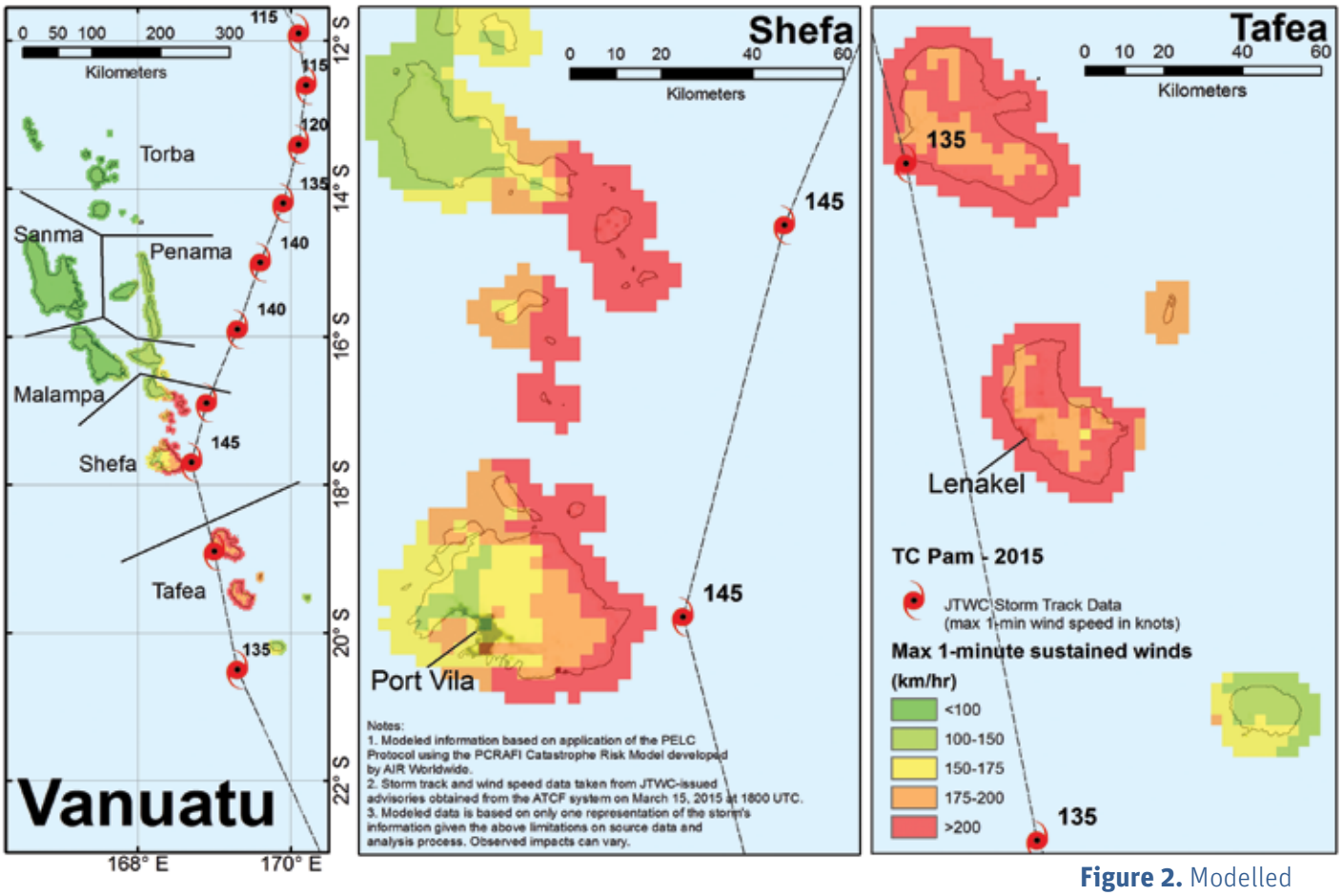


Figure 2. Modelled Maximum Wind Speed from Tropical Cyclone Pam over Vanuatu

Source: Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) event brief April 2015.

1.3 Tropical Cyclone Pam

Between March 12 to 14, 2015, Tropical Cyclone Pam struck 22 islands of Vanuatu as an extremely destructive Category 5 cyclone. The cyclone swept through the southern portion of Vanuatu's islands with estimated wind speeds of 250km/h and wind gusts that peaked at around 320km/h (Figure 2). At approximately 11 p.m. local time, the cyclone's western eyewall passed over the eastern side of Efate Island, which has a population of approximately 66,000 and is home to the capital city of Port Vila. Tropical Cyclone Pam then continued southward, passing just west of Erromango Island and Tanna Island.

Following the cyclone's passage from Vanuatu, there were reports of significant damage. The storm brought down communications systems linking the islands, which hampered initial efforts to obtain a comprehensive understanding of the full scale of the disaster impacts. Eleven fatalities were subsequently confirmed in Tafea and Shefa Provinces. Fifteen thousand buildings were damaged or destroyed, including houses, schools, clinics, and medical facilities. An estimated 65,000 people were displaced and required temporary shelter. The cyclone destroyed crops on a large scale, and compromised the livelihoods of at least 80% of Vanuatu's rural population.

Fifteen thousand buildings were damaged or destroyed ... an estimated 65,000 people are in need of temporary shelter.

Severe and widespread damage was worse on the larger islands of Tanna, Erromango, and Efate than on the smaller islands of Anatom, Aniwa, and Futuna in the southern region. A detailed breakdown of damage and loss by sector, province, and split between public and private ownership is provided in Annex 2 to this Post-Disaster Needs Assessment (PDNA).

Damage to Port Vila waterfront. © Becky Last, Vanuatu Dept. of Tourism.

1.4 Response from the Government and Development Partners

On March 15, in the wake of Tropical Cyclone Pam, the government of Vanuatu officially declared a state of emergency for Shefa Province (which includes Port Vila). On the same day, the president of Vanuatu appealed for international support to respond to the crisis.

The government of Vanuatu has lead and continues to lead response efforts, with the support of the Pacific Humanitarian Team and the Vanuatu Humanitarian Team. Humanitarian partners—including the United Nations, the European Union (EU), international and national nongovernmental organizations (NGOs), international governments, donors, and civil society and other partners—are also supporting the government-led response. In order to obtain a baseline overview of the situation on the ground, reach a common understanding of the scale and severity of the cyclone, and target the response accordingly, the government of Vanuatu undertook a joint Initial Rapid Needs Assessment. The assessment indicated that there was an urgent need for food, water, medical supplies, hygiene kits, kitchen kits, tents, and bedding. Humanitarian agencies are working with the government to develop a single Humanitarian Action Plan that is based on the identified needs of the affected communities.

To assess the impact on key sectors, gain a full understanding of the scale of Tropical Cyclone Pam's economic impact, and assist in mobilizing the resources needed for recovery and reconstruction, the government of Vanuatu requested that a Post-Disaster Needs Assessment be conducted. This PDNA and the Humanitarian Action Plan will form the basis of a Joint Action Plan to be prepared by the government of Vanuatu. The Joint Action Plan will provide a framework to guide the recovery and reconstruction within all the sectors that have been affected by Tropical Cyclone Pam.

1.5 Post-Disaster Needs Assessment Methodology

The assessment methodology is based on the PDNA guidelines (GFDRR 2013). The PDNA is an approach to analyzing disaster effects and disaster impact for the purpose of identifying recovery needs, understood from human, socio-cultural, economic, and environmental perspectives. A unique aspect of the PDNA is that it is led and owned by the government of the affected country with assistance from a multidisciplinary, multiagency team. In this instance, the PDNA team comprised the World Bank, Global Facility for Disaster Reduction and Recovery (GFDRR), United Nations agencies, the European Union, the Secretariat of the Pacific Community, and other relevant stakeholders. The methodology has three main elements: assessment of disaster effects, assessment of disaster impact, and recovery strategy and needs.

1.5.1 Assessment of Disaster Effects

Under the PDNA methodology, assessment of the disaster effects is based on a bottom-up approach; it captures the information about the effects of the event sector by sector and then aggregates the data to arrive at the total effect of the event on the society and the economy. Assessment of disaster effects is based on the quantification of damage and losses.

- *Damage* to infrastructure and physical assets is the quantification of public and private sector infrastructure and assets destroyed in the disaster. Damage includes either total or partial destruction of the assets.

- *Losses* due to disruption of access to goods and services are defined as changes in economic flows and higher costs in production arising from the disaster. They occur until full economic recovery and reconstruction is achieved, in some cases lasting for several years. Typical losses include the decline in output in productive sectors (i.e., agriculture, livestock, fisheries, industry, commerce, and tourism).

The disaster effects also include a qualitative assessment of the increased risks and vulnerabilities resulting from the disaster.

Damage to buildings mapped from X-craft footage. *Source:* Micromappers.

Legend:
- = Fully destroyed
- = Partially damaged
- = Little or no damage

1.5.2 Assessment of Disaster Impact

Within the PDNA methodology, the assessment of the impact of a disaster encompasses the impact on the macroeconomy, employment, livelihoods, and households.

- *Economic impact at the macro level* includes the estimation of the disaster's likely effects on economic performance and the temporary macroeconomic imbalances that may arise from the disaster.
- *Social and household impact* includes the impacts of the disaster on household and community livelihoods, employment, and gender.

1.5.3 Recovery Strategy and Needs

The assessments of disaster effects and disaster impacts collectively assist with the determination of recovery needs under the PDNA methodology, and incorporate the concept of "building back better" (BBB).[5] The identified recovery needs form the basis for determining short-, medium-, and long-term recovery and reconstruction interventions through a recovery strategy. Accordingly, the main goal of a PDNA is to assist governments in assessing the full extent of a disaster's impact on the country and, on the basis of these findings, to produce an actionable and sustainable recovery strategy for mobilizing financial and technical resources.

1.5.4 Specific Context of This PDNA

The geographical context of this PDNA is limited to the provinces of Malampa, Penama, Shefa, and Tafea, the four provinces where Tropical Cyclone Pam's impact was concentrated. Annex 3 provides a map of Vanuatu that clearly shows all provinces.

1.5.5 Limitations of This Rapid Assessment

This assessment was completed 36 days after the cyclone event of March 13. For the first weeks, much of the work focused on humanitarian efforts, cleanup, and restoration of basic services. In parallel, the sector teams completed the significant task of collating the data for this assessment. Despite highly commended efforts by each of the sector teams, data collection in this short time frame competed with other efforts to get Vanuatu operational. In some cases, businesses and services did not have operational premises, could not be contacted, or simply did not have the damage and loss information available. Accordingly, this assessment reports only on the data received at the time of writing and is not a full assessment of total damage and losses. The estimates of damage, losses, and needs may therefore be underestimates. These limitations were acknowledged at the outset by the government of Vanuatu, which agreed that additional work may be required.

[5] Building back better (BBB) is an approach to reconstruction that seeks to reduce vulnerability and improve living conditions, while promoting more effective and sustainable reconstruction. BBB uses the opportunity of having to rebuild to examine the suitability and sustainability of reconstruction activities.

2 Macroeconomic Impact

Damage to structures in Port Vila - including the Ministry of Finance building. © Becky Last, Vanuatu Dept. of Tourism.

2.1 Pre-Disaster Economic Outlook

Before Tropical Cyclone Pam struck on Friday, March 13, 2015, Vanuatu was looking forward to three years of economic growth of over 4.5% per year, following moderate growth of around 2% per year between 2012 and 2014.

In 2014 the economy grew at an estimated rate of 2.3%, driven partly by strong growth in the information and communications sector following the completion of the submarine cable project. The implementation of large construction projects in the public sector continued to contribute to growth, although growth was lower than previously forecast due to delays in some projects. Performance in the tourism sector was mixed; although the number of air arrivals recorded a slight decline, the number of cruise ship arrivals continued to register steady growth. The agriculture sector continued to grow at a moderate pace, reflecting increases in livestock production.

Prior to Tropical Cyclone Pam, it was projected that the economy would show strong growth over the medium term; the forecast was for 4.6% growth in 2015 and 4.7% growth in 2016, slowing slightly to 4.4% in 2017. This was underpinned by the boost in construction and other related activities, resulting from the implementation of key public sector infrastructure projects. Strong growth was also projected in the tourism sector and other related services.

Inflation and Monetary Developments

During 2014 inflation remained comfortably within the 0–4% range targeted by the Reserve Bank of Vanuatu (RBV). In the December quarter of 2014, the Consumer Price Index (CPI) rose by 1.1% over the same quarter of the previous year. Low global prices for fuel and food items had placed downward pressure on imported inflation while domestic inflation remained contained. In light of this situation, the RBV maintained an accommodative monetary policy stance, reducing its rediscount rate from 5.50% to 5.25% in November 2014. Despite these low levels, it was anticipated that CPI inflation would rise to 3.1% in 2015 due to the projected increase in domestic demand and overall economic activity. In the monetary sector, money growth was slower than trend growth levels in the immediate period preceding Tropical Cyclone Pam, although liquidity was high within the banking system.

Balance of Payments

The current account was projected to return to deficit in 2015 with an expanded trade deficit offsetting inflows from tourism earnings and remittances from the Recognised Seasonal Employers scheme.[6] The strong growth projected for imports in 2015 was due to the implementation of major projects, with fuel and other project-related items the main contributing factor. Imports were set to further increase in 2016, thus widening the current account deficit, before slowing in 2017. Exports were projected to be lower in 2015, falling to around 8% of GDP, due to low commodity prices. Tourism earnings and grants were not expected to offset the increase in imports in 2015/16 and 2017.

Fiscal Developments

The government fiscal position improved significantly over the past four years, with sizable fiscal surpluses. The 2015 national budget of VT 18,162.9 million was higher than the 2014 budget by

[6] The Recognised Seasonal Employers scheme is a program in New Zealand that allows a quota of ni-Vanuatu to pick fruit and perform other seasonal agricultural work on a temporary basis.

13.2%. At the time the budget was passed, the fiscal outlook was positive, with sizable operating surpluses forecast to 2017. The government was projected to run a fiscal surplus of VT 613.5 million in 2015, which was going to be used to meet external debt repayments. However, since the budget was passed, the outlook for revenue has considerably worsened due to the anticipated loss in revenue of VT 950 million through the Permanent Residency Scheme.

2.2 Post-Disaster Economic Outlook

The overall macroeconomic impact assessment includes revised projections for GDP, as well as updated fiscal and monetary outlooks.

In order to determine the impact of Tropical Cyclone Pam on GDP, the existing baseline forecasts have been modified to incorporate the estimated losses and reconstruction needs as identified by each sector. Given that the cyclone hit in early 2015, a large proportion of the losses will be felt in the 2015 calendar year, although much of the recovery and some reconstruction activity will also occur in 2015. The remainder of the reconstruction activities are anticipated to be completed during 2016 and 2017.

The losses resulting from Tropical Cyclone Pam are estimated to reduce GDP growth by 5.5 percentage points relative to the 2015 pre-cyclone forecast, bringing the growth rate down to -0.9%. This represents a significant contraction of the Vanuatu economy in 2015, moderated only by the significant effect of the already-planned construction projects on GDP growth.

Recovery and reconstruction, some of which has already commenced, will have a large positive effect on GDP growth in 2015, thus offsetting part of the economic losses. Taking into account the effect of recovery and reconstruction, GDP growth in 2015 is estimated to be 1.4%. This represents a decline of 3.2% compared to the pre–Tropical Cyclone Pam baseline scenario. The positive growth figures for 2015 and beyond reflect the scale of the reconstruction activities under the assumption that all the identified recovery needs are met.

The exact growth rate would depend not only on the availability of financial resources to meet the reconstruction needs, but also on capacity constraints. There is a risk of delays due to skill

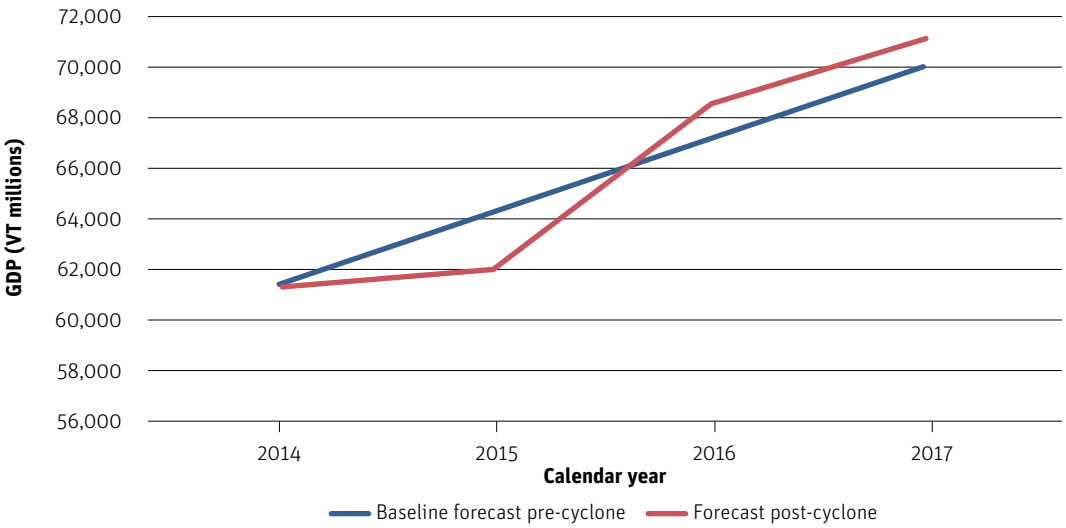
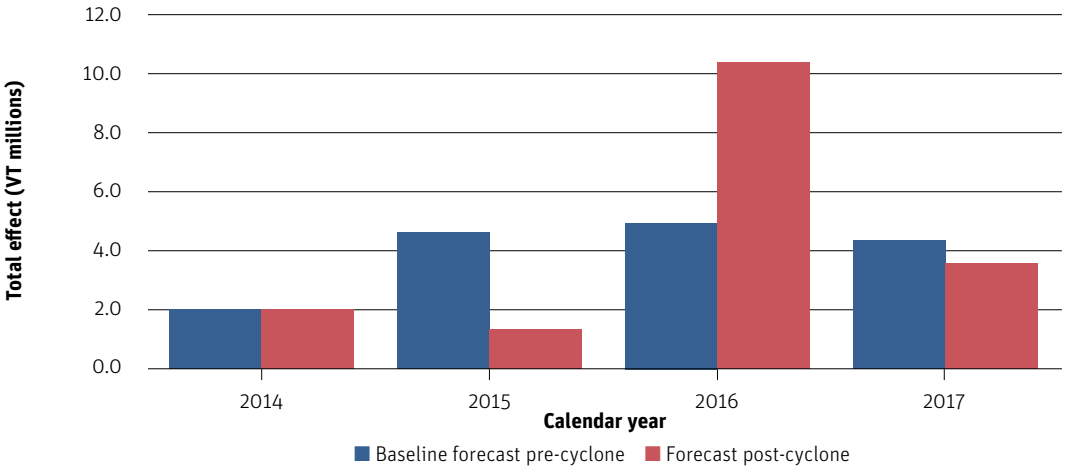


Figure 3. Constant Price of GDP Forecast: Pre- and Post-Tropical Cyclone Pam (VT million)

Sources: Baseline estimate based on Macroeconomic Committee forecast; post-disaster estimate based on data submitted to PDNA team.

Figure 4. Economic Growth: Pre- and Post-Tropical Cyclone Pam

Sources: Baseline estimate based on Macroeconomic Committee forecast; post-disaster estimate based on data submitted to PDNA team.



shortages within the construction sector and uncertainty regarding the availability of locally sourced materials. The reconstruction over the next three years will require the existing capacity constraints to be addressed. It is expected that a large proportion of the reconstruction activity will take place in 2016 and beyond. Thus the GDP growth rate is expected to accelerate to 10.3% in 2016. The outlook for 2017 assumes that reconstruction will continue, resulting in a growth rate of 3.6%, as the reconstruction activities conclude and the economic situation normalizes.

2.3 Inflation and Monetary Developments

As a result of Tropical Cyclone Pam, the forecast for inflation in 2015 has been revised upward, from 3.1% to 3.6%, reflecting the expected increase in the prices of food and housing materials to be used in the reconstruction efforts. There are significant upside risks to the inflation forecast resulting from increased reconstruction activities, particularly in the short term. In addition, the partial release of Vanuatu National Provident Fund (VNPF) funds to members may further increase the risk of inflation.

Following Tropical Cyclone Pam, the RBV undertook further accommodative monetary policy both to support the economy and to provide liquidity support to the banking system. In March 2015, the RBV reduced the statutory reserve deposit requirement, which comprises reserve deposits of commercial banks held as required reserves, from 7% to 5%. The RBV policy rate was reduced from 5.25% and linked to the 91-day RBV note rate, which at the moment of the disaster stood at 1.8%. This change therefore represented a significant reduction in the RBV policy rate.

The RBV also allowed holdings of commercial banks to be part of security for the RBV's Secured Advance Facility, in addition to the commercial banks' holdings of government bonds and RBV notes. This change was taken as part of RBV's response to support banking system liquidity, following the government's decision to allow withdrawal of 20% of member retirement funds in the VNPF as part of the response to Tropical Cyclone Pam; but the move had an impact on banking liquidity. The RBV also activated the Natural Disaster Reconstruction Credit Facility to all businesses for the purpose of rehabilitation and reconstruction following the disaster. This is a low-cost back-to-back lending facility via commercial banks that allows domestic commercial banks to obtain credit from the RBV at a 1% interest rate for the purpose of on-lending to all businesses at a maximum of 5% interest a year. Repayment is for six months and can be rolled over up to five years. The lending window is available until September 30, 2015.

Balance of Payments

It is anticipated that the performance of the balance of payments will be affected in several ways by Tropical Cyclone Pam from 2015 onward. First, exports are now likely to decline relative to the pre-cyclone forecast, as there has been some damage to cash crops, including kava and copra. However, the impact of this is somewhat limited, as many export crops come from the provinces that were less affected by the cyclone. Import of reconstruction materials is now expected to rise to higher levels. Tourism earnings are expected to be dramatically affected, with most major hotels closing their doors for three to six months.

Cash grants and aid in kind are anticipated to increase significantly such that, despite the reduction in tourism earnings and the expanded trade deficit, the impact on the official reserves is expected to be minimal in 2015.

As a result of Tropical Cyclone Pam, the forecast for inflation in 2015 has been revised upward, from 3.1% to 3.6%, reflecting the expected increase in the prices of food and housing materials to be used in the reconstruction efforts.

Fiscal Developments

There will be a number of impacts on the government's fiscal balance. In order to support reconstruction efforts, value-added tax (VAT) and duty exemptions were introduced in the hardware and agricultural supplies sector on March 14 for a three-month period. This is expected to support reconstruction efforts to the value of VT 145 million. Additionally, the government has spent VT 242.3 million from its Emergency Relief Fund of VT 248 million in supporting the immediate humanitarian response. Furthermore, line ministries have redeployed funds from their 2015 budgets for recovery activities, and these will have to be replenished.

General budget support from the EU totaling VT 359.6 million, as well as a VT 202.0 million insurance payout from the World Bank, has been released into the recurrent budget to be used to finance recovery-related expenditures. At the same time, grant funding for cyclone recovery operations equivalent to VT 667.4 million has been received from donors. Furthermore, estimates of recovery and reconstruction needs in the public sector will have to be accounted for as additional expenditures for 2015 and beyond.

Damage and debris in Port Vila. © Becky Last, Vanuatu Dept. of Tourism.

Fiscal position after Cyclone Pam

A fiscal scenario incorporating all currently available, relevant post-cyclone information presents a large forecasted net operating deficit for the GoV of VT 123.7 million in 2015, VT 940.7 million in 2016 and VT 812.0 million in 2017. Including donor financing, the forecasted net operating surplus would amount to a total of VT 18.1 million in 2015, VT 940.7 million in 2016 and VT 812.0 million in 2017.

However, taking into account that the reconstruction efforts will require substantial investment in fixed assets, this fiscal scenario shows an estimated net borrowing (or fiscal deficit) for the GoV of VT 5,548.5 million in 2015, VT 8,090.8 million in 2016 and VT 6,264.9 million in 2017. Considering donor financing, the combined net borrowing (or fiscal deficit) is now estimated at VT 11,296.7 million in 2015, VT 14,918.9 million in 2016 and VT 13,956.0 million in 2017. Amore detailed picture of this fiscal scenario is provided in Annex 4.

Revenues

As of May 2015, Tropical Cyclone Pam had a number of effects on GoV revenues. While negative impacts on revenues manifest themselves in the form of revenues forgone under tax exemptions and losses in revenues due to the cyclone's negative effect on GDP, the GoV also received an insurance pay-out from the Pacific Catastrophe Risk Insurance Pilot and donor grant funding from foreign governments and other organisations for relief operations.

As mentioned above, on 14th of March, the GoV granted VAT and duty exemptions on construction materials and gardening tools, in order to support the country's reconstruction efforts. The revenues thus forgone will however also further aggravate the difficult fiscal and cash flow position of the GoV. These exemptions will stay in place until 12th June, i.e. for a total of 3 months.

The effect of these exemptions on revenues from VAT and duties is hard to determine at this point, as several distinct forces are at play. Firstly, VAT is forgone due to the exemptions. Secondly, imports on both construction tools and gardening materials would be higher than usual after the cyclone due to increased demand for such goods. Thirdly, individuals may have spent money on the purchase of these reconstruction goods that they would have otherwise used to buy other consumption goods that are not currently VAT exempted. Finally, members of the Vanuatu National Provident Fund (VNPF) were authorised to withdraw 20% of their contributions and commercial banks deferred repayments of debt until three months. These measures increased household's disposable income that could have led to higher spending on both reconstruction related materials and consumption goods.

The long-term impact of the cyclone on revenues collected from VAT, duties and other revenues has yet to be estimated. Given the uncertainty surrounding the post-cyclone situation, it is currently too early to produce accurate forward projections.

To date, the GoV has received grants worth VT 473.0 million. These financial resources are specifically intended to fund emergency relief operations and will be used, to the extent possible, to fund minor reconstruction or recovery operations. The GoV also received an insurance pay-out of VT 202.0 million from the Pacific Catastrophe Risk Insurance Pilot (PCRIP) administered by the World Bank.

Expenditures

Due to the cyclone, the GoV has incurred a total of around VT 309.9 million of unexpected expenditures to date, made up both of spending by line agencies and centred through the Declared State of Emergency Budget. In addition, initial costing as part of this PDNA indicates that VT 34.1 billion will be required for recovery and reconstruction.

In the aftermath of the cyclone, the Council of Ministers approved a Declared State of Emergency Budget of VT 248.0 million under the Ministry of Finance and Economic Management (MFEM). This supplementary budget was financed in part through the PCRIP pay-out of VT 202.0 million and the rest was sourced from within the GoV's recurrent budget. As of 6th May 2015, VT 258.3 million had been spent on relief operations. As the cost of these operations are higher than originally anticipated, the GoV had to draw down on the annual budget allocated for emergencies to finance these.

As of 6th May, 2015, spending on emergency relief operations from Ministries' recurrent budgets totalled VT 51.6 million. It is possible that there are further cyclone expenditures that were made by line agencies, which are not reflected in this figures.

Total cyclone related damages and losses have been estimated at VT 29.2 billion and VT 19.3 billion respectively. 69% of these disaster effects fall within private ownership and the remaining 31% of effects are within public ownership. This breakdown provides guidance on the sharing of responsibilities during the reconstruction and recovery process. Furthermore, the recovery and reconstruction needs are estimated at VT 34.1 billion, 52% of which will come under the public domain.

Applying the same reasoning as for post-cyclone GDP forecasts in the PDNA, it is assumed that 30% of these expenditures will be incurred in 2015, 40% in 2016 and 30% in 2017.

Women walk through debris scattered streets in Port Vila following Tropical Cyclone Pam. © Silke Von Brockhousen, UNDP.
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3 Damage, Loss, and Needs by Sector

3.1 Productive Sectors

3.1.1 Agriculture, Livestock, Forestry, and Fisheries

Summary

For the purpose of this PDNA, the agricultural sector is defined to include the crops, livestock, fishery, and forestry subsectors. The sector is dominated by crops, which represented 79% of the agriculture sector contribution to GDP in 2013, significantly higher than livestock (14%), forestry (5%), and fisheries (3%).

Total agriculture sector damage and losses caused by Tropical Cyclone Pam are estimated to be slightly less than VT 6.1 billion. Consistent with its share in sector GDP, the crop subsector was the most affected (69%), followed by forestry (16%), livestock (9%), and fishery (6%) (see Figure 5). Permanent crops, such as kava, banana, coconut, cocoa, and coffee, were the most impacted by the cyclone, but seasonal crops (vegetables) and annual crops (cassava, taro) also suffered important losses. Livestock subsector damage and losses occurred mainly in Shefa and Tafea Provinces, mostly for commercial poultry farms and for pigs and apiculture activities. In the forestry subsector, damage to infrastructure and trees affected the timber industry in Tafea and Shefa. The fishery sector was also affected, with the heaviest impact on artisanal fisheries and commercial aquaculture.

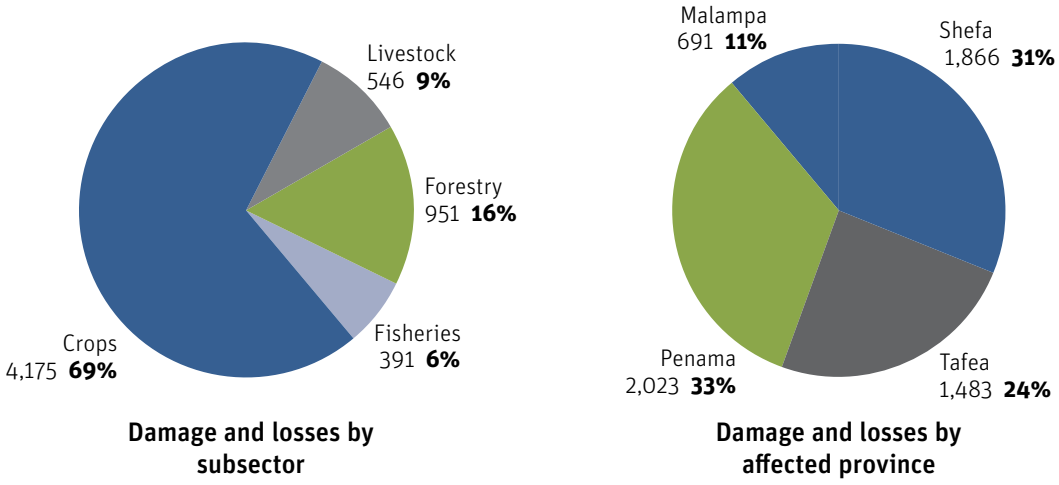
Total agriculture sector damage and losses caused by Tropical Cyclone Pam are estimated to be slightly less than VT6.1 billion.

Agriculture, Livestock, Forestry, and Fisheries Sector Background

The agriculture sector represented approximately 25% of the VT 75.8 billion GDP in 2013. Approximately 80% of Vanuatu's population relies on agriculture (mainly crops, livestock, and fisheries) for livelihood and food and nutrition security, and at least 71% of the rural population derives some income from agricultural activities (VNSO 2013). Vanuatu's agriculture sector is dominated by semi-subsistence farmers using mostly household labor, who are located in tiny village communities spread throughout the archipelago. Food is the most important household expenditure item among rural households, representing 56% of total household expenditure, with the large share of the value of this expenditure being for home consumption among subsistence farmers.[7]

[7] Based on the Vanuatu 2010 Household Income and Expenditure Survey, Vanuatu National Statistic Office, Port Vila, Vanuatu.

Figure 5. Agriculture Damage and Losses by Subsector and Affected Province (VT million)



Crops. Dominant food crops include taro, yam, banana, plantain, peanut, corn, and leafy vegetables. Copra, kava, and cocoa are the major export crops and important sources of cash income for many rural households. Some 80% of semi-subsistence households derive income from copra, while 30% to 40% of households also receive income from cocoa and kava. However, due to logistical constraints associated with the geographical isolation of many islands, rural households find it difficult to access markets for cash crops, particularly in the most remote areas.

Livestock. Most rural households also raise livestock such as chickens (64%), pigs (45%), and cattle (29%) (VNSO 2009). Vanuatu also has commercial poultry, pig farming, and beef industries, and exports premium beef mainly to Japan and other Pacific countries.

Forestry. The forests of Vanuatu occupy around 70% of the country's total land area (about 1.2 million ha.[8]) Forests and forest products play a significant role in supporting ni-Vanuatu livelihoods by providing food, clean water, fuel, medicine, and income.

Fisheries. Subsistence and commercial fisheries and harvest of coastal resources are a mainstay of food security throughout Vanuatu. The fisheries sector (including aquaculture) involves 15,758 households (VNSO 2008). Fish supply for direct consumption was 7,657 tons in 2007, and annual fish consumption is 33.6kg per capita. Nearly all households in coastal villages (32% of all households in Vanuatu) are involved in coastal fishing activities at different levels of intensity. About 6% of households in the country are engaged in fishing activities for sale purposes.

Assessment of Disaster Effects on the Agriculture, Livestock, Forestry, and Fisheries Sector

The loss in production and income has been assessed and estimated for the most affected crops using an initial mapping-based assessment by the World Food Program, with additional refinement from key sector experts.

Description of damage to agriculture, livestock, forestry, and fisheries sector

Crops. The total damage to the crops subsector was assessed at VT 132 million.[9] Most of the damage refers to total or partial destruction to nurseries, driers, and pulperies; damage to agriculture sector public buildings and machinery; and damage to permanent cash crops such as coconut, coffee, and cocoa. Damage in the crops subsector accounts for around 9% of total damage to the sector. Most of the damage occurred in Shefa and Tafea, as Table 3 shows, and reflects damage to agricultural infrastructure.

Livestock. The estimated damage to the livestock subsector was VT 282.7 million, which represents around 20% of total damage to the sector (Table 3). Impacts on the livestock subsector included damage to infrastructure and loss of animals, mostly poultry in Shefa Province and pigs in Tafea, along with damage to fences, chicken sheds, and beehives.

[8] This is based on 1998 data from FAO (2006).

[9] Key parameters for the estimates included the estimated level of the damage (percentage), the average number of plants/trees cultivated for each crop, the expected income or yield, and the farm gate price. A seasonal crop calendar was used in order to cross-reference accuracy of the findings in terms of the magnitude of production losses. The cost for replanting root crops was not considered because most farmers will procure planting material at no cost (from nondamaged crops).

The Port Vila Market, a key location for buying and selling local produce, was closed for many weeks following Tropical Cyclone Pam. © Becky Last, Vanuatu Dept. of Tourism.

Forestry. The estimated damage to the forestry subsector was VT 738 million, which is more than half (52%) the total damage in the agriculture sector. Damage occurred mostly in Tanna and in Shefa Province and includes damage to infrastructure (mainly buildings, sheds, and nurseries) and mature trees, which were uprooted.

Fisheries. For the fisheries subsector, the estimated damage was VT 268 million, which is approximately 19% of total damage in agriculture. Damage in the fisheries subsector includes the destruction of fisheries infrastructure and the loss of fishing equipment, canoes, and a few boats. Half of the damage affected artisanal fisheries activities, and the other half was distributed between commercial fisheries (24%), loss of fisheries infrastructure (17%), community aquaculture (5%), fisheries market facilities (3%), and subsistence fisheries (1%).

Table 3. Damage to Agriculture, Livestock, Forestry, and Fisheries Sector by Subsector and Province (%)

Province	Crops	Livestock	Forestry	Fisheries	Total
Malampa	7	11	9	9	**9**
Penama	9	14	7	4	**8**
Shefa	42	51	41	80	**50**
Tafea	41	24	43	7	**33**
Subsector Share of Damage	9	20	52	19	**100%**
Total Damage (VT 1,000)	**131,596**	**282,752**	**738,318**	**268,253**	**1,420,919**

Description of the losses to the agriculture, livestock, forestry, and fisheries sector

Crops. The estimated loss to the crops subsector was VT 4.0 billion (Table 4). The cyclone caused significant damage to fruit trees (banana, citrus), cash crops (kava, cocoa, copra, and coffee), and food gardens (mostly kumara, cassava, taro, and vegetables). Most of the crop losses are in kava (58%), a crop that is very fragile and vulnerable to strong winds.[10] Losses in plantain (12%) and

[10] Total kava losses were estimated at VT 2.3 billion, which is 6% higher than kava's contribution to GDP in 2013. This estimate appears high, although it is based on conservative assumptions with respect to kava prices and

banana (10%) were also significant. Other crops such as taro, cassava, coconut, and leafy vegetables account for between 2% and 4% of total losses. Although coffee accounts for less than 1% of losses, it is mainly produced in Tafea (Tanna) and is an important contributor to this island's economy.

Livestock. The estimated loss to the livestock subsector was VT 263 million. Production losses will mainly occur in the poultry, pig, and honey sectors. In addition to livestock, farmers reported losses of animal feedstock. Livestock is an important source of income for Shefa and Tafea Provinces, and the loss of animals has a direct economic impact because it means loss of revenue from sales of eggs, pork, and chicken meat as well as offspring (especially weaners and finishers for pigs).

Forestry. The estimated loss to the forestry subsector was VT 212 million, two-thirds of which is due to the heavy losses attributable to sandalwood. Losses of indigenous species (17%) and mahogany trees (6%) were also relatively significant. Forestry losses were concentrated in Tafea and Shefa Provinces.

Fisheries. For fisheries, losses were estimated at VT 122 million. Fishery losses are expected to arise from a reduction in daily catch linked to missing fishing equipment, canoes, and boats and to reduced access to fishing grounds (due to floating debris and sedimentation).

Province	Crop	Livestock	Forestry	Fisheries	Total
Malampa	13	6	5	15	**12**
Penama	46	9	2	5	**41**
Shefa	21	78	17	60	**25**
Tafea	20	7	75	20	**22**
Subsector Share of Losses	87	6	5	3	**100**
Total Losses (VT 1,000)	**4,043,278**	**263,133**	**212,332**	**122,486**	**4,641,229**

Table 4. Share of Losses to Agriculture, Livestock, Forestry, and Fisheries by Subsector and Province (%)

	Damage	Losses	Total Effects
Crops	131,596	4,043,278	4,174,874
Livestock	282,752	263,133	545,884
Forestry	738,318	212,332	950,650
Fishery	268,253	122,486	390,739
Total Agriculture	**1,420,919**	**4,641,229**	**6,062,148**

Table 5. Damage and Losses in the Agriculture, Livestock, Forestry, and Fisheries Sector by Sub-Sector (VT 1,000)

	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	462,697	1,020,125	1,482,822	95%	5%
Penama	715,046	1,150,693	1,865,739	86%	14%
Shefa	132,592	557,923	690,515	92%	8%
Tafea	110,584	1,912,488	2,023,072	99%	1%
Total Agriculture	**1,420,919**	**4,641,229**	**6,062,148**	**93%**	**7%**

Table 6. Damage and Losses in the Agriculture, Livestock, Forestry, and Fisheries Sector by Province (VT 1,000)

yields (5kg yield per kava plant instead of the average of 10kg; and VT 100 per kg of fresh kava instead of the average price of VT 200). However, the estimate appears reasonable if the losses are spread over the three to four years that are needed for the new kava plants to mature. Taking into account the fact that the four provinces affected by Tropical Cyclone Pam represent about 69% of total kava output for the country, the estimated annual losses would amount to 40% to 50% of annual kava output for the four provinces, which is equivalent to 27% to 35% of Vanuatu's annual kava contribution to GDP.

Social impact of damage and losses to the agriculture, livestock, forestry and fisheries sector

It is clear that extensive destruction of food crops has seriously affected households' food security and nutrition. Already 61.8% of ni-Vanuatu eat less than five servings of fruits and vegetable per day as recommended by the World Health Organization.[11] A head of island cabbage, a common and important vegetable in ni-Vanuatu cuisine, rose from VT 100 before the cyclone to VT 300 at the time of this PDNA. The loss of vegetables and fruits, compounded by exorbitant vegetable prices, could place food beyond the means of the most vulnerable households. According to custom, women eat last; with limited availability of food, there are concerns that women, particularly pregnant and lactating women, may not get sufficient nutrition.

Recovery Strategy and Needs in the Agriculture, Livestock, Forestry, and Fisheries Sector

Given the loss of income and major food access issues resulting from Tropical Cyclone Pam, many small farmers are now facing significant hardship. The recovery should focus on facilitating access to good-quality agro-inputs such as seeds and tree seedlings, supporting animal restocking (and possible destocking where pastures and feed are heavily depleted), and rehabilitating damaged infrastructure. This recovery strategy should maintain and strengthen inclusion, and incorporate clear identification and participation of vulnerable groups, with a gender focus where necessary. It should also include nutrition and food security concerns through the medium and longer term.

The total value of recovery needs is estimated at VT 1.8 billion, of which VT 0.6 billion is short-term needs and VT 1.2 billion is medium- to long-term needs.

The recovery and rehabilitation efforts in agriculture primarily aim to support the revival of economic activity across the sector and to strengthen the capacity of the sector to sustain similar shocks in the future. The Food Security and Agriculture Cluster (FSAC) has identified short-, medium- and long-term post-cyclone recovery and reconstruction programs, some of which have been incorporated in the PDNA.[12]

Short-term recovery for the agriculture, livestock, forestry, and fisheries sector

In the short term,[13] immediate attention is to be given to the following: (i) production and distribution of seeds and planting material as well as distribution of tools and equipment for the crops subsector; (ii) distribution of feed and support for stocking and restocking as well as facilitation of access to veterinary products and services for the livestock subsector; (iii) land clearing and sanitation and recycling of byproducts as well as provision of planting material for the forestry subsector; and (iv) supply of primary fishery inputs and equipment, as well as initial repairs of retrievable assets to support the recovery of fisheries activities. Short-term recovery needs are set out in Table 7.

Medium- and long-term reconstruction for the agriculture, livestock, forestry, and fisheries sector

In the medium to long term, the rehabilitation and reconstruction strategy aims to increase the disaster resilience of affected farming, fishing, and natural resource–dependent households, as well as the resilience of private commercial farming enterprises. This strategy seeks to maintain

[11] World Health Organization, "Vanuatu Steps Survey 2011: Fact Sheet," http://www.who.int/chp/steps/2011_Vanuatu_FactSheet.pdf.

[12] Programs identified by FSAC are part of the still-developing Tropical Cyclone Pam recovery and rehabilitation strategy. This strategy is aligned with the government of Vanuatu's Overarching Productive Sector Policy, which is overseen by the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity (MALFFB).

[13] Affected farmers and fishers require initial income support and humanitarian assistance, including food relief, until their farming and fishing livelihoods can be restored. These needs are accounted for in the humanitarian assistance program and are therefore not included in the needs assessment in the agriculture sector.

Table 7. Short-Term Recovery Needs for the Agriculture, Livestock, Forestry, and Fisheries Sector

Subsector	Programs	Amount (VT 1,000)	Responsible Agency
Crops	Crops recovery program	56,564	MALFFB, development partners, NGOs
	Community food security restoration	98,695	
	Seed and planting material	30,600	
	Distribution of tools and equipment	33,050	
Livestock	Support to commercial livestock farmers	50,890	MALFFB, private sector
	Support to animal welfare	96,646	MALFFB, development partners, NGOs
	Livestock feed program	26,400	MALFFB, development partners, NGOs
Forestry	Forest seed, nursery, and rehabilitation	128,724	MALFFB, development partners, NGOs
Fisheries	Fishery equipment repairs and replacement	82,780	MALFFB, development partners, NGOs
Cross-Sector	Improved disaster response and resilience	46,713	MALFFB, development partners, NGOs
Total		**651,062**	

Some VT 460 million in emergency food relief has been distributed to the affected population. This short-term food security need has not been included in the needs for the sector as it has been met through the UN TC Pam Flash Appeal.

Note: MALFFB = Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity.

and strengthen inclusion; it clearly identifies, and encourages participation by, vulnerable groups, with a gender focus where necessary. It also incorporates nutrition and food security concerns through the medium and longer term. This is critical for building resilience, as the vulnerable and marginalized are always hit hardest in recurring natural disasters. When feasible, damaged buildings and infrastructure will be rehabilitated following BBB principles. Table 8 provides an overview of medium- to long-term recovery needs.

Table 8. Medium- to Long-Term Recovery Needs for the Agriculture, Livestock, Forestry, and Fisheries Sector

Subsector	Programs	Amount (VT 1,000)	Responsible Agency
Crops	Food and cash crops long-term recovery and resilience	340,864	MALFFB, development partners, private sector
	Community food security restoration	98,695	MALFFB, development partners, NGOs
	Rehabilitation of damaged infrastructure and assets	64,850	MALFFB, development partners
Livestock	Support to commercial livestock farmers	64,89	MALFFB, development partners, private sector
	Support to animal welfare and resilience	186,645	MALFFB, development partners, private sector
	Rehabilitation of damaged infrastructure and assets	82,460	MALFFB, development partners
Forestry	Forest seed, nursery, and rehabilitation	147,270	MALFFB, development partners, NGOs
	Rehabilitation of damaged infrastructure and assets	50,320	MALFFB, development partners
Fisheries	Rehabilitation of damaged infrastructure and assets	68,804	MALFFB, development partners, NGOs
Cross-sector	Improved disaster response and resilience	122,470	MALFFB, development partners, NGOs
Total		**1,162,378**	

Note: MALFFB = Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity.

Gender considerations for recovery strategy

There is an immediate need to provide seeds for replanting and tools for clearing gardens, as well as a need for extension services to women, who are often sidelined in favor of men and cash crops,

despite being the main providers of agricultural labor. Investments are needed to offer skills capacity training and vocational training for women and so reduce their dependence on subsistence cropping for household income. Investment in the livelihoods of women and men should be equitable, as replacement of men's assets only (e.g., boats) can significantly imbalance the resources available to each gender and thus perpetuate inequality.

3.1.2 Commerce and Industry

Summary

Commerce and industry comprises close to 40% of GDP and is therefore a key sector for Vanuatu. The total damage is estimated at VT 1.2 billion, and the economic losses are estimated at VT 2.2 billion.

Commerce and industry comprises close to 40% of GDP and is therefore a key sector for Vanuatu. Tropical Cyclone Pam damaged the sector's buildings and inputs for production, and it will continue to affect the sector through increased costs of inputs and reduced activity in the economy. The total damage is estimated at VT 1.2 billion, and the economic losses are estimated at VT 2.2 billion, hence the total effect is VT 3.3 billion. The economic cost of recovery is estimated at VT 645 million and reconstruction needs are estimated at VT 1.6 billion, bringing the total recovery cost to VT 2.3 billion.

It is important to note that the figures reported are likely to be underestimated due to the amount of data available for inclusion within this PDNA, which was prepared in a short time frame. The Vanuatu Chamber of Commerce and Industry (VCCI) distributed 497 assessment forms to retail and wholesale businesses, women's groups, other professional services, credit facilities and other businesses in the capital of Port Vila and Tafea that are not engaged in manufacturing, tourism, or communication. Three hundred and ninety-seven firms responded to the post-cyclone survey of businesses survey (May 1, 2015), and some 122 surveys remain outstanding, predominantly in outer Shefa. The data from 397 firms were included in the assessment. There were 1,451 businesses registered across the agriculture, tourism, and commerce sectors as of the end of 2013.

To recover in the short term and facilitate growth, the sector will need funds to cover both rebuilding and economic losses beyond those funds that have already been committed to by proprietors and development partners.

Damage to poultry shade at Chicko Farm, Efate Island in Shefa Province. © Jimmy Rantes, Vanuatu Dept. of Industry.

Commerce and Industry Sector Background

The subsectors that contribute to the commerce and industry sector accounted for 36.3% of GDP (VT 27.7 billion), according to the 2013 National Accounts. The contributions by the subsectors are reported in Table 9 below.

The manufacturing subsector accounted for VT 2.4 billion in 2013, having experienced a reduced share to GDP in both relative and absolute terms since 2010. Cooperative businesses are mostly involved in the retail market and the finance subsector through loans and savings, but some are involved in crop production and fishing. The other subsectors include retail and real estate, among others.

Table 9. Commerce and Industry Contribution to GDP by Subsector, Current Prices (VT 1,000)

Subsector	2011	2012	2013
Manufacturing	2,986,000	2,604,000	2,442,000
Wholesale and Retail Trade and Repair of Motor Vehicles	1,076,000	979,000	989,000
Other Wholesale Trade	1,863,000	2,709,000	2,766,000
Retail Trade	8,094,000	8,806,000	9,101,000
Finance and Insurance	5,011,000	4,842,000	5,464,000
Real Estate	4,438,000	4,928,000	5,096,000
Professional, Scientific, Technical, and Administrative	2,239,000	1,857,000	1,881,000
Total Sector GDP (Excluding Accommodation and Food Services)	25,707,000	26,725,000	27,739,000
Total GDP	**70,873,000**	**72,415,000**	**75,803,000**

Source: VNSO 2013.

Assessment of Disaster Effects on the Commerce and Industry Sector

Description of damage and losses for the commerce and industry sector

Damage to the commerce and industry sector derives mainly from physical and water damage to buildings, furniture, fittings, communication and technology infrastructure, vehicles, storage, and inventory or stock. Losses are primarily attributable to lost revenues, drop in demand, higher operational costs, cleanup costs, and lower productivity due to temporary closures and shorter working hours. Revenue losses resulted from lost sales (i.e., without supplies, there can be no customers), and also from downtime arising from a lack of goods to sell, lack of power and water to operate, or damage to premises and machinery. Additional losses derive from lack of insurance, void insurance, higher prices, additional credit and import reliance, and scarce resources; these cause delays that compound missed sales and increase extra financing costs.

Manufacturing. All 51 firms with industrial permits in 2015 were invited to participate in the assessment carried out by the Department of Industry. Thirty two firms responded, and consequently only their damage is included in the total damage figures for this PDNA. The damage reported in Table 10 is therefore underestimated.

The value of the manufacturing subsector was estimated in the 2013 National Accounts as VT 2.44 billion (current prices), or 3.2% of GDP. The manufacturing firms were not requested to provide their estimated losses in the survey, and thus this information had to be inferred at a macro level. The losses are assumed to reach 1% of GDP. Assuming GDP grew by 3% in 2014, the losses would then amount to VT 773 million. These losses will mainly be due to the shortage of raw materials,

which affects production either through increased costs or (in some cases) through temporary or permanent closure of manufacturing businesses.

Cooperative businesses. Surveys of cooperative businesses were conducted in the most affected provinces of Shefa and Tafea. Damage was estimated at VT 15.7 million for building materials and other assets, while approximately VT 4.3 million was estimated to be lost due to reduced economic activity.

Other businesses. For other subsectors in the commercial sector, the Vanuatu Chamber of Commerce and Industry (VCCI) distributed 397 assessment forms to retail and wholesale businesses, women's groups, other professional services, credit facilities, and other businesses in the capital of Port Vila and Tafea that are not engaged in manufacturing, tourism, or communication. The figures presented in Table 10 incorporate feedback from the 365 businesses who responded. There is a total of the 1,451 registered businesses across all private sector segments that were provided with assessment forms. As such, the figures presented in Table 10 are an underestimation of the total damage and loss. Damage is mostly related to buildings, while losses comprise the expected decreased economic activity over the next period.

Table 10. Quantification of Damage and Losses in the Commerce and Industry Subsectors (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Manufacturing	754,172	774,351	1,528,523	100	0
Cooperative Businesses of All Types	15,703	4,291	19,994	100	0
Other Business Subsectors	426,587	1,373,288	1,799,875	100	0
Sector Total	**1,196,462**	**2,151,930**	**3,348,392**	**100**	**0**

Table 11 below shows the distribution of damage and losses across the affected provinces. As the commercial sector is mainly clustered in the capital, Port Vila, in Shefa Province, most of the damage and expected losses are concentrated there.

Table 11. Quantification of Damage and Losses in Commerce and Industry by Province (VT 1,000)

Province	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	1,800	1,846	3,646	100%	0%
Penama	N/A	N/A	N/A	N/A	N/A
Shefa	1,161,323	2,111,617	3,272,940	100%	0%
Tafea	33,339	38,467	71,806	100%	0%
Sector Total	1,196,462	2,151,930	3,348,392	100%	0%

Note: N/A = not applicable.

Mitigation of disaster effects on commerce and industry by the financial sector

The VNPF, the RBV, commercial banks, and the insurance industry have all acted to minimize the effect of TC Pam on commerce and industry.

Vanuatu National Provident Fund. The government of Vanuatu reacted quickly to the disaster and directed the VNPF to release 20% of superannuation saving to its members, on request, to help them deal with the disaster impacts. This equates to approximately VT 2.2 billion among 21,000 members. As at May 7, 2015, VT 1.467 billion had been drawn down by 17,446 members under this option, which is open until May 29. This money was invested in bank term deposits, and consequently may affect liquidity in the banking system. Fortunately, the VNPF mandated that payments be made to bank accounts and is phasing the payments to the most-affected areas first. The withdrawal of

Damage to North Efate Timber, a factory in Port Vila, Shefa Province. © Lazarus Aising, Vanuatu Dept. of Industry.

these funds from VNPF will affect its planned investments going forward, with low-cost housing and petroleum projects of particular relevance. Accordingly, these withdrawals will impact profitability and distributions for the next 12–24 months. VNPF indicated that its property portfolio was largely undamaged, although like other tourism-related sectors, it will experience diminished revenues.

The Reserve Bank of Vanuatu reacted quickly to ensure that the financial system remained robust by easing of monetary policy to reduce the Statutory Deposit Ratio (SDR) to 5% (from 7%) and the benchmark policy rate to 1.85%. The RBV also announced two facilities to be made available to the commercial banks so they could continue lending to their customers. Both are short-term six-month rolling facilities: the first is a VT 500 million import-export facility at 1.50%, and the second is a VT 500 million disaster facility for six months at 1.50%. Both can be rolled for up to five years and are funded off the RBV balance sheet.

Commercial banks (Westpac, ANZ, Bred, and NBV) are still assessing the impact of the damage on their loan books. The impact for them could come in two ways: (i) damage to collateral; and (ii) customer default due to decreased revenues and money diverted to rebuilding (see the discussion of insurance below). The banks' major customers are largely covered by insurance, although some big businesses are not covered for damage or lost revenue. The impact on smaller customers is not known. The industry has approximately VT4.2 billion in loans to the private and residential sectors. What has been immediately apparent is the need to fund working capital in the medium and longer term. The liquidity in the system is adequate, but the withdrawal of the VNPF money is expected to increase the cost of funds for Bred and NBV in particular. The challenge going forward will be to fund the reconstruction efforts.

Commercial banks reacted by suspending all individuals loans, mortgages, and consumer finance until May 30. This move has provided valuable breathing space to consumers but has hidden from the banks current debt distress. Further, many small businesses are funded from personal loans and mortgages, so there could be an increase in these after May 30.

The insurance industry comprises three insurers (QBE–Domestic General, Dominion–External General, Vancare–Domestic General) and six brokers (Aon, Chartered Pacific, and Poe-ma are domestic; Marsh, Willis NZ, and Arthur J. Gallagher are externally based). QBE has 86% of the domestic market and Lloyds underwrites 3% through brokers. They are licensed and regulated.

The group had reported to the RBV that by May 6, 2015, 620 claims had been received, which translated to an estimated total loss of VT 11.8 billion, all in the private sector. Claims for VT 701.4 million have been settled. Three claims of VT 1.6 million for business continuity are being paid progressively. Normally claims must be submitted within a fixed time period, but due to infrastructure damage the insurers have provided some latitude, so the final numbers should be available by May 30, 2015. Reporting by sector is not yet available, Table 12 was prepared in consultation with industry members.

Table 12. Insurance Claims and Payouts by Category (VT 1,000)

Company / Market Share	Category	Claim Value[a]	Payout Estimate[b]
QBE / 86%	Residential, Personal, Contents	3,565,320	3,303,522
	Commerce & Tourism		
	2 Large Tourism Resorts	5,402,000	5,402,000
	Commerce & Tourism	1,620,600	1,377,510
Other / 14R%	Residential	432,160	367,336
	Commerce & Tourism	756,280	642,838
TOTAL		**11,776,360**	**10,820,206**

a. Sourced from RBV as at May 6, 2015. Allocation from industry discussion. Claims excludes the other one major hotel severely damaged and insured offshore.
b. Payout estimated at 85% of claims by industry.

The tourism survey indicated that 6 of the 38 registered hotels in Port Vila did not have insurance, and that in the rest of Efate less than 50% had insurance. There is no insurance in the Islands, and no insurance in the agriculture sector. A large volume (versus value) of claims relates to the residential sector. There are two big claims in the tourism sector for VT 5 billion. Net of residential, there is approximately only VT 2.2 biliion in insured damage across the rest of tourism and commerce, and this still excludes the other major hotel damaged (i.e., the Port Vila Holiday Inn). It is believed that no insurance or underinsurance is common, with people often electing for high excesses to reduce insurance premiums.

In the next phase, the insurers determine what claims they will settle and for how much. The industry indicates that it is only now starting to assess and pay claims, and companies are expecting to complete 70% of claims by October 2015 and the balance in 2016. The industry indicates that typically 10% will go to litigation before agreement. Insurance generally covers the larger established businesses, though even those business that have insurance may be facing uninsured losses arising from insurance contracts that did not cover a Category 5 cyclone. In addition, only those buildings with a valid engineering certificate are covered. Only a few businesses held business continuity coverage, and damage to fences, ancillary buildings, access roads, and ancillary equipment was generally not covered. Public sector assets (buildings, vehicles, information technology, etc.) are not insured by commercial insurance. To minimize future event impacts, public asset insurance could be a consideration for the government of Vanuatu going forward.

Recovery Strategy and Needs

Private businesses in the commerce and industry sector have been greatly affected by Tropical Cyclone Pam. The economic cost of recovery is estimated at VT 645 million, and reconstruction needs are estimated at VT 1.6 billion,[14] bringing the total recovery cost to VT 2.28 billion. There is need for considerable support to avoid a prolonged reduction in the production capacity of the country. Reconstruction will need to rely on a combination of subsidized loans, commercial finance, insurance, grants, private savings, and duty exemptions. The weight to be given to the respective instruments and their detailed design will be decided by the committee appointed by the government of Vanuatu to devise the economic recovery strategy for the country.

What is clear is that buildings that were constructed to the right cyclone standards survived. Going forward, the government should seek to have inspectors ensure that the industry rebuilds correctly.

Short-term recovery needs for the commerce and industry sector

In addition to access to finance, access to insurance is a concern for the sector. The perceived risk from natural disasters in Vanuatu is likely to have increased after Tropical Cyclone Pam. There are currently no suitable insurance products for micro-, small, and medium (MSME) entreprises, and this was likely an important barrier to investments even before the cyclone. After the cyclone, disaster risk will be a central concern for any business owner considering an investment. This is the case for the commerce and industry sector, but it is equally true for the tourism sector. Given the prospects of increasing extreme weather due to climate change, the Ministry of Tourism, Trade, Commerce and Ni-Vanuatu Business Development (MTTCNVB) considers the absence of microinsurance a key market failure that should be addressed to facilitate private sector growth in all subsectors. A first step would be to study possible designs for insurance products suitable for informal markets in Vanuatu; and a second step, for the longer term, would be to facilitate the establishment of a private microinsurance market in Vanuatu by subsidizing insurance premiums in the first years.

Table 13. Short-Term Recovery Needs for Commerce and Industry

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Commerce and Industry	Repairs and reconstruction of commercial and manufacturing physical assets and economic stimulus	2,245,000[a]	MTTCNVB/RBV/DCIR/ private sector/insurance
	Feasbility study on the establishment of a natural disaster microinsurance market and technical assistance for implementation (also to benefit the tourism sector)	35,000[b]	MTTCNVB/RBV
Total		**2,280,000**	

Note: DCIR = Department of Customs and Inland Revenue.

a. Amount would be financed through a combination of commercial finance, insurance payouts estimated at VT 600 million, grants, private savings, and exemptions. The uninsured portion in debt distress would need subsidized loans.

b. The total reflects the cost of the implementation study (VT 20 million) plus 12 months of technical assistance as based on past donor projects (VT 15 million).

The short-term support identified by the commerce and industry sector should not divert attention from the pursuit of the long-term policy priorities identified by the government for the development of these sectors under the 2010 National Cooperatives Policy, the 2011 National Industrial Policy, and the 2012 Trade Policy Framework and its implementation matrix. In terms of projects, donor

[14] Economic recovery is calculated at 30% of loss. Reconstruction cost is calculated at 1.35% of damage to simulate the costs associated with the BBB principle.

partners should confirm support to priority value chains where Vanuatu has a comparative advantage—mainly those where local manufacturers have the possibility of adding value to Vanuatu's primary goods (e.g., agro-processing). In this respect, the EU could confirm its support of €25 million toward rural development, including priority value chains already identified (coconut, beef, and fruits and vegetables). Australia's strategic refocus of development cooperation on aid for trade could be followed by high-level bilateral discussions to identify and agree upon funding for productive sectors that still lack significant support; cocoa, kava, and coffee value chains would be ideal candidates.

Medium- to Long-term recovery needs for the commerce and industry sector

In terms of longer-term support directly linked to coping with risk from natural disasters, as explained above, there is need for longer-term funding to support the development of an insurance market for small businesses. Such an intervention will be based on the feasibility study proposed below.

Table 14. Medium- to Long-Term Activities and Needs for Commerce and Industry

	Program of Activity	Value (VT 1,000)	Responsible Agency
Commerce and Industry	Support establishment of microinsurance for small businesses	Not available	MTTCNVB/RBV

Note: The feasibility study would establish the initial need for support of the proposed market.

3.1.3 Tourism

Summary

Tourism is a significant contributor to Vanuatu's GDP. Tourism expenditure as a percentage of GDP increased from 26% in 2002 to 33% in 2010.[15] This translates to up to 4,000 direct jobs.[16] Moreover, foreign exchange earnings generated by trade in tourism services represent the major contributor to the surplus observed in the service accounts of the national balance of payment. This surplus almost counterbalances the chronic deficit in the goods account, making the tourism sector key to Vanuatu's macroeconomic stability.[17]

Tourism activities strongly contribute to the observed growth in GDP for the construction sector as well as for the primary sector (for example livestock, fish, fruits and vegetables).[18] As a major contributor to the country's GDP, tourism activities provide significant revenues to the government through VAT and import duties.

[15] Data are from Reserve Bank of Vanuatu, 2012.

[16] See the 2010 Millennium Challenge Account Survey, https://mcavanuatu.gov.vu/MCA%20CONTENTS/MCA%20Environment%20and%20Social%20Assesment/MCA%20Vanuatu%20Tourism%20Survey%20Baseline%20Study.pdf.

[17] See figures of the balance of payment. There is a goods accounts and a surplus in services accounts. Most of the surplus in services is due to tourism. See Vanuatu Government, "Trade Policy Framework," 2012, 8, https://gov.vu/DET001%20Trade%20Policy%20Framework%20-%20Englisha711.pdf?download=45%3Atrade-policy-framework-english-vs.

[18] Construction is largely driven by tourism, with major construction projects, such as the 80-room Ramada Hotel, currently under way in Port Vila. Also, draft findings from an International Finance Corporation (IFC) agriculture study show that locally sourced produce accounts for 38% of overall spend on hotels with restaurants (the rest is imported).

Damage to Port Vila foreshore, including many tourism businesses. © Becky Last, Vanuatu Dept. of Tourism.

Tropical Cyclone Pam has severely affected the tourism sector, with estimated damage of around VT 5.9 billion and estimated losses of VT 3.6 billion for a six-month period. The estimates for damage include VT 5 billion in insurance claims for two major hotels that remain closed, as well as an additional estimate of VT 0.9 billion representing uninsured damage. However, data on one of the remaining hotels, which was severly damaged and closed has not been accounted for, so the damage figure may still be an underestimate.[19]

Tropical Cyclone Pam has severely affected the tourism sector, with estimated damage of around VT 5.9 billion and estimated losses of VT 3.6 billion.

Given that much of the GDP contribution is generated in the peak travel months of March to August, cancellations and loss of future business represent the greatest risks to recovery. Accordingly, the losses have been calculated against a six-month (March-August) projection of pre-cyclone-level business for these months. However, full recovery may take longer than 12 months.

Tourism's greatest challenges stem from the urgent need to reconstruct and reestablish damaged businesses, while complementing reconstruction with marketing funds to restore consumer confidence so that visitors return to the country. The proposed recovery strategy provided as part of this PDNA addresses these key concerns.

[19] For the insurance breakdown, refer to Table 12 in chapter 3.1.2. For the 0.9 billion figure, the average cost of damage per room was calculated from available information, including data collected from accommodation operators post-cyclone and multiplied by the number of rooms damaged in the four major hotels. The losses figure was calculated as loss of revenue for six months.

Aerial view of damaged hotel. *Source:* X-craft. Reproduced with permission; further permission required for reuse.

Tourism Sector Background

Visitor arrivals were at record levels in 2014, with approximately two-thirds of arrivals coming by cruise ship and one-third by air. Over the last five years, cruise ship passenger arrivals have grown at approximately 15% per year. The number of cruise passengers grew to 240,000 in 2013, which translates to 490,000 passenger days, with Australians the main source market (over 90% of passengers) for the cruise ship sector.[20] Cruise ship visitation is in the form of day visits, with Port Vila, Luganville, and Mystery Island hosting 85% of all cruise ship calls to Vanuatu.

Tourism arrivals by air have grown at around 6.8% per year for the last 10 years, which is higher than the global average of around 4%.[21] Limited marketing funds have constrained further arrivals growth, with the Vanuatu Tourism Office's budget of VT 159 million considerably lower than competitors', such as Samoa (VT 310 million) and Fiji (VT 1.3 billion).[22]

Vanuatu source markets are the three short-haul markets of Australia, New Zealand, and New Caledonia. Australia is by far the largest market (60%), followed by New Zealand (13%) and New Caledonia (12%).[23] The average length of stay is eight nights.

Assessment of Disaster Effects on the Tourism Sector

Based on information collected from accommodation and tour operators, it is estimated that Tropical Cyclone Pam has produced damage of around VT 5.9 billion and will lead to losses of VT 3.6 billion over the next six months. Accommodation represents the subsector that has incurred the highest damage and loss (VT 8.4 billion in total). As to the geographical spread, Shefa represents the province most affected by damage and losses to the tourism sector (97% of total effects). The economic impact of these losses is mirrored by a significant social impact, including employment repercussions, especially for female employees.

[20] Data are from Vanuatu's Department of Tourism.

[21] Tourists' reasons for travel include holiday, business, or visits to friends and relatives. Holiday tourists represent 82% of tourists. World Bank data on arrivals trends can be found at http://data.worldbank.org/indicator/ST.INT.ARVL/countries?display=default.

[22] The data are from an IFC analysis.

[23] Data are from VNSO.

Description of damage and losses for the tourism sector

Damage from the cyclone varied from minor repairs to major structural damage to buildings, facilities, and land caused by wind and water. While a small number of operators are functioning in Port Vila, the major operators have closed for a three-month period to assess and repair damage, including major resort operator Warwick Le Lagon. Two of the other major operators are scheduled for longer closure periods, including Holiday Inn (six months) and Iririki Island Resort (nine months). These three resorts are the major brands associated with Vanuatu, and account for around 30% of room stock on Efate. Tour operators were also significantly damaged, with initial reports from the Department of Tourism indicating that 88% of operators reported damage in Shefa. Accommodation and tour operators in Tanna were also considerably damaged by Tropical Cyclone Pam, with only half of the rooms currently operational. Initial anecdotal reports indicate that most of the accommodation and tour subsectors do not have adequate insurance cover to claim on the damage and losses caused by the cyclone. The delay in trade and repairs has both revenue and financial costs. Additional financial costs are incurred by the need for additional credit to carry out repairs that are not covered by insurance.

Table 15. Damage and Loss to the Tourism Sector (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Accommodation	5,630,054	2,780,568	8,410,622	100	0
Tours	278,177	829,033	1,107,210	100	0
Sector Total	**5,908,231**	**3,609,601**	**9,517,832**	**100**	**0**

Table 16. Distribution of Damage and Loss in the Tourism Sector by Province (VT 1,000)

Province	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	1,000	8,630	9,630	100	0
Penama	4,000	20,000	24,000	100	0
Shefa	5,775,898	3,455,426	9,231,324	100	0
Tafea	127,333	31,982	159,315	100	0
Sanma	N/A	93,563	93,563	100	0
Total	**5,908,231**	**3,609,601**	**9,517,832**	**100**	**0**

Note: N/A = not applicable.

Recovery Strategy and Needs

Tourism is a critically important sector of the Vanuatu economy, with significant impacts on GDP and employment. Support is now required to ensure that the sector fully recovers after Tropical Cyclone Pam.

Of all the productive sectors, tourism has the greatest potential for fast recovery. The recovery will require funding allocations to three items:

1. Reestablishment and rebuilding of business operations, done to appropriate standards and with inspections by engineers.
2. Restoration of consumer confidence in the Vanuatu brand
3. Research on microinsurance schemes to increase future resilience

The total estimated cost of recovery needs is around VT 1.7 billion, of which 1.2 billion is reconstruction costs for the next 24 months (Table 17 and Table 18).[24]

Short-term recovery needs for the tourism sector

As part of the effort to rebuild the private sector, reconstruction will need to rely on a combination of subsidized loans, commercial finance, insurance, grants, private savings, and exemptions.

The disaster received widespread coverage in Vanuatu's core markets of Australia, New Zealand, and New Caledonia. A significant new marketing push, to give tourists the signal they can return to Vanuatu for holiday, is critical to getting tourism back on its feet. The marketing budget should increase from its current level of VT 159 million per year—one of the lowest levels of tourism marketing seen among Pacific countries—to VT 318 million per year in 2015/16.[25] This increase in marketing allocation is critical to the recovery and will closely complement the reconstruction effort for businesses. It is important to note that without new influxes of tourists, many Vanuatu tourism businesses will not survive the coming 12- to 18-month period—even if they rebuild and reconstruct.

In addition, the sector requests funding to conduct a professional feasibility study of how to establish insurance for microbusinesses. Suitable insurance will improve the ability of smaller businesses to cope with risk from natural disasters in future.

Table 17. Short-Term Needs for the Tourism Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Reconstructions costs (partly to be financed by low-cost line of credit and partly by the private sector)	1,226,110	Private sector, RBV, commercial banks
Marketing activity	318,000[a]	Vanuatu Tourism Office
Feasibility study on the establishment of a natural disaster microinsurance market and technical assistance for implementation	35,000[b]	MTTCNVB, RBV
Total	**1,579,110**	

a. Tripling of the marketing budget for the next 12 months requires an additional VT 318 million.
b. This item is proposed jointly under the commerce and industry sector and the tourism sector. An additional estimate for the needs for the commerce and industry sector are presented in Chapter 3.1.2.

Medium- to long-term recovery needs for the tourism sector

Over the longer term (between 12 and 24 months), the marketing budget should be doubled for a further commitment of VT 159 million (on top of the existing budget). This is to ensure the credibility and sustainability of the initiatives implemented in the first year.

[24] The calculation multiplies damage by a factor of 1.35 to simulate the costs associated with the BBB principle. Accordingly, the estimated reconstruction cost is VT 1.2 billion. It also discounts the VT 5 billion for the major hotels' damage, as this will be covered by insurance providers.

[25] This figure takes into account the loss of revenue from the Tourism Development Marketing Fund in the coming months. The Vanuatu Tourism Office operating budget is VT 159 million, of which VT 123 million is for campaigns (38 million Tourism Development Marketing Fund and 85 million budgetary funds).

Table 18. Medium- to Long-Term Recovery Needs for the Tourism Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Marketing	12–24 months: 159,000[a]	Vanuatu Tourism Office
Support for establishing microinsurance for small businesses through subsidized insurance premiums for 3 years	Not available[b]	MTTCNVB, RBV
Total	**159,000**	

a. The figure represents the additional funding need to double the current budget for marketing
b. The feasibility study would establish the initial need for support to create the proposed market.

Additional activities for consideration in the proposed recovery strategy are presented below. Although these activities have not been costed, many of them may not require additional funding.

Table 19. Additional Uncosted Activities for Consideration as Part of Recovery Strategy

Program of activity	Activities for consideration
Reconstruction of infrastructure and physical assets and further development	Provide duty exemptions for construction materials for the sector, for a six-month period that reflects realistic timelines for reconstruction.
Resumption of service delivery and access to goods and services	Assist businesses with staff retention measures and training to prevent mass unemployment in the tourism sector and to ensure that experienced, skilled personnel are still available to businesses when they reopen (e.g., employment with cruise ships during reconstruction period). Provide duty exemptions for food imports for the sector, for a six-month period that reflects realistic timelines for recovery of business. Ensure government travel advisory services for key market countries are restored to pre-cyclone levels and are supportive of tourist travel to Vanuatu.
Restoration of marketing, governance, and processes	The Vanuatu Tourism Council should facilitate implementation of the recovery strategy with private sector consultation/representation and implement the governance reform agreed to in the Vanuatu Strategic Tourism Action Plan 2014–2018 (VSTAP) and further detailed in the Vanuatu–New Zealand Partnership arrangement and in the Activity Design Document for the tourism interventions funded by NZAid.
Cross-cutting issues	The government could conduct a review of budget allocation to align support to economic sectors based on their economic significance. The MTTCNVB could work with Ministry of Infrastructure and Public Utilities (MIPU) and businesses to ensure a cohesive approach and alignment between Vanuatu tourism operator minimum standards and MIPU's development of building acts and building codes. MTTCNVB should work with MIPU and the Vanuatu Project Management Unit to implement priority infrastructure projects recommended by the VSTAP. MTTCNVB could work with the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity (MALFFB) to orient regeneration of the agriculture and forestry sector to increase the supply of local produce to the tourism sector. MTTCNVB and MALFFB should ensure that available supplies of natangura (palm fronds) and other natural materials are distributed to damaged tourism areas to support rebuilding and income-generating handicraft activities.

Gender considerations for recovery strategy

There is limited information on the impact of disasters on women engaged in tourism. Although it is assumed that the percentage of women employed in this sector is higher than the national average for all sectors of 40%, less than a third of women in the formal sector are in managerial or supervisory roles. Women are mostly employed as housekeepers and waitresses, while men

tend to hold managerial posts. It is commonly observed that in coping with post-disaster stress, the tourism sector often maintains managerial and ground staff such as gardeners while laying off housekeepers. Thus women's economic opportunities will probably suffer significantly as a result of Tropical Cyclone Pam, as women will most likely be the first to lose their jobs from within the tourism sector.

Recruitment to positions of temporary employment (in debris clearance, solid waste management, and other activities) should prioritize women where feasible, so that their incomes can be augmented until the tourism sector recovers. In the medium- to long-term, women should be trained to perform managerial and supervisory roles.

3.2 Social Sectors

3.2.1 Private Housing

Summary

The passage of Tropical Cyclone Pam through the islands of Vanuatu resulted in damage totaling VT 9.45 billion to over 16,000 houses across a number of provinces.

The passage of Tropical Cyclone Pam through the islands of Vanuatu resulted in damage to over 16,000 houses across a number of provinces. As the cyclone moved slowly, wind damage to houses was extensive; but because it was a relatively dry cyclone within the high wind zone, the potential impacts of water damage were reduced. In summary:

- Over 16,000 houses suffered damage due to high winds from Tropical Cyclone Pam in all four provinces considered within this PDNA.
- There are reports of flood damage to houses in the Torba and Sanma Provinces.
- Displaced populations were still living in evacuation centers in Tafea Province at the time this PDNA was conducted.
- Emergency shelter response by humanitarian agencies was ongoing at the time of this PDNA.
- The self-recovery of affected populations is being supported by the government of Vanuatu and humanitarian agencies, with distribution of tarpaulins, tool kits, and non-food items, including buckets, water containers, blankets, and nails and other building consumables.
- Tropical Cyclone Pam has affected rental stock in informal settlements in peri-urban and urban areas around Port Vila.
- Recovery planning is under way, with the aim of supplementing the existing resilience and coping systems of the ni-Vanuatu people and of assisting them in building back better—by distributing building materials and offering technical assistance to make self-repaired houses more durable and weatherproof.

Housing Sector Background

In terms of Vanuatu's constitution, all land belongs to the indigenous *kastom* (customary) owners and their descendants. The ownership and use rights to land follow customary systems, of which there are a large number, though very few are legally codified. With some exceptions, land allocations to

Damge to Makura Village, Shepard Islands. © Michael Bonte-Grapentin, World Bank Group.

members of the family and clan are patriarchal and in some cases disadvantage women, although both men and women typically can enjoy usufruct (use) rights to land, including for the purposes of a dwelling. On the outer islands, land pressures for residential use are not overly constrained, and settlement patterns have evolved over time and with local knowledge to adapt to extreme weather events. However, tenure in the Greater Port Vila area is more complex. All land within the designated municipal boundary was acquired by the state from the indigenous owners and any freehold owners in the 1980s, and the Department of Lands now formally leases it to individuals for 50–75 years (renewable). According to the 2009 census, some 51% of households in Port Vila, largely the higher-income individuals and households, hold direct long leases. However, the remainder of the population live as "renters" (39%) or with no recognized use rights (10%) in the more than 30 informal settlements within the Port Vila municipal boundary, or within a further number of settlements located in the peri-urban periphery *kastom* lands. Here, some 19% of residents legally rent land through their native or *kastom* procedures; 18% have informal residency agreements with the private land owners; and an unknown percentage reside on (predominantly government/state) land illegally in "squatter" settlements.[26]

Responsibility for housing and related land delivery and infrastructure services is scattered among many different agencies, including the Department of Lands (for formal land registration), the Physical Planning Unit, Ministry of Internal Affairs, MIPU, Port Vila municipality (elected), and Lenakel municipality (appointed), as well as the provincial governments (deconcentrated arms of the central government). Through the Vanuatu Housing Authority, the government provides fully serviced units, but supply has dwindled, and production costs typically are affordable only by

[26] The percentages shown are extrapolations of the 2009 census; there is a dearth of recent official and verifiable data available.

medium- to high-income groups. The Building Act was passed in late 2014, and a draft building code has been prepared by MIPU, but it awaits approval. Other than a draft urban master plan (zoning codes) for Port Vila (which is rather outdated), no planning or building codes are applied in either outer islands or urban settings.

As a result, the emerging housing stock typology[27] in all affected outer-island, peri-urban, and urban settlements[28] can be summarized as follows:

- *Traditional housing (43%)* is constructed from local materials such as thatch, natangura (woven palm fronds), woven cane, or other naturally available material. Key features include a concrete or crushed coral gravel floor; lightweight timber frame with local material wall cladding; roof sheeting made from locally grown material, sometimes with chicken wire covering the thatch (predominantly outer island and peri-urban).

- *Semipermanent housing (30%)* is incrementally constructed from traditional materials that are replaced or supplemented over time with salvaged or secondhand materials. Key features include concrete or crushed coral rock floor, inadequately designed timber-framed walls; natangura grass or corrugated galvanized iron (CGI) roof on nonengineered roof members (predominantly informal settlements or rural communities).

- *Permanent housing (27%)* comprises single- and double-story structures that were likely designed to be comparatively durable. Key features include engineered concrete or timber-framed floor; concrete block or timber-framed walls; and CGI on trussed roof structure or roof tiles.

Assessment of Disaster Effects on Housing Sector

Rapid, cross-sectoral "harmonized provincial assessments" were organized and deployed by the National Disaster Management Office (NDMO) across all affected islands to set the baseline.[29] For the housing sector, data regarding the extent of totally destroyed houses and partially damaged houses[30] were derived from the provincial data and, where possible, verified with other albeit limited sources, including satellite imagery (Copernicus), dedicated footage from unmanned aerial vehicles (UAVs—which covered around 10% of the affected areas) used in crowd-sourced mapping, assessments from NGOs, and firsthand accounts from people who had visited affected areas. Data provided by the harmonized assessment confirmed the expected extent of damage to housing based on the path of the cyclone. However, there was not adequate information at the time of the PDNA to

[27] The typology of the house is dictated by the location, access to markets, materials, and vulnerability of the occupier. On Tanna Island (in Tafea Province), the proximity to the active volcano precludes use of corrugated galvanized iron, so most houses on this island are made from locally available materials such as thatch and woven cane, which allows repairs to be undertaken as required with minimal cost. Housing around Efate is much more developed due to its proximity to the capital, Port Vila. There are a number of informal settlements within the urban and peri-urban area around Port Vila that are generally poorly constructed using recycled materials. Anecdotal evidence indicates there is a relatively significant rental market in these communities, which could be impacted by damage to the housing stock. On the smaller islands of the Shepherd group, most housing is semipermanent, as there is not adequate space for growing and harvesting materials such as natangura. Accordingly, most houses are constructed using timber frames with lightweight cladding and CGI roofing. The affected islands in Penama and Malampa Provinces have a higher percentage of traditional houses, which are constructed using natangura.

[28] The typology of the houses and the distribution through area councils was derived from the 2009 census.

[29] The 2009 National Population Census (VNSO 2009) was used to determine the baseline for populations in each of the affected areas, then extrapolated by the NDMO to approximate 2015 numbers.

[30] For the purpose of this PDNA, houses were assumed to be totally destroyed in cases where there was more than 40% damage. Houses were considered partially damaged if there was less than 40% damage.

Timber frame house being rethatched. © David Womera, World Bank Group.

definitively quantify damage to the various types of construction typology; for this, the 2009 census was used.

Damage to the housing sector

Due to its vulnerability and exposure to high cyclone winds, the housing stock of the Shepherd group was seriously impacted. Although the cyclone travelled closer to Efate and the islands immediately offshore, the damage to the housing sector on these islands, which used more resilient types of construction materials, was less severe. Damage to the informal sectors around Port Vila was widespread (although the early level of self-recovery here is extraordinarily high).

Reports from the more southerly Erromango in Tafea Province indicated extensive damage on the west coast, while UAV footage revealed moderate damage to isolated areas on the east coast. Tropical Cyclone Pam lingered over the Tafea group, particularly over the western side of Tanna, which resulted in extensive damage to traditional housing in the area. Analysis of satellite imagery and UAV footage indicates that as much as 80% of housing may have been totally destroyed. The eastern coast, while relatively close to the eye of the cyclone, appears to have been protected by the mountain range that runs along the length of the island.

A clear observation from the early assessments was that communities, particularly those in the outer islands, have their own time-tested methods of coping with extreme weather events, seeking refuge in caves, within densely vegetated areas, or in structurally sound public buildings.[31] In part, these practices would have contributed to the remarkably low loss of life among the population.

[31] Identification and documentation of these practices would be invaluable in planning resilience-strengthening activities in other provinces.

Not only were house structures themselves damaged or destroyed. Household goods within the houses were equally affected. For the purposes of the damage assessment, and extrapolating from the 2009 census, the cost of damage to household goods was assessed and included as 5% of total housing.[32] For the primarily rural communities affected by Tropical Cyclone Pam, the possessions lost represent a significant portion of the family's wealth and will be difficult to replace.

Losses to the housing sector

Loss as a result of the cyclone represents loss of potential income through home-based livelihood activities, which in particular affects women,[33] and loss of rental income. Within greater Port Vila, 50% of households own their own house and 50% rent one or more rooms (VNSO 2009). Outside of the urban areas, on customary land the rental market is assumed to be insignificant.

The psychosocial effect on the affected population (in particular on those internally displaced) is difficult to measure, as are the losses associated with not only reduced productivity, but personal grief and bereavement. In particular, lower-income households or those on outer islands that do not have insurance will face the double burden of self-rebuilding and depleting personal savings. The losses that cannot be easily measured include issues with personal security (in particular for women and young children), loss of land (in the absence of registered tenure), disruption to schooling for children, displacement from friends and family, and the disappearance of routines that provide an overall sense of security. Damage and loss to the housing sector are summarized in Table 20, and are broken down into housing type in Table 21. Provincial damage and losses are presented in Table 22.

Table 20. Total Damage and Loss in Housing Sector (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)[a]
Totally Damaged Houses	5,737,622	286,881	6,024,503	100	0
Partially Damaged Houses	3,072,179	153,609	3,225,788	100	0
Damaged Household Goods	440,532		440,532	100	0
Water Tanks	201,842		201,842	100	0
Sector Total	**9,452,175**	**440,490**	**9,892,665**	**100**	**0**

a. Publically owned government housing is covered under the public buildings sector assessment of this PDNA.

Table 21. Total Damage and Loss by Housing Type (VT 1,000)

	Total Damage		Partial Damage	
Typology	Number	Value	Number	Value
Permanent House	2,205	3,968,773	3,489	2,512,306
Semipermanent House	2,445	733,523	3,131	375,723
Traditional House	3,451	1,035,366	1,535	184,151
Total	**8,101**	**5,737,662**	**8,155**	**3,072,179**

[32] This percentage reflects the low incomes of the population and the very minimal ownership of electrical goods, as there is little to no electricity supply outside of Efate.

[33] In situations where livelihood activities were undertaken at home, destruction of the house will have a major effect on a family's capacity to earn money to pay for children's schooling, purchase seeds for crops, or even purchase essentials such as food or medicine.

	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	558,143	24,495	582,638	100	0
Penama	222,705	10,605	233,310	100	0
Shefa	6,558,236	305,020	6,863,256	100	0
Tafea	2,113,091	100,370	2,213,461	100	0
Total	**9,452,175**	**440,490**	**9,892,665**	**100**	**0**

Table 22. Distribution of Damage and Loss in Housing Sector by Province (VT 1,000)

Recovery Strategy and Needs for the Housing Sector

In a country as vulnerable as Vanuatu to frequent extreme weather events and geohazards, the early recovery and longer-term reconstruction strategy rests on the need to recognize and safeguard the self-resilience of communities and individuals and to enhance existing coping mechanisms. A second underlying principle of recovery is that individual households, in particular the very poor, may not be able to fully meet all reconstruction needs on their own. The government (with assistance where appropriate from external support partners) has a role to play in ensuring that individuals and communities are provided with necessary technical and social support throughout the reconstruction phase and that any additional support is clearly and transparently targeted for the benefit of the most vulnerable, i.e., those who may not be able to self-recover at the same pace as the wider community. Finally, a critical aspect of the recovery strategy will be a well-coordinated communication strategy to ensure that all households (including households that include people with disability) are aware of and have access to information about any support being provided.

A large number of NGOs have assisted the government with the emergency and early recovery phase,[34] and it is anticipated that they will continue to be involved in the short-term and medium- to long-term recovery activities, as set out in Table 23 and Table 24 respectively. For the longer-term recovery and reconstruction needs, it is anticipated that the agencies and communities might be assisted if needed by larger bilateral and multilateral support partners.

Destroyed and severely damaged homes mapped from UAV footage. *Source:* Humanitarian Open Street Map.

[34] NGOs include Adventist Development and Relief Agency (ADRA), Association for Aid and Relief Japan, Australian Red Cross, Caritas, French Red Cross, International Federation of Red Cross and Red Crescent Societies, International Organization for Migration, Oxfam, Salvation Army, Samaritan's Purse, Save the Children, Vanuatu Red Cross, and World Vision.

Table 23. Short-Term Recovery Needs for Housing Sector

Program of Activity	Value (VT 1,000)	Agency
Increase resilience through "building back better" principles, and by supplementing self-recovery with additional bracing material and technical guidance, trainings, and IEC (information, education, and communication) material	300,000	VRC, FRC, IFRC, Save the Children, Care, Oxfam, ADRA, Salvation Army, Caritas, IOM
Develop and integrated response with the water sector, and ensure WASH needs are addressed	5,000	VRC, FRC, IFRC, Save the Children, Care, Oxfam, ADRA, Salvation Army, Caritas
For islands in Shepherd group hit by cyclone, source natangura from northern provinces—stimulating livelihoods and sharing knowledge	To be confirmed	VRC, FRC, and IFRC
Develop building standards/practices and promote behavior change—e.g., start community consultation to revise building standards and "deemed to comply" construction ; work with small builders and professionals to ensure voluntary uptake of improved standards	To be confirmed	Government
Promote land tenure recognition by mapping of all occupation situations, developing an integrated recording system (register of informal occupancy arrangements), and undertaking information and awareness campaigns of rights under different arrangements	To be confirmed	Government
Undertake salvage and reuse of debris by providing means to harvest fallen trees for rebuilding; process should include asbestos awareness and safe bunding and disposal	20,000	IOM
Total	**325,000**	

Note: VRC = Vanuatu Red Cross; FRC = French Red Cross; IFRC = International Federation of Red Cross and Red Crescent Societies; ADRA = Adventist Development and Relief Agency; IOM = International Organization for Migration; WASH = water, sanitation, and hygiene.

Table 24. Medium- to Long-Term Recovery Needs in the Housing Sector

Program of Activity	Value (VT 1,000)	Agency
Multihazard mapping of urban areas and action plan identifying safe areas for future growth, installation of tsunami warning systems	291,896	Government, World Bank (MDRR project)
Training in risk to promote risk awareness	500,000	NGOs
Informal settlement study, including mapping of housing and tenure status in selected informal settlements	77,000	UN-Habitat
Construction of community safe structures, including identification of buildings for new construction or reinforcement	400,000	World Bank, NGOs
Consultative preparation and adoption of a National Housing Policy	37,500	Government, World Bank (to be confirmed)
Owner-led/self-reliant incremental housing reconstruction in all areas, making use of simple, low-cost measures to improve resilience of new housing stock	10,594,887[a]	Private households (may include some sector assistance, e.g., with water tanks)
Identification of locations and structures suitable for safe evacuation sites in all areas and preparation of a costed action plan to retrofit such buildings (access by people with disability, lighting for security for women and children, WASH facilities)	30,000	Government, World Bank (in urban areas only, rural to be confirmed)
Total	**11,931,283**	

Note: MDRR = Mainstreaming Disaster Risk Reduction; WASH = water, sanitation, and hygiene.

a. This figure includes an additional 15% above replacement costs, in order to incorporate the cost of BBB. It excludes any provision for house insurance, as only houses with Category 5 cyclone certificates are eligible for insurance payments. The total number of such houses is understood to be less than 10.

Gender considerations for recovery strategy

Consideration should be given to female-headed households (FHHHs), which often have no ownership of the land they are on and face huge constraints in accessing finance and manpower to repair or reconstruct their homes. The 2009 gender census monograph (VNSO 2011) indicates that 20% of the households in Vanuatu are female-headed, which can be extrapolated to approximately 3,200 households that suffered damage and losses in the amount of VT 1.9 billion (based on the total effects presented in Table 20).

Housing rehabilitation and reconstruction/recovery programs should be positively adjusted to prioritize FHHHs as well as people living with disabilities and the elderly. Similarly, early recovery and livelihood programs should also provide specific support to FHHHs to enable them to find resources for rebuilding. With regard to evacuation centers, disaster preparedness planning should address the needs of women and girls by ensuring adequate lighting and segregated wash facilities. Future planning and building of evacuation camps should also ensure accessibility for people living with disability.

3.2.2 Health

Summary

As a result of Tropical Cyclone Pam, the Ministry of Health sustained major damage and losses to health facilities in Shefa and Tafea and minor damage and losses to health facilities in Malampa and Penama. The health sector was unaffected in the remaining two provinces of Torba and Sanma.

The cyclone's total effect on the health sector is estimated to be approximately VT 976.7 million, split between VT 869.8 million (89%) for damage and VT 106.9 million (11%) for losses.

As a result of Tropical Cyclone Pam, the Ministry of Health sustained major damage and losses to health facilities in Shefa and Tafea and minor damage and losses to health facilities in Malampa and Penama. The cyclone's total effect on the health sector is estimated to be approximately VT 976.7 million.

Health Sector Background

There are 132 formal, publicly managed health facilities in Vanuatu, comprising 6 hospitals, 34 health centers, and 92 dispensaries. In the four affected provinces, there are 96 formal health facilities, comprising 4 hospitals, 23 health centers, and 69 dispensaries. Community aid posts lie outside of the direction of the Ministry of Health. Responsibility for the management of the 204 village health workers (community volunteers) who staff the 200 aid posts that are currently active rests with Save the Children. There are a further 18 clinics that are run either by the Port Vila Municipal Council or by private providers.

Prior to the cyclone, many of the formal health facilities were in poor condition. This was confirmed by the recently completed Provincial Resource Review (Ministry of Health and Australian DFAT 2015), which surveyed all the formal health facilities in Vanuatu and which provides an excellent baseline.

The distribution of health facilities by affected province and population is shown in Table 25.

Table 25. Distribution of Health Facilities by Affected Province

Province	Population	Number of Community Aid Posts	Number of Health Dispensaries	Number of Health Centers	Number of Hospitals	Total Number of Health Facilities
Malampa	40,191	46	20	8	1	75
Penama	34,551	43	23	6	1	73
Shefa	101,440	40	13	5	1	59
Tafea	35,131	29	13	4	1	47
Total	**211,313**	**158**	**69**	**23**	**4**	**254**

Assessment of Disaster Effects on the Health Sector

Damage to the health sector

Assessments conducted on site following Tropical Cyclone Pam revealed damage to the majority of health facilities in Shefa Province, to around half in Tafea Province, and to a minority in both Malampa and Penama Provinces. In total, 39 of the formal health facilities were damaged—two hospitals, 15 health centers, and 22 dispensaries. In addition, there was damage to the health administration buildings in Shefa (both the national headquarters and provincial-level buildings). Looking at the proportion of damaged facilities relative to total stock shows that health centers were the worst affected.

The total monetary damage across all health facilities, including administration buildings in the four affected provinces, is estimated to be VT 869.8 million. The breakdown is shown in Table 26.

Table 26. Distribution of Damage by Health Facility and Province (VT 1,000)

Province	Community Aid Post	Health Dispensary	Health Center	Hospital	Support Buildings	Total Health Facilities
Malampa	2,100	10,300	41,100	0		53,400
Penama	10,500	62,200	16,800	0		89,500
Shefa	22,500	1,19,100	137,400	136,500	97,900	513,300
Tafea	5,300	37,700	46,500	124,100		213,600
Total	**40,400**	**2,29,200**	**241,700**	**260,700**	**97,900**	**869,800**

The total damage is by far the highest in Shefa Province, with VT 513.3 million of damage occurring across all health facilities. Tafea is the next highest, with VT 213.6 million of damage, including VT 124.1 million at Lenakel Hospital.

The total damage to health dispensaries listed in Table 26 includes damage to public health facilities, and to private/municipal clinics. In Malampa, no damage was sustained to private/municipal clincs. For private/municipal clinics in Penama, VT 2.8 million of damage was sustained, in Shefa, VT 41.7 million was sustained, and in Tafea, VT 11.6 million was sustained.

Assessment findings revealed that six health facilities were completely destroyed by the cyclone, with a further seven suffering major damage. Around one month after the cyclone, all but seven facilities were open, although around one-third of open facilities were operating with a reduced service.

Losses to the health sector

Losses totaling to VT 106.9 million have been identified in the areas of increased health care provision, health sector revenues, health sector coordination, and additional outreach interventions. These are set out in Table 27.

Table 27. Distribution of Losses to Health Sector by Facility and Province

Domain	Category	Amount (VT 1,000)
Increased Health Care Provision	Medical referrals covered	917
	Further medical referrals expected	5,560
	Staff overtime	7,811
	Staff wages (additional staff)	18,247
	Drug requirements	38,891
	Emergency lodging of critical staff at Port Vila Central	1,043
	Hospital rations required	2,670
	Subtotal	75,149
Health Sector Revenues	Inpatient fees waived	8,331
	Outpatient fees waived	8,000
	Subtotal	16,331
Health Sector Coordination	Building repairs required	1,140
	Fuel supplied	318
	Fuel required	650
	Vehicle hire undertaken	85
	Communications	508
	Stationeries	253
	Subtotal	2,955
Additional Outreach Interventions	Replacement of broken mosquito nets	11,478
	Health facility assessments conducted	188
	Psychosocial support conducted	214
	Reproductive health outreach undertaken	10
	Oral health outreach required	85
	General outreach required	500
	Subtotal	12,475
Total		**106,910**

Impacts on health sector service delivery

Overall availability. Multi-cluster assessments conducted in all four affected provinces show that the availability of service has declined in the six key areas: general clinic services, child health, communicable diseases, STI/ HIV, maternal and child health, and noncommunicable diseases and environmental health. The fall is sharpest in the areas of child health and communicable diseases, where service levels are reported to be under half of pre-cyclone levels. Because data are lacking, the reductions in these services have not been monetized as losses.

Vulnerable groups. Again because good data are lacking, gender- and disability-specific impacts cannot be quantified. It is important to note, however, that given the high birth rate (32.5 per 1,000 women [VNSO and SPC 2014]) and a reduced health facility base, there is likely to be an adverse impact on expectant mothers and their children. It is estimated that 900 women will require specialized medical assistance over the next nine months. One early response measure taken in Shefa is to focus more explicitly on high-risk pregnancy cases; nurses in health facilities are encouraged to update Vila Central Hospital each day by telephone if any cases are problematic.

Data on disability from the Vanuatu Demographic and Health Survey 2013 (VNSO and SPC 2014) reveals that the prevalence of disability is higher in rural areas and among lower-income groups. Ensuring access to services is an important challenge.

Table 28 and Table 29 show the total effect of Tropical Cyclone Pam by subsector and by province respectively.

Table 28. Total Effect of Tropical Cyclone Pam on Health Sector by Subsector (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Infrastructure and Equipment	869,793	0	869,793	1	99
Health Care Provision	0	75,149	75,149	0	100
Health Sector Revenues	0	16,331	16,331	0	100
Health Sector Coordination	0	2,955	2,955	0	100
Additional Outreach Interventions	0	12,475	12,475	0	100
Sector Total	**869,793**	**106,910**	**976,703**	**1**	**99**

Table 29. Total Effect of Tropical Cyclone Pam on Health Sector by Province (VT 1,000)

Province	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	53,379	6,740	60,119	0	100
Penama	89,521	6,232	95,753	1	99
Shefa	513,320	59,832	573,152	0	100
Tafea	213,573	34,106	247,679	4	96
Total	**869,793**	**106,910**	**976,703**	**1**	**99**

Recovery Strategy and Needs

Short-term recovery needs for the health sector

The short-term recovery needs cost to the Ministry of Health's infrastructure, covering the next 12 months, has been calculated as VT 566.8 million. The estimate reflects several inflation factors under the BBB principle. A capital works plan will be produced to confirm all funding priorities. The success of the short-term recovery strategy also depends upon funds being made available and scale-up of personnel within the next three months; otherwise the plan will slip to the long term.

Given the very tight funding situation that faces the Ministry of Health, it is judged that 100% of the VT 106.9 million in losses will need to be recovered within the next 12 months in order to meet expected health care needs. Support from development partners is already forthcoming to enhance the capacity to manage public health risks. Included in the funding is support for expansion of routine childhood immunization across the whole country. As the costs of these public health activities are already covered, they are not included as short-term recovery needs.

The total short-term needs covering the next 12 months amounts to VT 673.7 million, as represented in Table 30.

Table 30. Total Short-Term Recovery Needs in Health Sector

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Health	Reconstruction of infrastructure and equipment	566,822	Ministry of Health (all recovery programs)[a]
	Health care provision	75,149	
	Health sector revenues	16,331	
	Health sector coordination	2,955	
	Additional outreach interventions	12,475	
Total		**673,732**	

a. Exceptions are short-term reconstruction of community aid posts, valued at VT 21.5 million; municipal clinics, valued at VT 16.4 million; and private clinics, valued at VT 9.0 million. Save the Children, Port Vila Municipal Council, and private providers are the respective responsible parties.

External funding of VT 31 million is currently available as a resource for the short-term plan for reconstructing infrastructure.

Medium- to long-term recovery needs for the health sector

An understanding, including quantification, of recovery needs beyond a 12-month time frame will require further assessment of the impact of the cyclone on Vanuatu's health sector.

Gender considerations for recovery strategy

In a pre-disaster situation, it is estimated that 6,800 ni-Vanuatu women would be pregnant in the four affected provinces at any given time. Damage to health facilities means more women will find it difficult to reach emergency obstetric care. It is estimated that some 900 women will require specialized medical assistance over the next nine months. In addition, the post-disaster context places women at increased risk of sexual violence. Reproductive health services and outreach by government and NGOs should be strengthened to provide critical services, including maternal health/family planning, response to sexual violence, and adolescent sexual reproductive health services and information.

3.2.3 Education

Summary

The impact of Tropical Cyclone Pam on the education sector is catastrophic, totaling VT 3.9 billion in damage. Immediate attention is required to allow children to return to school. The return to routine and the familiarity of the school environment have been proven to assist children in recovering from disasters.

The impact of Tropical Cyclone Pam on the education sector is catastrophic, totaling VT 3.9 billion in damage. Immediate attention is required to allow children to return to school.

The cyclone severely damaged education facilities such as classrooms, staff houses, kindergartens, and water and sanitation facilities as well as all the associated school furniture, books, and other resources. Specifically:

- 187 classrooms were totally destroyed, 279 had major damage, and 152 had minor damage.
- 490 staff houses were damaged to some extent.
- 218 kindergartens were damaged or destroyed.
- School resources and furniture were damaged or destroyed.
- Tafea Province is the most affected.

UAV footage of damages to schools on Tanna. *Source:* © HeliWest. Reproduced with permission; further permission required for reuse.

Destroyed school at South East Ambrym. © Brecht Mommen, UNICEF. Reproduced with permission; further permission required for reuse.

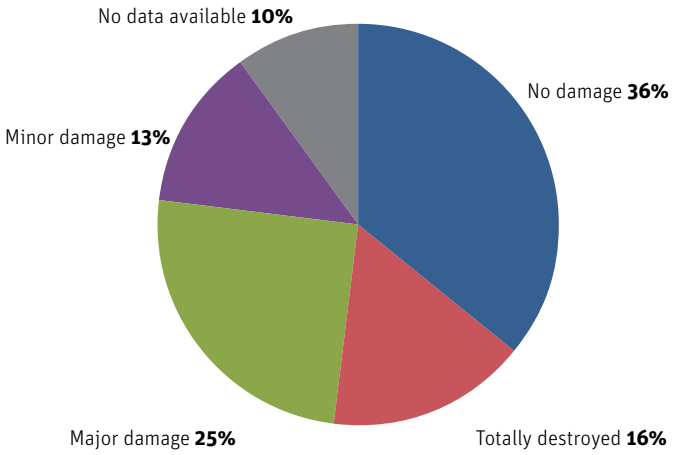
The number of damaged school buildings highlights the issue of poor construction standards and lack of maintenance of existing facilities. Initial damage assessments indicated that up to 34,614 children have been impacted by damaged school facilities, with 54% of early childhood care education (ECCE) centers damaged and 46% of all primary and secondary facilities completely damaged also. In many cases, buildings that were totally damaged had been built by the community in order to meet the need for more classrooms, or to provide accommodation for teachers. In these instances the buildings had generally been constructed on a very limited budget and not according to any building standard.

Learning supplies such as exercise books, textbooks, and writing instruments, along with school supplies such as furniture and blackboards, have been damaged or completely destroyed in many schools. In addition, the initial assessment and in-depth assessment undertaken as part of this PDNA show that most affected schools will need access to water and sanitation in order to ensure public health and safety. Currently, children in boarding schools are in need of water and food.

Table 31. Overview of Assessed Education Facilities by Province

Province		No. of Schools Assessed	No. of Students Enrolled	Classrooms				Staff Houses	Kindergarten	WASH (VT	Total for Province (VT 1,000)
				Usable	Totally Destroyed	Major Damage	Minor Damage				
Penama	Number	19	1608	72	6	7	4	77	14	90	300,192
	Total (VT 1,000)				19,632	23,975	2,780	182,105	42,000	29,700	
Malampa	Number	22	1653	31	10	10	5	30	10	70	194,495
	Total (VT 1,000)				32,720	34,250	3,475	70,950	30,000	23,100	
Shefa	Number	111	19425	281	42	130	40	54	86	226	1,070,764
	Total (VT 1,000)				137,424	445,250	27,800	127,710	258,000	74,580	
Tafea	Number	94	11928	20	129	132	103	329	108	590	2,242,558
	Total (VT 1,000)				422,088	452,100	71,585	778,085	324,000	194,700	
Subtotal	Number	246	34614	404	187	279	152	490	218	976	
	Total (VT 1,000)				611,864	955,575	105,640	1,158,850	654,000	322,080	
	Total cost of education infrastructure work (VT 1,000)										**3,808,009**

Figure 6. Primary and Secondary School Facilities: Extent of Damage



Education Sector Background

The Ministry of Education and Training (MoET) is one of the largest government ministries, overseeing a total of 1,093 schools (ECCE centers, primary schools, and secondary schools)[35] and 18 Rural Training Centres.[36] The sector covers enrollments for a total of around 80,000 students in ECCE, primary and secondary schools, and Rural Training Centres.

The education system offers three years of ECCE, one year in child care and followed by two years in kindergarten; primary school consists of years 1–6; junior secondary school consists of years 7–10;[37] and senior secondary school consists of years 11–13/14.

Education plays a key role in addressing children's need for normalcy and routine following a disaster, and can help children cope with the effects of trauma. Education spaces also can be used to provide psychosocial support to children who have been through traumatic experiences. School repairs and rebuilding, training of teachers, and provision of basic school and learning materials are all necessary to enable children to continue their schooling and learning without further interruption.

Assessment of Disaster Effects on Education Sector

Assessment of the school buildings was undertaken by MoET staff in conjunction with other ministries and external agencies. Damage was not limited to school buildings but also affected staff houses, both those within the grounds of the schools and those built by communities outside the grounds.

The damage was calculated based on the type of construction of the damaged asset, but the needs have been based on replacing and repairing buildings with durable engineered structures in accordance with the principle of BBB. As can be seen from Table 32 and Table 33, the damage and losses to the education sector are significant.

[35] As recorded in the Vanuatu Education Management Information System (VEMIS), the numbers for each type are as follows: ECCE (568), primary (433), and secondary (92).
[36] The figure applies to Rural Training Centres that are registered with the Vanuatu Qualification Authority.
[37] Years 7 and 8 are also offered at a few primary schools known as Center schools.

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
School Buildings and Furniture	3,808,009	66,819	3,874,828	0	100
Curriculum Materials	59,782	11,610	71,392	0	100
Curriculum Equipment	40,609	406	41,015	0	100
Sector Total	**3,908,400**	**78,835**	**3,987,235**	**0**	**100**

Table 32. Total Damage and Losses for the Education Sector (VT 1,000)

	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	306,202	4,711	310,913	0	100
Penama	200,930	6,943	207,873	0	100
Shefa	1,091,542	18,999	1,110,541	0	100
Tafea	2,309,726	48,182	2,357,908	0	100
Sector Total	**3,908,400**	**78,835**	**3,987,235**	**0**	**100**

Table 33. Distribution of Damage and Losses for the Education Sector by Province (VT 1,000)

Recovery Strategy and Needs

Full access to formal and informal education, including early childhood care education, needs to be fully reestablished for all children affected by Tropical Cyclone Pam. This requires extensive repair, rehabilitation, and rebuilding of government and nongovernment schools, including water and sanitation facilities, or provision of transitional/temporary facilities. UNICEF and Save the Children have provided tents for continuing schooling in some cases where school buildings have been totally damaged. MoET is exploring the option of tents for staff while awaiting reconstruction of staff houses. Short-term and medium- to long-term recovery needs are set out in Table 34 and Table 35 respectively.

Sector	Program of Activity	Value (VT 1,000)	Responsible agency
Education and Training	Reprinting curriculum materials (primary and secondary)	59,782	Not yet identified
	Replacing science and technology equipment (curriculum materials)	40,607	Not yet identified
Total		**100,389**	

Table 34. Short-Term Recovery Needs for the Education Sector

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Education and Training	Reconstruction of schools	6,748,764[a]	Not yet identified
Total		**6,748,764**	

Table 35. Medium- to Long-Term Recovery Needs for the Education Sector

a. This value assumes reconstruction of all schools and associated facilities to appropriately engineered standards, in accordance with the principle of BBB. However, the MoET is aware of the need to rationalize the number of schools in Vanuatu, and it is therefore unlikely that all school buildings will need to be repaired and reconstructed.

Gender considerations for recovery strategy

After disasters, children are more likely to stay out of school than under normal circumstances, not only because schools have been destroyed, but because demands for family labor (e.g., house clearing and crop planting) and reduced household income mean that children may need to assume

Woman surveys destroyed kindergarten in Port Marvin, Erromango. © Karen Bernard, UNDP. Reproduced with permission; further permission required for reuse.

domestic duties. Although the literacy gap between women and men is very small, more girls than boys usually support water fetching, cooking, and home cleaning. Thus the disaster impact across the affected provinces could have a temporary negative impact on girls' education. This is of particular concern in Tafea Province, where only 9 out of 120 ECCE schools are operational.

This impact has serious implications for the work burden of women, as kindergartens play a critical role in freeing mothers' time for pursuit of economic activities. Women report that young children are the most vulnerable in the community because they are hard to take care of and need to be watched, and these duties can be in conflict with women's need to clean and rebuild their houses. In addition, because more women than men are employed by the education sector, the closure of schools will have an unequal impact on men's and women's incomes. Finally, loss of income from agricultural and other income-generating activities means that parents will struggle to pay school fees. Interviewed female vendors in Shefa Province indicated that they were most worried about food security and school fees for their children.

A temporary waiver of school fees could alleviate the burden on rural households and reduce the number of children pulled out of school. In addition, recovery should support both public and private ECCE schools for rehabilitation and rebuilding. Provisional day-care facilities should be established to help alleviate the burden on females.

3.2.4 Culture

Summary

The peoples of Vanuatu have faced a changing environment and history for centuries, and adaptation to change is part of their lifestyle. Traditional knowledge, skills, and practices, along with the people's tangible and intangible cultural heritage, underpin their ability to live and thrive.

The PDNA cultural survey covered significant traditional and western buildings, the Vanuatu Cultural Centre (VCC) complex, and an archaeological site. Subcenters of the VCC—i.e., the public library, the Malekula Cultural Centre, and the Tafea Cultural Centre—are damaged and need urgent repair and reconstruction assistance. The Further Arts Centre and Alternative Communities Trade in Vanuatu (ACTIV) Centre are significantly damaged; this will affect production and sales of handicrafts, which are a significant contributor to tourism and the national economy. The Malvatumauri chief *nakamal* (traditional structure), a national treasure, sustained significant damage to its thatched roof and walls but the main structure survived. The performance of *nakamals* during Tropical Cyclone Pam demonstrates why traditional knowledge remains relevant and must be preserved as part of living heritage and culture. At the time the PDNA was being drafted, Chief Roi Mata's Domain, Vanuatu's only World Heritage site, remains badly affected by the cyclone's impacts, with livelihoods threatened by suspension of revenue-generating activities. Damage to selected government and privately owned heritage buildings in Port Vila was identified from the National Heritage Register.

As reconstruction is planned, it is important to recognize that fibro cement sheets used for external cladding are likely to contain asbestos, and that maintenance regimes are poor. It is recommended that current building codes be reviewed and enforced; that appropriate maintenance be undertaken regularly; and that the VCC and other cultural facilities develop a disaster risk management (DRM) plan and a disaster risk reduction strategy with professional organizations, such as the International Council on Monuments and Sites, the International Scientific Committee on Risk Preparedness, the International Council of Museums, the International Council of Archives, the International Federation of Library Associations, and the Blue Shield.

Culture Sector Background

Vanuatu's "ethnic, linguistic and cultural diversity," its "struggle for freedom," and its "traditional Melanesian values, faith in God, and Christian principles" are enshrined in its constitution. The VCC works under the authority of the Vanuatu National Cultural Council, and its role under the Preservation of Sites and Artifacts Act [CAP139] dictates that the work of the Centre is to protect, promote, and preserve the cultural, historical, and artistic values of Vanuatu. The VCC is also responsible for the National Heritage Register. Vanuatu is party to the World Heritage Convention (1972) and the Convention for the Safeguarding of the Intangible Cultural Heritage (2003), and Vanuatu sand drawing is inscribed on the Intangible Cultural Heritage Representative List. Several NGOs and foundations actively engage in promotion of arts and culture in Vanuatu, supporting the development of an emerging cultural industry.

Cultural heritage underpins community identity and plays a critical role in social cohesion. The cyclone has had a tremendous impact on community facilities, which are living heritage, and on historical records.

Assessment of Disaster Effects on the Culture Sector

Cultural heritage underpins community identity and plays a critical role in social cohesion. The cyclone has had a tremendous impact on community facilities, which are living heritage, and on historical records.

The cyclone damage highlighted the fact that construction of traditional *nakamals* has come to include western materials and techniques—which contributed to their collapse. Traditional building techniques are in use in some villages, but elsewhere they are being lost. The building of *nakamals* using traditional skills is a part of ni-Vanuatu culture that is under threat.

Vanuatu Culture Centre Complex and facilities

The VCC is the custodian of Vanuatu's national cultural collections (archives, library, and museum). The VCC buildings in Port Vila were partially damaged, and some cultural objects were affected by

water. Posts of the Farea Tabu were destabilized and the thatched roof was partially damaged. The public Library (Port Vila) and the Malekula Cultural Centre need new roofs. The Tafea Culture Centre was destroyed and its equipment damaged.

Nakamals

The *nakamal* (also sometimes known as *farea*), a significant traditional community shelter dating back several centuries, is used for decision making, governance, teaching, and dispute resolution. Traditionally every village had a *nakamal,* and traditional knowledge-based skills have adapted this typology to resist cyclones.

Nakamals often provide community refuge during storms or cyclones and are critical in disaster risk reduction. Windborne impact caused significant damage to the thatched roof and woven bamboo walling of the Malvatumauri chief *nakamal*, but the lightweight materials and flexible framing enabled it to survive. A number of other *nakamal*s also incurred some damage: strong winds damaged the long ridge of the Tikilasoa Farea (Nguna Island), causing water ingress. The roof of the Nikoletan Council of Chiefs office (Tanna) sustained significant damage, and the structure and roof of the Takara (North Efate) *nakamal* was damaged principally by tidal surge.

Chief Roi Mata's Domain (Lelema area, northwest Efate, Shefa Province)

Chief Roi Mata's Domain, inscribed on the World Heritage List (2008), is a cultural site of profound national and international significance as well as a significant tourism destination. It is managed by Lelema World Heritage Committee in collaboration with the VCC. Tours to the site are led by Roi Mata Cultural Tours, a community-owned cultural tourism business that has been in operation since 2008.

A preliminary visit on March 23, 2015, established that the cultural landscape, the Roi Mata Cultural Tours facilities at Mangaliliu and Aupa, the tour boat's engine, the World Heritage signage, and the office on Lelepa Island are significantly damaged. Obvious threats include potential deterioration, damage to the gravesites of Artok Island, damage to culturally significant vegetation and stone remains at Mangaas, and ongoing threats to the geological stability of Fels Cave. Landslides and fallen trees prevent access and need a carefully managed works program to protect cultural values. Impacts on local livelihoods threaten the community's capacity to manage the heritage place. Cultural tours are the primary mechanism to transmit the values of the place within and beyond the community.

Historic buildings including churches

In Port Vila, 17 places of general cultural and cultural heritage significance (churches, former residences, archway, and public library and art galleries) that are included in the National Heritage Register were surveyed during April 7–12, 2015. These places variously have aesthetic, historical, technological, or social significance and are tangible links with Vanuatu's history and culture. Two places support the arts and crafts industry.

Damage sustained by Port Vila heritage buildings was assessed as not significant, and all of the buildings have been reoccupied, are repairable, and should not be demolished. Importantly, the PDNA assessment survey identified the following within historic buildings: (i) the probable use of fibro cement sheet containing asbestos; (ii) a widespread poor maintenance regime (corrosion, rot, probable termites); and (iii) probable use of materials inadequate for purpose, lack of appropriate roof bracing, and inattention to rainwater. The BBB approach should address these shortcomings wherever possible.

Alternative Communities Trade in Vanuatu (ACTIV)

ACTIV headquarters is located at the Centre in Second Lagoon, Port Vila, with the handicrafts center and the chocolate factory. The handicrafts center opened in October 2014 and worked with women's groups and craftswomen across the islands to support handicrafts and agriculture production and marketing.

The Tropical Cyclone Pam affected the structure, roofs, and electrical system of the ACTIV building, plus stock and income. Tourism essentially ceased after the cyclone, and the handicrafts center remains closed as of April 9, 2015.

Further Arts Centre including Nesar Studio (community-access multimedia studio and library)

Further Arts is a registered charitable association in Anamburu, Port Vila, and Luganville (Espritu Santo). Its focus is on promotion and development of cultural activities in Vanuatu and Melanesia. Nesar Studio, opened in 2013, is a space for community voices, citizen and social media, and storytelling via creative digital media. It runs educational and technical courses, engages members in projects and productions, and provides support for external training, conferences, and employment opportunities.

Tropical Cyclone Pam significantly damaged the Anamburu office, along with multimedia equipment, educational materials, significant raw film footage, hundreds of hours of culturally significant documentation of Vanuatu's heritage, and thousands of digital photos. The Nesar Studio's revenue has diminished because of this damage.

Assessment of Damage and Loss

An overview of the economic damage and losses to the cultural buildings assessed as part of this PDNA is provided in Table 36.

Table 36. Economic Cost of Damage and Loss to the Cultural Sector (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Malvatumauri Council of Chiefs and Other *Nakamals*	19,200	0	19,200	0	100
Libraries/Archives, MKS, TKS	6,975	0	6,975	0	100
Chief Roi Mata Domain (World Heritage Site)	1,698	1,728	3,426	40	60
Historical Buildings in Port Vila	1,306	0	1,306	100	0
Further Arts Centre	7,500	1,000	8,500	100	0
ACTIV Centre	2,500	700	3,200	100	0
Churches of Port Vila	69,472	0	69,742	100	0
Sector Total	**108,651**	**3,428**	**112,349**	**75**	**25**

Note: TSK = Tafea Cultural Centre (Tafea Kaljoral Senta); MKS = Malekula Kaljoral Senta.

Recovery Strategy and Needs

The estimated recovery needs for the cultural sector incorporate the principle of BBB.

Short-term needs for the culture sector

Restoration of the chief's *nakamal* is a priority; it represents an iconic opportunity for collaboration with and encouragement of affected communities, along with economic recovery through employment generation. Priorities for Chief Roi Mata's Domain are (i) full assessment of impacts and needs; (ii)

restoration of site access; (iii) repair or restoration of site; and (iv) repair or replacement of facilities and infrastructure for Roi Mata Cultural Tours. Priorities for the VCC are the assessment of *nakamals* and assessment of the World Heritage site, along with reconstruction and maintenance of VCC subcenters to enable them to resume services. Short-term recovery needs are presented in Table 37.

Table 37. Short-Term Recovery Needs for the Cultural Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Emergency conservation of the Malvatumauri Council of Chiefs ***nakamals***	12,000	Vanuatu government and Malvatumauri Council of Chiefs
Emergency assistance for inventorying intangible cultural heritage related to ***nakamals*** (phase 1)	2,500	VCC, UNESCO
Emergency repair works relating to VCC facilities in Port Vila and Tafea Cultural Centre	6,975	Vanuatu government and VCC
Full loss and damage assessment of Chief Roi Mata's Domain (World Heritage site)	2,000	VCC, UNESCO World Heritage Centre
Emergency repairs and conservation of historic buildings and churches	1,306	Private owners and in-kind support from VCC and government
Development of action plans for the reconstruction of Further Arts Centre	8,500	Further Arts Centre
Emergency repairs of ACTIV Handicrafts Centre	3,200	ACTIV
Emergency repair and improvement of churches	66,792	
Total	**103,723**	

Medium- to long-term recovery needs for the culture sector

Once the condition of the affected *nakamals* and associated stories during the cyclone are documented, the priority is to recommend the best safeguarding measures. These include recording and teaching traditional building skills and the processes of procuring traditional materials, as well as youth training, development of a disaster risk reduction strategy for *nakamals,* and potentially sourcing of funding for reconstruction. BBB strategies should be implemented so as to combine best-practice traditional knowledge with contemporary standards. Consideration should be given to capacity-building training courses to revitalize traditional craft skills (e.g., weaving) by training trainers from other islands who will share their learning with other village women and men. A strategic review of the management plan for Chief Roi Mata's Domain should incorporate a disaster risk reduction strategy, specifically by documenting traditional community strategies for disaster management, including responses to cyclones. Medium- to long-term recovery needs are presented in Table 38.

Table 38. Medium- to Long-Term Recovery Needs for the Cultural Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Restoration of Council of Chiefs ***nakamal***	12,000	Malvatumauri and Vanuatu government
Inventory of intangible cultural heritage relating to nakamals, capacity building for revitalization of indigenous architecture and traditional building skills	7,000	VCC, Christensen Fund
Capacity building for cultural heritage risk management	2,000	VCC
Safeguarding of Chief Roi Mata's Domain	7,000	VCC, UNESCO WHC
Preservation and enhancement of historic buildings and churches in Port Vila	7,000	Vanuatu government, municipal government; VCC and private owners
Reconstruction of Further Arts Centre	8,500	FAC
Empowerment of craftswomen through sustainable development	5,000	ACTIV
Total	**48,500**	

Gender considerations for recovery strategy

Women play a critical role in preserving the ni-Vanuatu culture. They are skilled craftspeople who weave mats and baskets used in homes and bamboo walls for houses and *nakamals*, and they also contribute to income generation in homes and communities. The network of VCC fieldworkers, which comprised an equal number of men and women, has played and will continue to play an important role in incorporating a substantive gender-equality component and process in the intangible cultural heritage post-recovery process.

One of the key needs identified by the culture sector for women is ensuring that they are able to replant trees, such as pandanus and natangura, which are essential in their homes and also a source of income. It is also important to ensure that the markets promoting local handicrafts, such as ACTIV, are functioning, so that women who create these handicrafts have a market for them.

3.3 Infrastructure Sectors

3.3.1 Transport

Summary

The transport infrastructure networks and facilities throughout Vanuatu suffered severe physical damage as a result of Tropical Cyclone Pam. Most damage was recorded in the provinces of Malampa, Penama, Shefa, and Tafea, which were located directly in the cyclone's path. The immediate effect on the transport sector was to (i) sever all modes of transportation, (ii) hamper access to markets in Port Vila and other business centers and the surrounding communities, and (iii) hinder access to education and health facilities in villages and communities. Even though the cyclone path itself

Damaged approach to Teouma bridge outside Port Vila. © Michael Bonte-Grapentin, World Bank Group.

missed the northern provinces of Torba and Sanma, the associated rain caused flooding damage to culvert crossings, road pavements, and aerodromes in these two provinces.[38]

Losses in the sector were the result of delays in travel time at blocked sections of major and heavily trafficked paved roads and bridge-approach washouts; loss of revenue to the aviation sector as a result of cancelled flights; and loss of business to the maritime sector resulting from ships' inability to sail (in particular, the staying away of cruise liners) and the salvage costs of those passenger vessels that either sunk or ran aground during the cyclone.

Damage and losses in the transport sector constitute 13.5% of the total damage and losses suffered across all sectors.

Transport Sector Background

Vanuatu's transport sector is of critical importance to—and underlies—its economic and social development. For example, 70% of rural communities live near the coastline, and 66% of rural communities rely on artisanal and subsistence fishing to meet a portion of their subsistence and income needs. Thus the transport systems not only support the country's economic life; they also affect the ease and cost with which government administration and businesses operate, and with which households and communities interact and access markets and social and cultural facilities.

The aviation system, supporting both domestic and international travel, underpins public administration of services for the dispersed populated provinces and the important tourism sector. The country has 29 aerodromes, including three that are internationally certified (Category A): Bauerfield International Airport in Port Vila, Pekoa International Airport in Luganville, and Whitegrass International Airport in Tanna. There are three certified domestic aerodromes (Category B), which are at Norsup, Longana, and Lonorore, and a further 23 certified remote aerodromes (Category C) serving the domestic routes through all provinces.[39] In 2013, 318,964 domestic and international passengers were transported by air carriers registered in the country.

The maritime sector comprises multipurpose (carrying passengers and cargo) international seaports at Forari Bay, Luganville, and Port Vila under the responsibility of the ports authorities. Other maritime infrastructure consists of around 36 small wharves, jetties, and landing stages, of which 22 are public ports and wharves. Marine transport is not only critical to international tourism but is particularly important to domestic passenger and cargo movement within the country. The merchant marine fleet of 77 vessels includes 38 bulk carriers, eight cargo vessels, and 24 refrigerated cargo vessels.

The public road network comprises 2,233km across 24 islands, with 83% of the network constructed on eight main islands. The paved network, around 5% of the total, is restricted to Efate and Santo. The remaining 95%—the primary network on all other islands—is unpaved gravel and earth roads, typically island ring roads that follow the settlement patterns near the coastlines.

[38] For consistency, damage and losses in Torba and Sanma have been omitted from the PDNA transport assessment.

[39] There are also a small number of minor aerodromes: two for remote unscheduled operations (Category D) and two private (Category F).

Assessment of Disaster Effects on the Transport Sector

Table 39 summarizes the cost of damage to the transport infrastructure and the value of the losses incurred due to the cyclone. The cost of the damage is taken to be the replacement costs of the structures to the pre-disaster state[40] *using soundly engineered designs*—which, in a country as vulnerable as Vanuatu to natural hazard risk, necessarily incorporates strengthened design measures. BBB is also a priority of the government for the entire network, but it is assumed that, in time, the costs associated with BBB will be addressed through a number of ongoing development projects.

Damage to the transport sector

Vanuatu's transport infrastructure was severely damaged by Tropical Cyclone Pam. Partial damage was incurred at all three international airports and at 11 or more of the minor domestic airports and airfields. Partial damage was also recorded to wharves and jetties, and there was significant damage to marine vessels, in particular the smaller fleet. Damage to roads and bridges was confined to bridge-approach, culvert, and pavement washouts and blocked drains. About 80% of the road network was completely blocked due to fallen trees.

The damage assessed as of April 19, 2015, is summarized in Table 39. The table captures those assets managed by MIPU and the activities of the major air and sea carriers. At the time of the PDNA preparation, only limited verifiable information was available for those assets managed by provincial authorities or owned by the private sector. The damage data therefore include an assumed margin of error.

Loses to the transport sector

The losses assessed as of April 19, 2015, are summarized in Table 39. Within available constraints, loss assessment has been limited to losses associated with delays in travel time at blocked sections of major and heavily trafficked paved roads and bridges in the Port Vila vicinity; loss of revenue to operators and government (MIPU) as a result of cancelled flights and cancelled departures of cruise liners and cargo vessels; and the salvage costs of those passenger vessels that either sunk or ran aground during the cyclone.

Table 39. Damage and Loss Summary for Transport Sector (VT 1,000)

	Damage	Losses	Total
Roads and Bridges	2,358,718	84,988	2,443,706
Aviation	617,103	905,315	1,522,418
Maritime	41,600	1,147,046	1,188,646
Total	**3,017,421**	**2,137,349**	**5,154,770**

Source: Ministry of Infrastructure and Public Utilities.

Note: Figures include allowance for rapid assessment margin of error. At the time the PDNA was being prepared, assessment of losses had been undertaken only with regard to the following: losses of revenue by the major national airline carrier, Vanuatu Airports Authority, and a private locally registered carrier (which had ceased operations for three days around the time of the cyclone); loss of piloting and wharfage for nonarrival of cruise ships over the initial 10-day period and an assumed three-month slowdown in arrivals; salvage and towing costs of grounded vessels; and estimated revenue losses by inter-island cargo vessels and a large stevedore. Delays in travel time on the affected road network in Port Vila (only) also have been costed. Further disruptions in transport services as they affected businesses and household livelihoods are captured in the commerce and industry sector assessment and by the social and household impact assessment.

[40] Where necessary, these costs include phased reconstruction, including emergency repairs and medium- and long-term (<4 years) reconstruction.

Table 40. Distribution of Damage and Losses in Transport Sector by Province (VT 1,000)

	Damage	Losses	Total Effects	Private (%)	Public (%)[a]
Malampa	162,464	0	162,464	0	100
Penama	74,847	0	74,847	0	100
Shefa	2,506,730	2,137,349b	4,644,079	48	52
Tafea	273,380	0	273,380	0	100
Sector Total	**3,017,421**	**2,137,349**	**5,154,770**	**43**	**57**

Note: For consistency with other sectors, Torba and Sanma Provinces have been excluded. However, MIPU has carried out assessments for these two provinces, and figures are available.

a. Includes state-owned enterprises.

b. Only assessed (major) losses are recorded and have been assigned to Shefa Province. The distribution of the losses across the subsectors is shown in Table 39.

Potential impact of disaster effects on service delivery

Access to essential services was cut off to all the major centers around the country, and quality of service suffered because of cancelled flights, vessels not sailing, and inaccessible roads. Lack of all-weather access on most of the road network has also restricted the delivery of emergency supplies after the cyclone. Maritime services ceased for 10 days and airports were closed for 3 days during the cyclone, and these interruptions have severely impacted tourism and other services. While the airports and seaports themselves are now largely operational, it is assumed that inbound air and sea passenger (tourist) traffic will be disrupted for at least two more months.

Increased risks and vulnerabilities resulting from the cyclone

Transport infrastructure remains vulnerable to further damage and total failure unless emergency protective repairs are carried out immediately and restoration work is designed with sound engineering solutions to make the infrastructure climate resilient. Emergency attention is required to address (i) the airport at Lamen Bay on Epi Island; (ii) the landslide at Klems Hill on the Efate ring road; and (iii) the washed-out sections to the north of the Efate ring road. Proper engineering solutions that include climate-proofing measures need to be implemented immediately before further damage is inflicted by heavy rain.

Recovery Strategy and Needs

The total cost of the damage assessed to date is VT 3.02 billion, with the distribution across the three modes of transportation shown in Table 39 above. Even though the cost includes a 30% allowance for error taking into account the very rapid nature of the assessment, this figure may increase slightly after MIPU is able to visit and assess damage in the islands that have not yet been visited (as of April 2015).

MIPU will continue with repair works to roads and bridges using its 2015 budget allocation for maintenance as bridging finance, but the available funds fall well short of the total needs for recovery. Ongoing planned maintenance of other assets not damaged by the cyclone should continue at the same time. Supplementary funding therefore needs to be secured quickly to facilitate full construction of the emergency works and to ensure a smooth transition from the emergency phase to medium-term restoration and the application of BBB principles or long-term measures.

The losses as incurred by MIPU and the state-owned enterprises are unlikely to be recovered through own-source revenues and would need supplementary budgetary provision. Operation losses incurred by private sector operators are unlikely to have been covered by insurance. As private air

Cyclone damage to outer island domestic terminal in Epi. © Michael Bonte-Grapentin, World Bank Group.

and marine operators are expected to return to pre-disaster service levels in the coming weeks, the recovery strategy concentrates on reconstruction of airports, port facilities, and roads and bridges to ensure that travel can be brought back to normal levels as soon as possible and ongoing losses minimized. Given the extreme vulnerability of Vanuatu to natural hazard risk, all construction will be done to a soundly engineered standard, and phased as necessary.

Short-term recovery needs for the transport sector

The priority for the transport sector is to restore connectivity to essential services such as hospitals, schools, markets, and the main commercial centers around the country in the shortest possible time. This will benefit the entire population and in particular the poorer and more vulnerable groups, who have limited buffers for longer travel times on alternative routes. The expenditure on the emergency phase after one month of operation was in excess of VT 124 million, and at the time of this PDNA it was continuing to increase as clearing operations and emergency repairs were ongoing. It is expected that the emergency phase—during which assets are temporarily restored to function safely—will take up to six months. A number of private contractors located within the cyclone-affected islands have also assisted with the clearing works.

The reinstatement of the damaged transport assets to the pre-cyclone condition, applying sound engineering designs, will be a priority during the six-month to one-year time frame. More delay in such reinstatement will result in an increase in the losses and the cost of the repairs, as current damage will further deteriorate. Due to the vast area affected by Tropical Cyclone Pam, it is not possible to effectively carry out restoration work using the limited resources, both equipment and

manpower, that MIPU has in its force account operation and contract management. Therefore a combination of force account and contracting out needs to be carefully planned, with assistance for detailed engineering designs, environmental and social safeguards, and a project management team to be established within MIPU. Total short-term recovery need is VT 2.2 billion, as shown in Table 41.

Table 41. Short-Term Recovery Needs for the Transport Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Roads and bridges: Temporary repair of bridges and clearing of debris from roads, landslides, and waterways	422,523	MIPU/PWD
Aviation: Repair of airport terminal building and hangers and replacement of damaged equipment	66,088	MIPU, AVL, Private
Maritime: Replacement of damaged navigation aids	1,014	MIPU/P&M[a]
Road and bridges: Restoration of road sections, repair of bridges, restoration of drainage and professional engineering services	909,776	MIPU/PWD
Aviation: Repair of runways, installation of navigational aids and environmental safeguards, rebuilding of terminals, restoration of professional engineering services	736,145	MIPU, AVL
Maritime: Replacement of fenders to improve design at wharves; provision of additional bollards, lighting, and professional engineering services	53,066	MIPU/P&M
Total	**2,188,612**	

Note: PWD = Public Works Department; AVL = Airports Vanuatu Limited; P&M = Ports and Marine Department.
a. Private moorings have largely been replaced by the private sector.

Medium- to long-term recovery needs for the transport sector

To minimize the detrimental effect of natural disaster on transport infrastructure, the medium- and long-term restoration efforts should apply the BBB principle governed by soundly engineered designs for climate proofing using MIPU's *Vanuatu Resilient Roads Manual: A Design Guide for Low Volume Rural Roads in Vanuatu Based on Accessibility, Security and Sustainability* (PWD and MIPU 2014). For the aviation and maritime sectors, it is anticipated that ongoing sector development projects will incorporate such principles in all designs to be undertaken.[41] The total estimated cost for direct Tropical Cyclone Pam–related long-term response (BBB) is VT 1.7 billion, as shown in Table 42.

Table 42. Medium- to Long-Term Recovery Needs for the Transport Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Reconstruction of main highway sections	1,734,035	MIPU
Aviation	0	Ongoing development projects
Maritime	0	Ongoing development projects
Total	**1,734,035**	

[41] Transport-related projects currently being implemented by MIPU that might be drawn on to meet some of the recovery needs are the Vanuatu Aviation Investment Project, Port Vila Urban Development Project, Port Vila Tourism Infrastructure Project, Roads for Development (R4D) Program, Vanuatu Inter-Island Shipping Program, Shipping Subsidy Support Mechanism, Tanna Road Phase I and II, Malekula Road Phase I and II, and Port Vila Temporary Domestic Wharf.

The following principles and approaches are endorsed by MIPU (see PWD and MIPU [2014]) for future reconstruction activities:

- Due to the terrain and high rainfall, it is important for road designs and maintenance to emphasize drainage, such as by provision of scour checks, line drains, relief culverts, and outlets and soakaway pits. Consideration might also be given to elevating low spots (where practical) and sealing shoulders. Drainage structures should also rely more on in situ building of concrete pipe culverts rather than the use of corrugated pipes, given the aggressive environment and corrosion.

- Community consultations will be a key part of the implementation approach. Strong community ownership will be essential to ensuring longer-term sustainability of investments in the road network, particularly as communities are expected to play a substantial role in future routine road maintenance. As different groups (men, women, those with disability) may have different needs, the pre-construction engineering designs should be informed by meaningful engagement with communities, and with different groups within the communities, to identify needs, risks, and adaptation measures.

- Labor-based methods are very well suited for the construction of drainage structures, excavation of drainage channels, construction of soil berms, stone pitching, scour protection, etc. As part of the MIPU inclusive approach, both men and women will be provided with opportunities for participating in construction and planned maintenance employment.

- Roads should be built to be sustainable and climate resilient. All decisions made on the level of intervention must be based on the principle of no regrets. Whatever decision is made should allow for further modifications to be made in the future without excess cost or difficulty. The climate change design interventions should be reviewed every 5 to 10 years.

- As part of its ongoing institutional reforms, MIPU is focusing more on the setting of policy and oversight functions and wishes to facilitate the involvement of the private sector to the extent possible in the reconstruction effort. This involvement may be by way of construction contracts, community-based activities, or formal public-private partnerships as appropriate.

Gender considerations for recovery strategy

Transport infrastructure with strong linkages to women's needs include the roads that facilitate access to public infrastructure such as health facilities, courthouses, primary schools, child care facilities, and markets. Women are also frequent users of secondary and tertiary road networks because they are more likely than men to do connective trips.

Clearance of debris from secondary or tertiary roads should be considered when prioritizing recovery needs. Paid debris clearance programs should ensure that both women and men can benefit from them.

3.3.2 Public Buildings

Generally public buildings performed well during Tropical Cyclone Pam, although a number of buildings were in a weakened condition prior to the cyclone due to poor cyclic and routine maintenance, which limited their capacity to withstand even a moderate wind event.

Summary

Generally public buildings performed well during Tropical Cyclone Pam, although a number of buildings were in a weakened condition prior to the cyclone due to poor cyclic and routine maintenance, which limited their capacity to withstand even a moderate wind event. Such buildings have in many cases been damaged, and the damage is considerably worse than for those with a robust, sound construction. For damaged buildings, the damage is typically associated with roofing and the roof structure and has arrisen from poor construction standards in many of the colonial-age buildings. The major mode of failure is roofing iron, followed by roof structures not being securely fastened. There have been few examples of wall failures in the public buildings.

Buildings that were designed in the modern era generally performed well, as they were designed and constructed to a higher standard for cyclonic wind and seismic events. An emerging issue is exposure of asbestos sheeting used as a construction cladding in the past. This is obvious in a number of locations. As an issue of public health, this should be addressed as soon as possible.

Forty public buildings were identified by the Public Works Department for assessment. After categorizing the levels of damage, 11 were assessed as being more than 40% damaged, and the balance of the buildings were assessed as being superficially damaged (less than 40% damage). Two buildings in particular have been identified as requiring immediate reconstruction action:

- *The National Disaster Management Office building* under the Vanuatu Meteorology and Geo-Hazards Department (VMGD). The NDMO is designated as the controller for response and recovery operations under the National Disaster Act (Cap 276) of 2000. The building requires special attention given its essential pre- and post-disaster functions. The building was flooded during the cyclone event. The flooding occurred because of preexisting poor construction standards and building design detailing, and because of the abnormal nature of the rain event. Recommendations have been made as part of this PDNA to rectify the problems.

- *Malvatumauri Council of Chiefs building* has been damaged and needs restoration. This particular building has been highlighted here due to its important cultural and traditional lands tribunal function. However, the costs associated with the damage and recovery needs are included within the cultural sector assessment as part of this PDNA (Chapter 3.2.4).

Public Buildings Sector Background

There has been an ad hoc application of building codes and building standards, and this increases risk to public (and private) buildings during a disaster event such as Tropical Cyclone Pam.

Public buildings in and around Port Vila are a mixture of contemporary design and construction and colonial construction. The same mixture is found across the four provinces considered within this PDNA. In many cases, the buildings have not been designed for cyclonic wind events of any nature. The colonial-era buildings generally are not of good construction, especially the metal roof structures. There are also examples of concrete cancer within this building group associated with the age of the buildings and the lower construction standards at the time.[42] Poor routine and cyclic maintenance left these public buildings vulnerable to the cyclone. Buildings constructed according

[42] Concrete cancer is concrete degradation caused by the presence of contaminants or the action of weather combined with atmospheric properties.

to contemporary design and construction standards are of a more resilient stock, having been specifically designed and constructed for cyclonic conditions and seismic activity.

Public (government staff) housing appears to have been constructed to a much lower standard than the other contemporary public buildings. Public/staff housing construction has suffered from the building profession's lack of knowledge of standards appropriate for cyclonic and seismic events. The construction industry would greatly benefit from future capacity building, technical assistance, and targeted changes in professional practice to make use of standards appropriate to robust construction for severe cyclonic and seismic events. Public/staff housing also appears to have suffered from neglect (i.e., poor cyclic and routine maintenance), which left the roofing and roof structures particularly vulnerable to cyclonic events, and then once damaged vulnerable to rain.

Assessment of Disaster Effects on Public Building Sector

The effects of Tropical Cyclone Pam on public buildings varied across the islands of Vanuatu. While the damaging effects of the wind were limited in the northern provinces, they resulted in significant damage to public buildings in the southern provinces of Shefa and Tafea. Damage to buildings, furniture, and equipment were also incurred due to inundation from rain. The total cost of the damage to public buildings was estimated to be VT 532 million.

Losses are linked to costs associated with lost rental income, removal of rubble and mud from damaged buildings, and retrieval of public data/records that were damaged or lost during Tropical Cyclone Pam. The total loss was estimated to be VT 12 million.

A summary of the damage and loss associated with public buildings is presented in Table 43. The distribution of damage and loss by province is presented in Table 44.

Table 43. Quantification of Damage and Loss in Public Buildings Sector (VT 1,000)

Subsector	Damage[a]	Losses	Total Effects	Private (%)	Public (%)
Government offices	274,441	9,000	283,441	0	100
Government Staff Housing	136,829	3,000	139,829	0	100
VMGD Emergency Warning Centre	121,089		121,089	0	100
Sector Total	**532,359**	**12,000**	**544,359**	**0**	**100**

a. The Ministry of Infrastructure and Public Utilities divided damage into four categories: 0 for a structure habitable with only cosmetic damage; 1 for a structure damaged and currently fully or partly uninhabitable but repairable (10–15% of total asset); 2 for a structure temporarily uninhabitable and needing major repairs (15–40% of total asset); and 3 for a structure permanently uninhabitable and condemned.

Table 44. Distribution of Damage and Losses for Public Building Sector by Province (government offices only) (VT 1,000)

	Damage	Losses	Total Effects	Private (%)	Public (%)
Shefa[a]	227,536	700	228236	0	100
Tafea	117,396	200	117596	0	100
Geographic Location of Data Not Available	187,427	11,100	198527	0	100
Sector Total	**532,359**	**12,000**	**544,359**	**0**	**100**

Note: Although buildings in the province of Torba have been excluded from the PDNA figures, they were especially affected by the week-long rain event and flooding associated with Tropical Cyclone Pam.

a. Data for Shefa include the VMGD Early Warning Centre.

Increased risks and vulnerabilities resulting from disaster

An emerging issue related to public buildings following Tropical Cyclone Pam is the exposure of asbestos sheeting, which was used as a construction cladding in the past and has been uncovered in a number of locations. As an issue of public health, this damage should be addressed as soon as possible.

A significant ongoing issue at the time of this PDNA is the damage from the original rain event as well as from subsequent periods of rain. The inundation of buildings after damage to the roof has resulted in loss of records and data. Two examples of this issue are the Ministry of Finance and Economic Development building and the archive store in the Provincial Affairs Department in the Ministry of Internal Affairs.

Recovery Strategy and Needs

The total monetary value of recovery needs, in the short term (12 months) and in the medium- to long-term (12–48 months) is shown in Table 45 and Table 46. Needs have been calculated in accordance with the principle of BBB, to ensure that reconstructed public buildings can withstand Category 5 cyclones in the future.[43] A close examination of this event in terms of wind speed and return period needs to be undertaken, to determine if Category 5 is to become the new normal. The NDMO and associated first-responder buildings should be closely examined, possibly reverse-engineered, to ensure that they are able to withstand cyclones and other hazards. Less important buildings, with a shorter building life expectation, can be designed and constructed for a lower cyclone category.

Adhering to the principle of BBB will add between 10% and 15% to construction costs. The significant reconstruction issues for Vanuatu are a better standard for roof structure tie-down to walls, better and heavier members sizes for rafters and purlins, and better and more robust metal roofing decks fixed with heavy gauge screws and storm washers. It was found that due to the seismic conditions in Vanuatu, building walls in permanent construction generally have a default standard of original construction that is robust, with considerable redundancy for cyclonic wind action.

Short-term recovery needs for public buildings sector

At the time of this PDNA, reconstruction of damaged public buildings has generally proceeded with little or no regulation or supervision. There is a real need to ensure that construction work on government buildings is carried out to an appropriate standard. Recovery needs in the short term include the need to ensure that the emergency repairs and the rapid rebuilding of public buildings is properly supervised. There is also a need to ensure containment of any threat from asbestos cladding. The short-term recovery needs are presented in Table 45.

Table 45. Short-Term Recovery Needs for the Public Buildings Sector

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Public Buildings: Offices	Emergency repair	181,061	PWD
Public Staff Housing	Emergency repair	47,559	PWD
VMGD	Emergency repair	68,624	
Total		**297,245**	

[43] The building standard varies depending on the importance of the building. A policy for future hazard events and building standards needs to be determined.

Medium- to long-term recovery needs for public buildings sector

Proposed medium- to long-term needs include capacity building and technical assistance for promotion of better building standards (Table 46).

Regarding government public buildings and public staff housing, a concerted effort is needed to increase awareness and practical application of better building standards and better regulation of building practices. There are no building control standards in Vanuatu, although the Building Act was recently passed (2014) and a draft building code has been prepared and is awaiting approval. Its practical application would be most appropriately focused on the formal building stock—government and public building and facilities, along with commercial and high-value residential buildings. Technical assistance within the Public Works Department (PWD), the three urban municipalities, and the professional institutes is recommended to address this issue in practical form.

Table 46. Medium- to Long-Term Recovery Needs for the Public Buildings Sector

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Public Buildings: Offices	Rebuild	93,380	PWD
Public Staff Housing	Rebuild	89,269	PWD
VMGD	Improvement works	52,465	
Public Works Department	Capacity building/technical assistance for building standards	45,000	PWD
	Identification of asbestos threat hazard	15,000	PWD
Total		**295,114**	

3.3.3 Water, Sanitation and Solid Waste

Summary

Strong winds and intense rain from Tropical Cyclone Pam damaged water and sanitation infrastructure, which in turn has affected health, protection, and education. Damage to rural and peri-urban water supply networks has primarily impacted rainwater catchment systems, with roofs, guttering, and pipework the most affected. Rainwater-dependent islands have been most vulnerable in the aftermath of the cyclone, as communities have limited water source alternatives. Urban water infrastructure managed by the private company UNELCO suffered no major damage, and the company anecdotally reported minimal losses. Sanitation superstructures (i.e., structures above the ground) made from bush materials suffered considerable damage. As a result, women, children, and vulnerable people now lack privacy and, in some cases, safe access to sanitation facilities. Education and health facilities also suffered substantial damage to water and sanitation facilities, primarily associated with rainwater catchment systems and bush toilets.

Solid waste management suffered substantial losses due to the large amounts of green waste and building material debris that need to be collected, transported, and processed. This has put additional pressure on the landfill space and waste management resources.

Strong winds and intense rain from Tropical Cyclone Pam damaged water and sanitation infrastructure, which in turn has affected health, protection, and education.

Water, Sanitation and Solid Waste Sector Background

Water. Currently there are many actors in the water sector. The Department of Geology, Mines and Water Resources (DGMWR) under the Ministry of Lands and Natural Resources (MLNR) is responsible for rural water supply and water resources management. The Department of Public Health, under the Ministry of Health, is responsible for health promotion and sanitation messaging. The Department

People developing immediate solutions to the destroyed housing and rainwater harvesting systems on Mataso Island. © Brecht Mommen, UNICEF. Reproduced with permission; further permission required for reuse.

of Public Works, under the Ministry of Infrastructure and Public Works, is responsible for peri-urban water supplies in provincial centers. The regulation of water in Vanuatu is controlled by the Utilities Regulatory Authority (URA) under the Ministry of Finance. The Ministry of Education and Training is responsible for ensuring access to water and sanitation facilities and integrating hygiene promotion into curriculum at schools. UNELCO is a private enterprise and the utilities concession holder for the production, transport, and supply of water (in addition to electricity). Access to improved drinking water in Vanuatu is on track to meet the 2015 Millennium Development Goal indicator 30—that is, 84% national coverage (WHO/UNICEF 2014).[44] The four provinces covered by this PDNA each have a unique composition of water supply systems including piped (gravity fed and pumped), borehole, protected well or spring, and rainwater.

Sanitation. The percentage of the population using sanitary means of excreta disposal in Vanuatu is slightly under the 64% target of Millennium Development Goal indicator 31 (WHO/UNICEF 2014). Sanitation coverage is achieved predominately through ventilated improved pit (VIP) latrines and basic pit latrines. Both take advantage of local bush material superstructures that make them significantly susceptible to damage from high winds.[45]

Solid waste. The Port Vila Municipal Council (PVMC) and the Lenakel Municipal Council are responsible for solid waste management and report to the Department of Local Authorities under the Ministry of Internal Affairs. PVMC is responsible for providing municipal solid waste collection service for all residences, businesses, and government offices within the boundaries

[44] Improved drinking water sources include sources that, by nature of their construction or through active intervention, are protected from outside contamination, particularly fecal matter.

[45] The superstructure consists of a simple 1m x 1m square building, approximately 2m tall, made of local bush materials such as bamboo and coconut leaves.

of the municipality. Before Tropical Cyclone Pam, the waste management within PVMC was both understaffed and underresourced, with aging infrastructure. Public (weekly or biweekly) and private collection provide limited coverage, with about 60% of waste generated collected and deposited at the Bouffa landfill. There is little or no waste collection at the edges of the municipality or in the peri-urban informal settlements, where waste is dumped or burnt. Prior to Tropical Cyclone Pam, four of PVMC's eight collection vehicles were in need of repair, as was heavy equipment at the landfill. On Tanna, the Lenakel Municipal Council was struggling to collect waste before the cyclone. Without its own collection vehicle, it was resorting to hiring taxis to pick up waste around Lenakel and drop it off at a temporary, unsanitary dump site. The waste management budget for Tanna Island in 2015 is reportedly only VT 100,000.

Assessment of Disaster Effects on the Water, Santiation and Solid Waste Sector

Damage to the water, sanitation, and solid waste sector

Water. The major damage to water infrastructure was to rainwater catchment structures and associated pipework, as can be seen in Figure 8. The systems were damaged in both urban and rural settings due to strong winds, flying debris, and fallen trees. Gravity pipeline systems have been damaged due to falling trees and landslides, with the damage exacerbated by pipelines not being buried. Damage to pumped systems is predominately related to the pump failure through direct impact, surge damage, or loss of power. Groundwater sources have been contaminated from debris and seawater in coastal areas. The impact of the damage was exacerbated by systems being unprotected but also through poor hygiene practices such as open defecation, resulting in fecal contamination of wells.

Urban water infrastructure damage to the UNELCO network include isolated and limited pipeline washouts and damage to one large storage tank. The UNELCO urban water network was predominately unaffected, and the company was able to get the system online within the week using its self-insurance reserves. Within the urban municipality of Port Vila, there is little knowledge of damage to private systems that are not a part of the UNELCO network. The same is true for the peri-

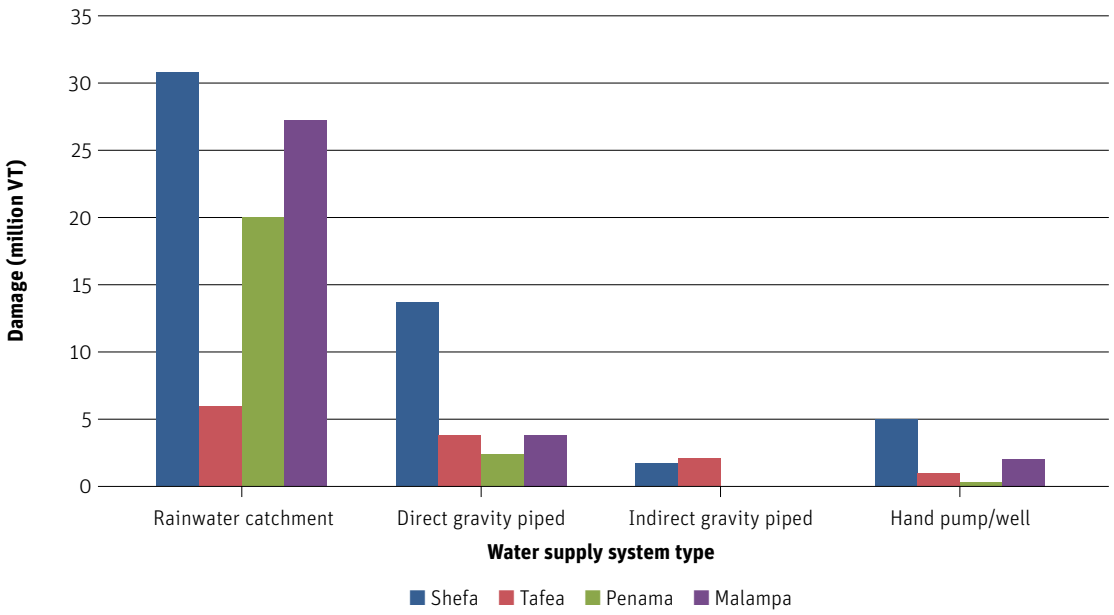


Figure 7. Damage to the Public Water Subsector by System Type and Province

Sources: DGMWR 2015; Shelter 2015; UNICEF 2015.

urban private water networks on the boundaries of Port Vila. The damage to these private networks was not established as part of this PDNA.

Sanitation. Sanitation infrastructure suffered considerable damage, with nearly 70% of sanitation superstructures destroyed. The superstructures are predominantly constructed from bush materials, which increases their vulnerability to strong winds and flooding. There has been minimal substructure/below-ground damage due to inundation. The only urban piped wastewater system—at the national hospital in Port Vila—was not reported as damaged. The majority of urban sanitation systems are septic tanks that reportedly incurred no damage.

WASH for health and education facilities.[46] Damage to water and sanitation assets in the health sector have been estimated at approximately VT 113 million (Chapter 3.2.2). Damage to water and sanitation assets in the education sector have been estimated at VT 270 million (Chapter 3.2.3). Even before Tropical Cyclone Pam, the water, sanitation, and hygiene (WASH) infrastructure in place at health care facilities fell short of internationally recognized standards for such facilities (WHO 2015). There are currently no national standards or recognized guidelines for WASH in the health or education sectors. This omission will need to be addressed in both short-term and medium- to long-term recovery and rehabilitation plans.

Solid waste. There was minor partial damage to a number of roof structures on workshops and operational buildings related to solid waste management. There was also 100% damage to waste collection receptacles in Lenakel.

Losses to the water, sanitation, and solid waste sector

Water and sanitation. Communities with limited sources of water have increased vulnerability to natural hazards such as cyclones, storm surges, and floods, which can destroy or contaminate their primary water source. Once these primary improved drinking water sources are damaged or destroyed, there is a considerable loss to individuals, who are forced to use secondary and tertiary sources. Up to 80% of this loss is attributable to lost productive time,[47] which results when additional time is needed to collect, transport, and store water. Secondary sources are also generally of lesser quality, quantity, and reliability, and are used for activities such as washing. They are also predominantly unprotected and hence likely to become contaminated. This increases the disability-adjusted life years[48] of individuals and results in losses in terms of additional medical treatment costs, lost productive time for disabled individuals, and lost productive time for those (predominately women) who nurse them. Losses to UNELCO have not been disclosed so have not been covered in this PDNA.

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[46] WASH damage and loss estimates for health and education facilities have been considered within the health and education chapters of this PDNA (Chapter 3.22 and chapter 3.23 respectively). These figures are discussed here for information only, and have not been considered within the total damage and loss estimates for the water, sanitation and solid waste sector.

[47] The method used to estimate these losses to individuals from damage to both water and sanitation infrastructure was derived from the global cost-benefit analysis of water supply and sanitation interventions conducted by the World Health Organization (Hutton, Haller, and Bartram 2007; Hutton and Bartram 2008; Evans et al. 2004; OECD 2011). The lower benchmark in Western Pacific Region B of US$1 investment equals US$12 increased economic output was used. The logic was then reversed so that US$1 of asset damage would result in US$12 of economic loss. It was assumed that the losses would be incurred until the preexisting level of service was recovered (3 months) and the benefit/loss was equally distributed throughout the life of the asset (120 months).

[48] The disability-adjusted life year (DALY) is a measure of overall disease burden expressed as the number of years lost due to ill health, disability, or early death.

Solid waste. Losses associated with solid waste management have been due to the large amounts of green waste and building material debris that need to be collected, transported, and processed. This has put additional pressure on the landfill space, the machinery operating at the landfill, and the waste collection fleet. Following Tropical Cyclone Pam, the Public Works Department worked for four weeks clearing green waste from the municipal area at its own cost. It hired six loaders and 13 trucks and had four chainsaw teams operating for the first two weeks; for the next two weeks the department hired three loaders and nine trucks.

The total damage and losses by subsector and province are presented in Table 47 and Table 48 respectively.

Table 47. Total Damage and Losses in the Water, Sanitation, and Solid Waste Sector (VT 1,000)

Sector	Damage[a]	Losses	Total Effects	Private (%)	Public (%)
Water	198,305[b]	152,462[c]	350,767	65	35
Sanitation	210,000	63,000	273,000	77	23
Solid Waste Management	5,250	68,250	73,500	0	100
Sector Total	**413,555**	**283,712[d]**	**697,267**	**63**	**37**

Sources: DGMWR 2015, Shelter 2015, UNICEF 2015.

a. Damage assessment reports were taken from a number of sources, primarily DGMWR (2015), Shelter (2015), and UNICEF (2015). Replacement costs were estimated directly by UNELCO, DGMWR, and World Bank for damage up to 40%. Damages greater than 40% were estimated as requiring full replacement. Full replacement costs were estimated from current DGMWR project budgets of similar assets in the same province.

b. An estimated VT 360 million in damage to private rainwater harvesting infrastructure (typically private household roofs) was included in the housing sector. This amount has not been double-counted within this chapter.

c. Losses to UNELCO have not been disclosed for the urban water sector so have not been covered in this PDNA.

d. Of total losses, 70% is attributed to private households and is included for information purposes only.

Table 48. Distribution of Combined Damage and Losses for Water, Sanitation, and Solid Waste Management by Province (VT 1,000)

Province	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	93,155	54,497	147,652	68	32
Penama	30,600	15,180	45,780	45	55
Shefa	210,410	168,533	378,943	61	39
Tafea	79,390	45,502	124,892	68	32
Total	**413,555**	**283,712[a]**	**697,267**	**63**	**37**

Sources: DGMWR 2015; Shelter 2015; UNICEF 2015.

a. Of total losses, 70% is attributed to private households and is included for information purposes only.

Increased risks and vulnerabilities resulting from disaster

A key vulnerability that has emerged concerns those communities that rely solely on rainwater and that had their systems damaged or destroyed during the cyclone. The islands of Tongariki, Mataso, Makira, Buninga, Nguna, Moso, Aniwa, and South East Ambrym will require emergency assistance during the recovery phase, and consideration should be given to fostering resilience on these islands in the medium to long term through drilling shallow bores with hand pumps.

Initial rapid assessments indicate that there has been a substantial increase in open defecation and sharing of latrines by multiple people due to lack of private toilets. In the aftermath of the cyclone, 30% of rural communities reported that they are resorting to open defecation, compared to a 2.5% rural open defecation baseline. The increase in this practice aggravates the risk of diarrheal diseases (VNSO and SPC 2014).

Recovery Strategy and Needs

Short-term recovery needs for water, sanitation, and solid waste management

Water and sanitation. In the short term, the WASH sector will focus on preventing the outbreak of communicable diseases by providing immediate access to basic water, sanitation, and hygiene services and restoring protective environments. Due to the volume of work needed to reestablish access to safe drinking water and sanitation systems, especially in Shefa and Tafea Provinces, the WASH sector, led by DGMWR, will focus on increasing the capacity for project delivery at the national and provincial levels. This will require additional logistical support as well as resources for communication. Strong linkages will be required with the Ministry of Health regarding sanitation and hygiene activities and with the Ministry of Education and Training to provide access to WASH in schools. Recovery activities will reinforce effective collaboration between government and partners to deliver a coordinated set of WASH activities. Recovery activities will be informed by and responsive to health, education, protection, and other sector priorities and trends, with a strong focus on disaster risk reduction principles. DGMWR, as the lead agency for water supply and water resources management in the country and as WASH Cluster lead agency, will coordinate WASH recovery activities with all partners; this approach will ensure cohesion, quality, and prioritized action as well as systematic and continued monitoring. Support provided to DGMWR for WASH Cluster coordination will reinforce DGMWR's nonemergency sector coordination role.

Solid waste. Due to the extreme volumes of green waste being received at Bouffa landfill, the current landfill cell is now overflowing, and an additional cell will be required. A similar situation exists at Lenakel, where the landfill site is now overflowing and a new site will need to be located and built. Transport trucks in Lenekal are hired to collect the household and business house waste each week. Transport trucks are now in high demand, and a dedicated waste management collection vehicle is required for the future. The short-term needs are presented in Table 49.

Table 49. Short-Term Recovery Needs for the Water, Sanitation, and Solid Waste Sector

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Water and Sanitation	Provide the most vulnerable displaced and disaster-affected women, girls, men, and boys with timely and dignified access to safe and appropriate WASH services according to assessed needs, including schools and health centers	200,000	MLNR MoH MoET
Water and Sanitation	Provide effective coordination within the WASH Cluster and strengthen capacity for high-quality implementation through government mechanisms	50,000	MLNR
Water and Sanitation	Effectively coordinate within the WASH sector and strengthen capacity for high-quality implementation	3,000	MLNR
Solid Waste Management	Add additional cell to Bouffa landfill, including safe disposal of additional hazardous medical waste	60,160	PVMC
Solid Waste Management	Build an appropriate-size engineered landfill and purchase a camion for waste collection	52,000	Lenakel Municipal Council
Total		**365,160**	

Note: MoH = Ministry of Health: MoET = Ministry of Education and Training.

Medium- to long-term recovery needs for the water, sanitation, and solid waste management sector

Water, sanitation, and hygiene recovery activities will be used to reinforce the long-term sector outcomes of providing sustainable and equitable access to WASH facilities and increasing the

practice of safe hygiene behaviors in Vanuatu. Activities will be led by the DGMWR and will focus on improving the quality of implementation, planning, coordination, and monitoring within the sector.

In the medium term, recovery will focus on ensuring that communities have access to, and are able to manage and sustain, WASH services for enhanced resilience to future disasters. In order to complement planned sector development programs, recovery activities should help communities reduce their vulnerability to WASH-related health risks, and ensure that people return to protective environments with WASH services in communities, schools, and health care facilities. Rather than replacing damaged infrastructure to the same design standard, rehabilitation activities will use a BBB approach to community water supply systems with the aim of improving their resilience to future disasters. This effort will have to be accompanied with the preparation of infrastructure standards and guidelines, combined with monitoring and audits of designs and construction by the DGMWR. Community planning and management tools like drinking water safety and security plans will reinforce normal operations and maintenance trainings at the village level.

The extensive damage in four provinces of the country means that the main WASH sector must strengthen its collective capacity for high-quality program delivery in order to restore services. All actors (i.e., government, NGOs, and the private sector) should focus on establishing strong subnational management, technical, planning, and implementation capacity, which will reinforce the implementation of the 2008–2018 National Water Strategy. To guide the recovery process, the WASH sector should strengthen its use of evidence-based bottom-up planning and budgeting processes, with attention to vulnerable groups and communities.

In collaboration with the Ministry of Education and Training and the Ministry of Health, recovery activities should aim to restore and improve access to (and information about) water, sanitation, and hygiene facilities at schools and health care facilities. Some of these facilities were damaged by Tropical Cyclone Pam, although it is recognized that many did not meet established standards before the cyclone. Rebuilt facilities will be improved to a higher level of service.

An equity focus in planning may also warrant attention to peri-urban areas and informal settlements. Vanuatu has the advantage of effective private sector utility provision in urban areas. The government and the Utilities Regulatory Authority should work to provide a legal or contractual arrangement that enables private sector involvement in the ongoing maintenance and operation of any new rural water systems established as part of the post-cyclone recovery program. Medium- to long-term needs are presented in Table 50.

Table 50. Medium- to Long-Term Recovery Needs for the Water, Sanitation, and Solid Waste Sector

Sector	Program of Activity	Value (VT 1,000)	Responsible Agency
Water and Sanitation	Rehabilitation of damaged water systems in communities using a BBB approach to reduce disaster risk (in rural and peri-urban areas)	360,845	MLNR
Water and Sanitation	Rehabilitation of damaged water and sanitation systems in health and education sector using a BBB approach to reduce disaster risk (in rural and peri-urban areas)	200,000	MLNR MoH MoET
Water and Sanitation	The creation of legal and contractual environment to enable private sector in operation and maintenance of rural water supplies	2,000	MoF URA
Total		**570,845**	

Note: MoH = Ministry of Health; MoET = Ministry of Education and Training; MoF = Ministry of Finance.

The following will also be considered during recovery activities for the water, sanitation, and solid waste sector:

- The midterm review of the 2008–2018 National Water Strategy in February 2015 identified four core issues for implementation of the strategy, which are also relevant to post–Tropical Cyclone Pam recovery and rehabilitation activities: (i) improved coordination between all stakeholders (government, nongovernment, and development partners) at all levels (national and subnational); (ii) stronger leadership by the DGMWR, including the establishment of priority development plans and strengthening of monitoring; (iii) increased human resources capacity, especially at the subnational level, where limited capacity was identified as a bottleneck to delivering services on the ground; and (iv) closer partnerships between government and nongovernmental organizations. It is important that these core issues are addressed and appropriately resourced in the medium to long term.

- The DGMWR national office currently operates out of a condemned building that has been further damaged by the cyclone. In order for any institutional reform and strengthening program to be effective, the necessary physical resources—and the funding for them—must also be considered. Assets such as offices, vehicles, boats, drilling capacity, and communications all require additional human and financial resources.

Gender considerations for recovery strategy

Traditionally, women are the main users, providers, and managers of water in households, as well as the guardians of household hygiene, which means that they are the most affected when water systems break down. The cyclone has made the situation for vulnerable communities, who depend entirely on rainwater harvesting, even more dire. The extensive destruction of roof water-catchment systems along with pollution of water tanks, rivers, and springs means that previously clean water sources are no longer usable, and that alternative water sources are inaccessible—and thus that women and girls are now spending more time collecting water. The economic analysis of the water sector shows that women and children have lost about VT 295,180,356 due to the extra time used for water collection. This time could have been used for income generation or for schooling. Almost 50% of this economic loss is borne by women in Shefa Province.

Given the destruction of 90% of sanitation superstructures across the four provinces considered within this PDNA, there has been an increase in the number of people using the few remaining sanitation facilities and in the number of those without access to facilities. Inadequate access to safe, hygienic, and private sanitation facilities is a source of shame, physical discomfort, and insecurity for women and girls, particularly those menstruating, pregnant, or lactating. Defunct water and sanitation systems mean that women and girls have to walk further distances for water collection or for ablution privacy, thereby putting themselves at an increased risk of sexual and gender-based violence. Likewise, there has been an increased use of untreated water for cooking and drinking, and this, coupled with poor sanitation conditions, has the potential to increase the spread of vector-borne diseases and further increase the burden of work for women, who are the primary family caregivers.

The restoration of potable water is an urgent need in order to save lives, prevent the spread of diseases, reduce the burden of work for women and girls, and prevent an increase in gender-based violence. Women have a strong incentive to acquire and maintain improved, conveniently located water facilities, as they and their families benefit most when water quality and quantity improves. Given their long-established and active role in water management, women should play a key role in identifying long-term measures and solutions related to access to and use of water.

Men walk by damaged power lines in Port Vila. © Becky Last, Vanuatu Dept. of Tourism.

3.3.4 Energy

Summary

The energy sector in Vanuatu encompasses the subsectors of electricity, petroleum, and liquefied petroleum gas (LPG). Damage and loss to the energy sector following Tropical Cyclone Pam totaled almost VT 0.3 billion.

Electricity. Electricity was the energy subsector most affected by Tropical Cyclone Pam, particularly in Efate and Tanna Island, although minimal damage was recorded in Malekula and Santo. Disaster risk reduction measures for the electricity subsector must be considered as part of recovery activities. These could include the introduction of underground cabling and other disaster-resilient features, as well as backup generators to prevent disaster-related interruptions for customers and agencies.

Petroleum. The Pacific Petroleum Company, the only petroleum supplier in Vanuatu, reports minor damage to its building infrastructure. No major damage was identified for its vital infrastructure/assets.

Liquefied petroleum gas. Origin Energy, the only LPG supplier in Vanuatu, shows no record of damage to its main terminals in Efate and Santo. However, its retail shop in Tanna was totally destroyed, and some of its major assets—mainly cylinders and fittings—were lost.

The energy sector in Vanuatu encompasses the subsectors of electricity, petroleum, and liquefied petroleum gas (LPG). Damage and loss to the energy sector following Tropical Cyclone Pam totaled almost VT 0.3 billion.

Energy Sector Background

Electricity. Only one-third of the population of Vanuatu has access to electricity. Electricity access is primarily through a connection to the regulated grid in the two main urban areas (Port Vila and Luganville), in addition to Tanna and Malekula. The share of those without access to electricity remains high, with 24% of the population not connected to electricity on Efate, 65% on Santo, 86% on Tanna, and 84% on Malekula. Percentages are also high in rural areas: 83% to 85% of the population in Tafea and Shefa Provinces are not connected to electricity, and 92% are not connected in Malampa Province.

Outside the concession areas, the Department of Energy (DoE), within the Ministry of Climate Change and Natural Disasters, is responsible for electrification. Other government ministries involved in the electricity sector include the Ministry of Infrastructure and Public Utilities, which is responsible for all public infrastructure, and the Ministry of Education and Training and the Ministry Health, which have in the past been beneficiaries of solar energy packages for social institutions through donors. Power supply outside the concession areas is through some mini-grids, stand-alone solar and diesel systems, and pico lighting. UNELCO is the private company that operates the electricity concession for Efate, Malekula, and Tanna. The electricity services in the concession areas of Vanuatu are regulated by the URA under the Ministry of Finance.

Petroleum and LPG. The Pacific Petroleum Company is the only petroleum supplier in Vanuatu. Origin Energy is the only LPG supplier in Vanuatu.

Assessment of Disaster Effects on the Energy Sector

Damage to the energy sector

Electricity. UNELCO's records show that Efate and Tanna islands were the most affected locations in its concession areas. The predominant damage was to the transmission and distribution lines, of which a total of 65,000m was partially damaged or destroyed. An estimated 12,000 customers were affected, representing approximately 5% of UNELCO's base load.

The off-grid portion of the electricity sector shows no or minimal damage and losses. The assessments suggest that owners of individual solar home systems prepared before the cyclone by removing the systems and securely storing them. Damage and losses to private household solar systems are included in the housing sector of this report.

It should be noted, however, that people outside of the concession areas have been severely affected. Many rural communities have seen most houses destroyed, along with their household effects. Currently most of the aid is focused on food, water, and shelter, and little is being done to address energy needs, especially in the Shepherd Islands, Tanna, and Erromango, as well as parts of Ambae, Ambrym, and Banks Islands, where the effects of the cyclone were severe.

Damaged power lines in Efate. *Source:* Government of Vanuatu.

Losses to the energy sector

It is estimated that there will be VT 5 million in losses to the LPG sector from the closure of major hotels and businesses, assuming these recover within three months. There were no losses estimated for the petroleum subsector. The total damage and losses are presented in Table 51 (by subsector) and in Table 52 (by province).

Table 51. Total Damage and Losses in Energy Sector by Subsector (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Electricity	165,900	100,000	265,900	100	0
Petroleum	10,000	0	10,000	100	0
LPG	3,500	5,500	9,000	100	0
Sector Total	**179,400**	**105,500**	**284,900**	**100**	**0**

Table 52. Damage and Losses in Energy Sector by Province (VT 1,000)

Province	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	N/A	N/A	N/A	N/A	0
Penama	N/A	N/A	N/A	N/A	0
Shefa	140,030	85,000	225,030	100	0
Tafea	39,370	20,500	59,870	100	0
Total	**179,400**	**105,500**	**284,900**	**100**	**0**

Note: N/A = not applicable.

Recovery Strategy and Needs

Short-term recovery needs for the energy sector

In the short term, the electricity sector will need backup generators for some specific areas where there are still electricity outages. UNELCO has proposed the use of standby generators of 25KVa capacity, which cost approximately VT 1 million each. This type of generator can provide power for 40–60 households, depending on the type of customers. There are no short-term needs that have been identified in regard to the petroleum and LPG subsectors. The short-term recovery needs are presented in Table 53.

Table 53. Short-Term Recovery Needs for the Energy Sector

Subsector	Program of Activity	Value (VT 1,000)	Responsible Agency
Electricity	Backup generator sets for the few areas (peri-urban areas specifically) still without electricity	3,000	DoE/UNELCO
Total		**3,000**	

Medium- to long-term recovery needs for the energy sector

Longer-term recovery needs include the provision of backup generators for critical infrastructure, such as hospitals, pharmaceutical storage sites, airports, and wharves. In order to ensure an equity-based focus on recovery planning, greater attention should be given to peri-urban areas and informal settlements. There are no medium- to long-term needs that have been identified in regard to the petroleum and LPG subsectors. The medium- to long-term recovery needs are presented in Table 54.

Table 54. Medium- to Long-Term Recovery Needs for Energy Sector

Subsector	Program of Activity	Value (VT 1,000)	Responsible Agency
Electricity	Backup generators for vital customers including hospitals, pharmaceutical storage sites, airports, wharves, etc.—25KVa generator sets recommended	10,000	DoE/UNELCO
Total		**10,000**	

Gender considerations for recovery strategy

Renewable energy (such as solar energy) has the potential to spur rural economic development. For example, it can allow women to more efficiently process and preserve food for sale, or engage in other economic activities. In consultation with women, restoration of energy services should explore mechanisms for making community and household energy resilient to disasters. Light in evacuation camps and WASH facilities can play a critical role in preventing violence against women and should be part of a comprehensive recovery strategy.

3.3.5 Communication

Summary

Damage and loss to the communication sector following Tropical Cyclone Pam totaled over VT 2.6 billion.

Damage and loss to the communication sector following Tropical Cyclone Pam totaled over VT 2.6 billion. The data collected as part of this PDNA show that the worst impacts from Tropical Cyclone Pam on the communications sector were incurred in Shefa Province, followed by Tafea and then Malampa.

The most substantial damage was sustained by the communication distribution networks. Transmission towers in Shefa and Tafea were partly or totally destroyed, and equipment on towers in all four affected provinces was damaged. This damage resulted in a loss of service across both mobile phone and data services operators as well as radio and TV broadcasting. As a result of the initial damage, no communications services were available outside of Port Vila on the morning of March 14. For the outer islands, services were unavailable for approximately a week. In Tafea Province, it took up to three weeks to restore some services, and at the time of this PDNA, work still remained to be done to finalize this repair. While operators have restored most services to date, some islands still face downtime in crucial telecommunications service.

Services to the Vanuatu government provincial offices have been repaired temporarily with the support of equipment from the Emergency Telecommunications Cluster. The iGov network repair for the area servicing the northern island is based on an interim IP radio solution. A more substantial rebuild is planned as funds become available.

Both the private sector and the government showed excellent immediate disaster coordination and rapid response. Emergency satellite communications were established to many islands within 5 days, and approximately 80% of the networks were functioning (with some loss in service quality) after 10 days.

The Vanuatu Post network sustained losses in revenues due to business interruption for large clients in Vanuatu (e.g., pharmaceuticals) and had significant water damage to stamps and stamp archives.

The two greatest hindrances affecting the speed of recovery are (i) the logistics, time, and effort required to ship required materials to locations throughout Vanuatu; and (ii) the fact that electricity—needed to power telecommunications systems—has been unavailable in badly damaged areas (such as Tanna) or slow to be reestablished.

Destroyed satellite dish on Tanna Island, Taefa Province. © Anacle Namen, the Office of the Government Chief Information Officer.

As a result of the damage sustained, the transmission networks must be rebuilt in the worst-affected locations, and this process was under way at the time of this PDNA. Significant investment in new towers and equipment will be required by all communications networks in 2015. These investments will very likely affect the profitability of the private sector businesses, but it is assumed that the costs of the damage will in many cases be recovered from insurance coverage held by the operators. For this reason the recovery needs of the private sector have not been included in this PDNA.

Communication Sector Background

The Office of the Government Chief Information Officer (OGCIO) is responsible for managing the private network that services government traffic exclusively. This network relies on a combination of microwave and satellite technologies. Much of the voice traffic is carried by Voice over Internet Protocol (VOIP) services.

The Office of Telecommunications and Radio Communications Regulator (TRR) is the independent statutory regulatory agency responsible for regulating the telecommunications sector and facilitating telecommunications development. TRR has, to date, issued eight telecommunications licenses for the provision of telecommunications services in Vanuatu. Two service providers offer mobile and Internet services, and the rest offer Internet services, particularly in the urban areas.

Before Tropical Cyclone Pam, the mobile network population coverage was estimated to be about 93%, which means that many citizens in all provinces were enjoying access to a telecommunications service before the cyclone struck. That coverage provided for growing uptake of the mobile and Internet services each year; e.g., mobile subscriptions have increased by 18% since 2013, and Internet service subscriptions increased by 34% over the same period. (See TRR's annual reports for further information.[49]) With increased uptake of services in all provinces, the telecommunications sector is contributing significantly to the national GDP, at an estimated 5%.[50]

[49] See http://www.trr.vu/index.php/en/public-register/publications.

[50] The telecommunications sector contribution to Vanuatu's GDP can be expected to increase once the implementation of the government's Universal Access Policy is complete, with service provided to 98% of the population by January 1, 2018, and uptake of telecommunications services enhanced due to the increased coverage and access.

Assessment of Disaster Effects on the Communications Sector

As shown in Figure 9, the worst impacts to the communications sector were incurred in Shefa Province, followed by Tafea, then Malampa.

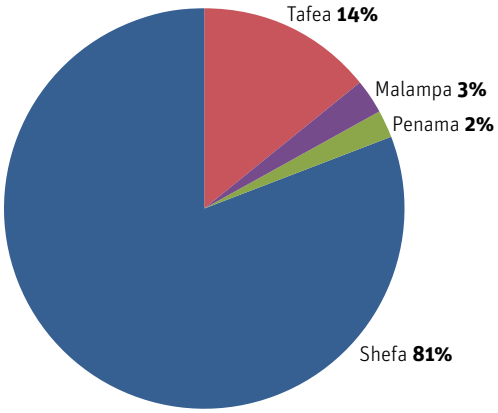


Figure 9. Distribution of Damage and Loss for the Communications Sector by Province

For the private sector, just over 70% of damage costs were in Shefa Province; these were due to damaged infrastructure and physical assets such as cellular systems.

At the time of this PDNA, some consumers, such as those on Buninga Island in Shefa Province, were still without communications. Some people had not yet been able to contact their family members following the cyclone. For example, on Aneityum Island in South Vanuatu and in areas in Tanna, there has been very little mobile communication coverage available since the cyclone struck.

Business customers also continue to be impacted; the poor quality of coverage results in higher communications costs because calls often need to be attempted multiple times. Some resorts and bungalows in the smaller islands of the Shepherd group and Tafea remain without services. In addition, the degradation of services affecting some areas is causing business interruption and frustration for users. It is assumed that as the networks are restored, optimization will follow and address these issues.

Damage to the communications sector

The most substantial damage in the communications sector was sustained by the communication distribution networks. This included damage to public and private physical assets within the distribution networks, such as destroyed or damaged towers for cellular systems and microwave networks.

Losses to the communications sector

Losses include the loss of sales of telecommunications services, due to the time required to reestablish, replace, or rebuild the system assets, along with the decline in consumer demand while assets are being rebuilt. This is despite a brief increase in sales of telecommunications services in Port Vila, which was driven by the increased demand during the post-disaster emergency, recovery, and reconstruction stages. Losses also include higher operational costs, due to the temporary utilization of alternative telecommunications systems (such as portable transmission equipment) and to staff overtime within the sector. The figures also include higher costs of operation, due to temporary utilization of alternative sources of electricity where the electrical system had been destroyed or otherwise affected.

Total damage and loss estimates are presented in Table 55 (by subsector) and in Table 56 (by province).

Table 55. Damage and Loss to the Communications Sector by Subsector (VT 1,000)

Subsector	Damage[a]	Losses	Total Effects	Private (%)	Public (%)
OGCIO	712,439	57,201	769,640	0	100
Vanuatu Broadcasting and Television Corp. and Private Broadcasting	70,897	28,461	99,358	50	50
Vanuatu Post	16,688	22,616	39,304	0	100
Private Telecom Operators	1,460,662	278,682	1,739,344	100	0
Sector Total	**2,260,686**	**386,960**	**2,647,646**	**68**	**32**

Sources: OGCIO; Vanuatu Broadcasting and Television Corporation.

a. Damage has been classified as "fully destroyed" if more than 40% of the asset has been damaged or if the replacement cost of the damage would be more than 40% of the total value of the asset. Damage was classified as "partially damaged" if less than 40% of the asset was damaged, structure was still sound, and repair cost would be less than 40% of the total asset value.

Table 56. Distribution of Damage and Loss in the Communications Sector by Province (VT 1,000)

Province	Damage	Loss	Total Effects	Private (%)	Public (%)
Malampa	126,376	12,311	138,687	94	6
Penama	175,754	8,371	184,125	91	9
Shefa	1,549,454	340,879	1,890,333	60	40
Tafea	409,102	25,578	434,680	81	19
Total	**2,260,686**	**387,139**	**2,647,825**	**67**	**33**

Recovery Strategy and Needs

Short-term recovery needs for the communications sector

The Vanuatu government network. The most immediate need is for emergency funding for OGCIO. This includes funding for higher-than-normal operational costs in March, due to the losses incurred in reestablishing communications services, and longer-term funding for the rebuilding of the affected parts of the network. Without access to funds, this work cannot take place.

The repair and recovery of the iGov network is in three phases: (i) reestablishment of basic communications, which is largely complete; (ii) activation of the interim Internet Protocol (IP) radio solution to reestablish the iGov backbone, which was imminent at the time of this PDNA; and (iii) design and rebuild of the network. In this last phase, OGCIO will look to include the principle of BBB, with enhanced resilience and redundancy. Although an initial needs assessment has taken place, there are restrictions on the available human resources to perform the required design work, given that work to establish operational services (the second phase above) is ongoing. Planning for the third phase will take place from May onward and will require funding commitments for both the planning and the implementation. The Vanuatu government may identify additional needs as the assessment of each sector continues and communication needs come to light. For example, sectors such as education may have a heightened need for information and communication technology (ICT) as part of their rebuild (i.e., instead of reprinting reference materials, schools may wish to distribute them electronically). The short-term recovery needs are presented in Table 57.

Table 57. Short-Term Needs for the Communications Sector: Public Sector (Vt 1,000)

Program of Activity	Value (VT 1,000)[a]	Responsible Agency
Repair to iGov Network	500,000	OGCIO
Repair to Broadcasting Networks	51,800	Vanuatu Broadcasting and Television Corp.
Repair Vanuatu Post Stock and Systems	168,000	Vanuatu Post
Total	**719,800**	

a. Estimated recovery needs are lower than the estimated damage, as it is proposed that recovery activities will utilize newer, more cost efficient technology.

Private sector. Telecommunications/ICT services are critical enablers and link communications/businesses in all other sectors. Accordingly, it should be noted that before and after any cyclone, tsunami, or state of emergency, telecommunications operators may need the government to support them through coordination of logistics for an approved period of time, to assist them in returning telecommunications services following a disaster event.

While telecommunications operators can largely expect to recover the cost of damage from insurance, there is an immediate impact on their expenditures and a significant loss of revenue in this period. Telecommunications operators may therefore need assistance—exemptions on duty and value-added tax as well as prompt processing of relevant permits/legal instruments throughout 2015—to support their rebuilding and to cater for the replacement/upgrade of the technology in the damaged areas. In order to support prompt recovery, telecommunications operators will need the government's support in the swift processing of building and rebuilding permits, land permits, trenching, ducting, and land authorities. Consideration should also be given to the feasibility of fast-track processing of the relevant visas/permits allowing international experts entry to Vanuatu for recovery activities.

Certain business administration or work processes may need to be streamlined or expedited for the provision of crucial services during the rebuilding stage. For instance, TRR may need to continue to clear and/or allocate appropriate or additional spectrum for the urgent use of radio apparatus equipment during the aid and rebuild/restoration works period. (Currently TRR is promptly providing appropriate access to spectrum to address critical needs).

3.4 Cross-Cutting Sectors

3.4.1 Environment

Key environmental assets affected by Tropical Cyclone Pam were coral reefs, mangroves, and tropical forests, particularly in Tafea and Shefa Provinces.

Summary

The environment is inextricably linked to the livelihoods of the cyclone-affected communities because of their dependence on natural resources. In Vanuatu, a number of sectors and subsectors—including fisheries, water, forestry, agriculture, and tourism—rely on the sustainable management of natural resources.

Key environmental assets affected by Tropical Cyclone Pam were coral reefs, mangroves, and tropical forests, particularly in Tafea and Shefa Provinces. Damage to these assets is expected to result in loss of a range of important environmental services, including but not limited to water regulation, recreation for tourism, nursery services for subsistence and commercial fisheries, carbon sequestration, and protection against natural hazard events.

The economic value of many of these service losses is captured in the relevant productive sector assessments within this PDNA (Chapter 3.1). Losses not included in the productive sector assessments, and their distribution across provinces, is summarized in Figure 10 below.

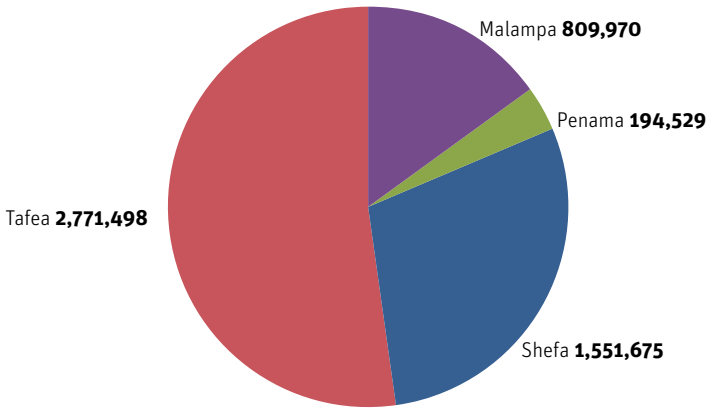


Figure 10. Summary of Losses for Environment Sector (VT 1,000)

Going forward, a concerted and carefully managed effort will be needed to restore affected environmental assets to their pre-cyclone condition. Short-term needs include community outreach programs to improve understanding of the increased vulnerabilities to the environment during the early regeneration phase, and removal of fallen trees to reduce pressures on natural forest areas. In the medium to long term, there will be the need for replanting of affected mangrove and forest areas, and management of invasive species.

In addition, it is recommended that ecosystem-based approaches to reduce climate risks are expanded as a key BBB strategy across sectors. Ecosystem-based approaches (e.g., mangrove planting adjacent to coastal roads) provide communities with the opportunity to manage climate risks in a way that is financially, socially, and culturally sustainable, and that generates additional co-benefits important for ni-Vanuatu communities (e.g., nurseries for subsistence fisheries).

Environment Sector Background

Coral reefs. Vanuatu's coral reef systems cover an area of approximately 75,000 ha[51] and mostly comprise fringing reef structures. Prior to the cyclone event, Vanuatu's coral reef systems were largely intact.[52]

Coral reef systems in Vanuatu support many endemic, rare, and iconic species, including the rock lobster (the *Panulirus* sp.), green snail (*Turbo marmoratus*), and hawksbill turtle (*Eretmochelys Imbricata*) (Department of Environment 2014). They also support species important for the commercial and subsistence fisheries (e.g., parrot fish) as well as for culture (e.g., green turtles and giant clams [*Tridancids* sp.]) (Department of Environment 2014). These ecosystem services are especially important in Vanuatu, where approximately half of the rural population engages in fishing activities (VNSO 2007) and more than 75% of this activity is for personal consumption. Moreover,

[51] The figure is based on an Institute of Marine Remote Sensing (IMARS) coral reef–mapping project undertaken between 2000 and 2006.

[52] The status of the reefs is based on the following survey reports: Dumas et al. (2012); Dumas, Ham, and Kaku (2014); Dumas, Ham, Amos et al. (2014); Dumas, Ham, Kaku et al. (2014); Kaku et al. (2014); Dumas and Ham (2015).

fish (and other marine invertebrates) are the main source of protein for rural populations (VNSO 2007).

Coral reef ecosystems are also a key attraction for tourism and provide a natural buffer against cyclones and other natural hazard events (Pascal 2013b). This latter function will become increasingly important in the future as the frequency and intensity of hazard events change under the effects of human-induced climate change.

Mangroves. Mangroves constitute the most extensive wetland vegetation in Vanuatu (MESCAL 2013) and are unique marine habitats that are both forests and wetlands (MESCAL 2013). Around three-quarters of Vanuatu's mangroves (around 2,000 ha) are located in Malampa Province, with the majority concentrated on the island of Malekula (MESCAL 2013). Prior to Tropical Cyclone Pam, most mangrove areas were intact or considered to be high-quality ecosystems. Some small areas in Shefa Province, however, had been partly degraded as a result of infrastructure developments and other human disturbances (MESCAL 2013). Twenty-three species of mangroves have been recorded in Vanuatu (Department of Environment 2014). Together with coral reef systems, they support a rich diversity of animal species, including saltwater crocodiles (***Crocodylus porosus***), mangrove mud crab (***Scylla*** sp.), and mud-shells (***Geloina*** sp.).

Like coral reefs, mangrove ecosystems provide food and nursery services for commercial and subsistence fishery species, act as a buffer against natural hazard events (e.g., storm surge), and are an attraction for tourists. Mangroves also provide carbon sequestration services, firewood, and building materials (Pascal 2013a).

Tropical forests (natural and mixed-use). As of 1993, approximately 74% (or 940,000 ha) of Vanuatu's total land area was categorized as forest.[53] Of this area, approximately 36% was primary forest—i.e., closed-canopy forest that has never been logged—and the remaining 64% was secondary or "mixed-use" forest. Tropical forests in Vanuatu contain a rich diversity of animal and plant species. The Vanuaflora database currently records some 171 families of plants, 842 genera, and more than 1,000 species. Animal species include 37 amphibian and reptile species, as well as 127 bird species. Of the 127 bird species, 11 are endemic and 8 are listed on the International Union for Conservation of Nature (IUCN) Red List for endangered species (Department of Environment 2014).

A proportion of the mixed-use forest area is used for small-scale timber production.[54] In addition to timber, forest areas also produce tubers, fruits, nuts**,** construction materials, game,[55] and firewood for use by communities. Tropical forest ecosystems further provide important water regulation and carbon sequestration services and are an attraction for tourists (including for scenic value) (Pascal 2013b).

Assessment of Disaster Effects on Environment Sector

Assessment of the physical damage to environmental assets (coral reefs, mangroves, and tropical forests) was undertaken as a rapid assessment by field officers from the Department of Fisheries and Department of Forestry. The economic value of the disaster is substantial and was calculated using a basic benefits-transfer methodology drawn from available economic valuation studies undertaken in Vanuatu and Fiji (Pascal 2013a, 2013b; Arche Consulting 2015). The economic value of damage to an

[53] 1993 National Forest Inventory.
[54] "Vanuatu Forest Policy: 2013–2023," http://theredddesk.org/sites/default/files/vanuatu_forest_policy_2013-2023.pdf.
[55] Ibid.

environmental system as an asset is the sum of the discounted present values of the flows of all of the services.[56] For the purposes of this PDNA, the value of the flow of environmental services is reported as a loss.[57] Table 58 and Table 59 summarize these losses for environmental service flows not captured in the productive sector assessments. Findings for each environmental subsector are as follows:

Coral reefs. For coral reef systems, extensive damage occurred in Tafea and Shefa Provinces. This damage was mostly characterized as breakage to both live and dead corals as well as high re-suspense of sediments. Coral reefs in Malampa and Penama were largely unaffected.[58] Some communities that rely mainly on fisheries for food security and livelihood have asked to use the coastal resources located within marine protected areas to substitute for subsistence fishery (and agriculture) losses that have been incurred. If not properly managed, this additional pressure may have long-term impacts on the productivity of subsistence and commercial fisheries, as well as on the recreational appeal of the coral reefs for tourism purposes.

Mangroves. Large areas of mangroves in Malampa, Tafea, and Shefa have been significantly affected. Damage in these areas is characterized as uprooting, broken limbs, and defoliation. Mangroves in Penama were largely unaffected. It appears that mangroves served to reduce damage to roads, housing, and other assets in some areas. One example observed was on Moso Island, where the only area to suffer significant coastal erosion was a short strip where mangroves have been removed for a helicopter landing pad. More detailed assessments would be required to robustly evaluate the effectiveness of mangrove areas in Vanuatu as a disaster risk reduction measure (and learn what has worked and what has not worked).

Tropical forests. Forest areas in Tafea, and to a lesser extent Shefa, were found to be substantially damaged. Damage in these areas was characterized as uprooting, broken limbs, defoliation, and canopy opening. Some relatively minor damage (broken limbs and defoliation) was also experienced in Penama, but no significant uprooting was observed. Extensive canopy openings have allowed for invasive species to enter and propagate in forest areas. If not properly managed, this invasive growth will substantially restrict the ability of these forests to recover to their precyclone condition. Hunting of birds and bats has reportedly increased because of food shortages (agriculture and fisheries) and because hunting is made easier by the damaged habitat. In addition, it has been reported that farmers are relocating gardens to adjacent primary forest areas because fallen trees have damaged existing garden areas.

Recovery Strategy and Needs

Programs needed to effectively manage the recovery of damaged ecosystems, and to help other productive sectors adhere to the principle of BBB, are estimated to cost in the order of VT 127.5

[56] For coral reef assets, environmental service flows included are (i) nursery and food flows to subsistence and commercial fisheries, and (ii) protection services for coastal infrastructure, etc. against natural hazard events. For mangrove assets, environmental services included are (i) carbon sequestration, (ii) nursery and food flows to subsistence and commercial fishery, (iii) protection services for coastal infrastructure, etc., against natural hazard events, and (iv) flow of firewood. For forest assets, flows included are (i) carbon sequestration, (ii) sediment control services, (iii) flow of wild game for food, (iv) water regulation services, and (v) flow of medicines and firewood. Environmental service flows do not include recreation services for tourism, timber values, or services to commercial fisheries.

[57] Economic values of disaster effects have been reported in terms of losses (of environmental services) only. This is because the economic value of a resource-environment system as an asset is the sum of the discounted present values of the flows of all of the services (Freeman 2003). It would be double-counting to include both damage and losses as measured in this way.

[58] A more thorough assessment would be necessary to confirm this is correct for all areas in both provinces. In each province, the rapid assessment methodology sampled only two sites judged as representative.

million. Of this amount, VT 37.5 million relates to short-term activities (within 12 months) and VT 90 million pertains to medium- to long-term activities. Priority program activities that need financial support are summarized in Table 60 and Table 61.

Table 58. Quantification of Damage and Loss in the Environment Sector (VT 1,000)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Services from coral reef ecosystems	N/A	713,045	713,045	0	100
Services from mangrove forest ecosystems	N/A	1,132,515	1,132,515	0	100
Services from natural forests	N/A	2,023,923	2,023,923	0	100
Services from mixed-use forests	N/A	1,458,189	1,458,189	0	100
Sector Total	**N/A**	**5,327,672**	**5,327,672**	**0**	**100**

Note: N/A = not applicable.

Table 59. Distribution of Damage and Loss in the Environment Sector by Province (VT 1,000)

	Damage	Losses	Total Effects	Private (%)	Public (%)
Malampa	N/A	809,970	809,970	0	100
Penama	N/A	194,529	194,529	0	100
Shefa	N/A	1,551,675	1,551,675	0	100
Tafea	N/A	2,771,498	2,771,498	0	100
Total	**N/A**	**5,327,672**	**5,327,672**	**0**	**100**

Note: N/A = not applicable.

Table 60. Short-Term Recovery Needs for the Environment Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Community outreach and education to improve understanding of both the increased vulnerabilities of coral reef ecosystems during the early regeneration phase, and the (community) management responses needed to achieve a full recovery	3,000	Fisheries
Community outreach and education to improve understanding of both the increased vulnerabilities of mangrove ecosystems during the early regeneration phase, and the (community) management responses needed to achieve a full recovery	5,500	Environment, Forestry
Community outreach and education to improve understanding of both the increased vulnerabilities of tropical forest ecosystems during the early regeneration phase, and the (community) management responses needed to achieve a full recovery	9,000	Environment, Forestry
Detailed assessment of damage to coral reef, mangrove, and tropical forest ecosystems to identify target areas for replanting and invasive species management	15,500	Environment, Forestry, Fisheries
Removal of fallen trees from agriculture and planted forest areas to reduce pressure on primary forest areas	4,500	Forestry
Total	**37,500**	

As a long-term management and resilience measure, it is strongly recommended that the scale and scope of ecosystem-based interventions be expanded—for example, planting and maintaining mangrove and forest ecosystems to buffer road and other infrastructure; expanding marine protected areas; and expanding invasive species management in tropical forests. This will help other sectors to build back better. It is also recommended that a national set of environmental accounts be established within the broader government systems.

Bird's eye view of damage to village and forest. © X-craft. Reproduced with permission; further permission required for reuse.

Table 61. Medium- to Long-Term Recovery Needs for the Environment Sector

Program of Activity	Value (VT 1,000)	Responsible Agency
Manage invasive species in damaged coral reef areas in Tafea and Shefa	15,000	Fisheries
Replant affected mangrove areas in Tafea, Shefa, and Malampa	15,000	Environment, Forestry
Replant (nontimber) native tree species in affected tropical forest areas in Tafea, Shefa, and Penama	20,000	Environment, Forestry
Manage invasive species in damaged tropical forest areas in Tafea and Shefa to increase the success of replanting programs	40,000	Environment
Total	**90,000**	

Gender considerations for recovery strategy

The environment plays a crucial role in supporting communities' efforts to cope with food deficit and income stresses. Some of the affected communities have reportedly switched to wild foods following the cyclone, including wild yams and swamp taro. Women in some areas have also reported that they are supplementing their protein intake through mud crabs, which are quite resilient to the impacts of cyclones. Women also tend to rely on artisanal fishing and the harvest of pandanus in natural forests. However, without the appropriate support, the overharvesting of these resources could erode communities' medium- and long-term resilience to disaster impacts.

Women should be engaged in community-based natural resource management. An assessment of coping mechanisms should be conducted to better understand the role and value of the environment in supporting poor households. The use of the natural environment by men and women should also be assessed to understand the key resources that need to be strengthened in order to support the resilience of affected communities.

4 Social and Household Impact

Woman and destroyed store in Port Narvin, Erromango.© Silke Von Brockhousen, UNDP. Reproduced with permission; further permission required for reuse.

4.1 Employment, Livelihoods, and Social Protection

Summary

Tropical Cyclone Pam has directly and indirectly affected the livelihoods of about 40,800 households, or 195,000 people, across the four disaster-affected provinces. A total of 504,050 work days and of VT 1.6 billion of personal income have been lost.

Tropical Cyclone Pam has directly and indirectly affected the livelihoods of about 40,800 households, or 195,000 people, across the four disaster-affected provinces. A total of 504,050 work days and of VT 1.6 billion of personal income have been lost. Half of all agricultural households located in disaster-affected provinces have lost the entirety or parts of their crops.

- 24,191 work days have been lost in the formal economy.
- 245,110 work days have been lost in the informal economy.

Enabling households to recover their productive and income-generating activities and increasing the resilience of livelihoods to future shocks must be a key component of the reconstruction and recovery process. A comprehensive Pacific Advisory Support Information Services and Training (PASIFIK-ASIST) strategy for disaster-resilient jobs is proposed, consisting of a package of interrelated downstream and upstream activities to bridge the continuum from immediate income generation to medium- and long-term employment recovery. The estimated recovery needs for employment, livelihoods, and social protection (ELSP) amount to VT 1.3 billion.

Pre-Disaster Situation

Although 71% of Vanuatu's labor force is considered economically active, only 30% receives a regular paid income. The majority of households therefore diversify their productive and income-generating activities and engage across the following three layers of the ni-Vanuatu economy:

- *The subsistence economy* provides a livelihood to about 52% of Vanuatu's labor force, through productive activities such as growing, gathering produce, or fishing. It is the main source of livelihoods for 32% of males and 28% of females aged 15 and older—with the proportion of subsistence workers being higher in rural areas. In many instances, smallholder households rely on the labor of their youngest members to contribute to subsistence work. From the age of 12, school enrolment rates rapidly decrease, and at age 16 only about half of children are still in school. Young people are therefore inevitably involved in agricultural labor. Reliable data on this aspect of the rural economy are scant, however, and no comprehensive survey has been conducted in Vanuatu as of yet.

- *The formal economy* offers employment opportunities to 20% of the workforce in public institutions and in medium-to-large private sector enterprises. Men are more likely to gain formal sector employment; 26% of all working-age males are employed formally, compared to only 14% of all working-age females. While employment in the formal economy compared to the total labor force may appear to be small, it contributes significantly to government revenue and to income generation in the informal economy through value chain links with microenterprises. According to the Vanuatu National Statistical Office (2000), 80% of all formal businesses were in the service industry, primarily depending on tourism. While the number of women employed in the service industry is above the national average, only a third of all women in the formal sector are managers. The majority of women work as housekeepers and waitresses, while men tend to hold managerial posts. The agriculture sector offers modest formal employment opportunities in commercial farms where a small number of men and women are employed.

- *The informal economy* provides income-generating opportunities to a large number of women and men, primarily through value chain links with formal sector enterprises in urban and peri-urban areas. Men typically engage in activities such as minibus/taxi driving (approximately 1,600 across Vanuatu), and women (i.e. "the mammas") are typically market vendors and/or operators of roadside stalls along the harbor where they sell handicrafts and other goods to tourists. According to the microfinance institution VANWODS (Vanuatu Women Development Scheme), more than 5,400 mammas currently rely on such income-generating activities to support themselves and their families. Informal wage earning opportunities are also found in the agricultural sector, where a considerable number of smallholder households generate sufficient revenue to employ skilled agricultural workers.

Vanuatu's labor market is fragile due to soaring population growth and the country's exposure to natural hazards. The ni-Vanuatu population is increasing rapidly, and 43% of the current population is under the age of 15. With the formal economy producing fewer than 700 new jobs per year and about 5,000 young people joining the labor force each year, Vanuatu's labor market fails to provide employment opportunities for the majority of the population.

A limited number of ni-Vanuatu finds low-skill seasonal work opportunities for less than six months in Australia and New Zealand, and remittances are becoming an increasingly important source of income for many households. In 2012, approximately US$ 19 million was sent to Vanuatu. It is estimated that 15% of urban and 38% of rural households receive remittances. In 2010, the average monthly amount received was VT 12,000.

The extent to which the Ni-Vanuatu depend on subsistence and informal income-generating activities renders their livelihoods extremely vulnerable to external shocks and disasters such as Tropical Cyclone Pam. The paucity of reliable and comprehensive labor market information in Vanuatu renders it difficult to adequately understand a disaster's impact on people's livelihoods. The income loss suffered by individuals and households as a result of a disaster is therefore likely to be omitted during data collection and assessments. The ELSP sector assessment is thus an attempt to give accumulated damage and loss figures a human face in order to better understand the consequences of Tropical Cyclone Pam for the daily lives of the ni-Vanuatu people.

Assessment of Disaster Effects on Employment, Livelihoods, and Social Protection

Tropical Cyclone Pam has affected directly and indirectly the livelihoods of about 40,800 households and 195,000 people across the four disaster-affected provinces. It has resulted in the loss of 504,050 work days and VT 1.6 billion of personal income (Table 62).

Several data extrapolation methods have been used to construct the baseline and to derive an estimate of the cyclone effect on ELSP, including primary and secondary sources.[59] As the ELSP assessment is based upon cross-sectoral analysis, additional data were obtained from the agriculture sector (loss of agricultural output), housing sector (ratio of destroyed and damaged dwellings), tourism sector (estimated duration of business interruption), and manufacturing sector (number of recorded layoffs) to conduct a quantitative analysis of the cyclone effect on ELSP. The results were subsequently triangulated and complemented through qualitative observations in the affected communities, such as interviews with representatives of the Vanuatu National Provident Fund, the Chamber of Commerce and Industry, the Workers' and Teachers' Union, VANWODS Microfinance,

[59] Secondary sources included the 2000 Labour Market Survey, the 2007 Census of Agriculture, the 2009 National Population and Housing Census, and the 2009–2012 Decent Work Country Programme.

and the Port Vila Efate Land Transport Association. An additional rapid survey was conducted by the Department of Labour to gather data on employment loss in the tourism sector. The effect of the disaster on civil servants and public employees such as teachers has not been taken into account, as it is reported that wages continue to be paid.

Table 62. Summary of Lost Work Days and Income by Province

Province	Work Days Lost	Income Lost (VT 1,000)	Private (%)	Public (%)
Malampa	82,511	81,088	100	0
Penama	27,711	26,796	100	0
Shefa	197,197	1,230,933	100	0
Tafea	196,630	268,305	100	0
Total[a]	**504,050**	**1,607,123**	**100**	**0**

a. Totals include income losses in the agricultural sector, and are for indicative purposes only.

Subsistence economy. Given Vanuatu's strong dependence on the agricultural sector for subsistence work, smallholder households have been gravely affected by Tropical Cyclone Pam. It is estimated that approximately 50% of all agricultural households located in disaster-affected provinces (i.e., 11,256 out of 21,184 households) have lost all or part of their crops, including crops such as kava, copra, and cocoa that will take up to one year to reestablish. The average income loss suffered per smallholder household is estimated to be VT 412,322.

Formal economy. Based upon rapid surveys conducted in the aftermath of Tropical Cyclone Pam, 97 employees have reportedly been laid off in the manufacturing industry and 70 employees have been let go from establishments catering for the tourist industry. No further data exploration was performed, but given the small number of observations, the actual number of layoffs is expected to be much higher, with initial estimations from hotel owners ranging from a total of 300 to 500 laid-off employees in the formal economy. Assuming that it will take a laid-off employee on average six months to obtain new formal sector employment,[60] a total of 24,191 work days have been lost, comprising 17,751 in the manufacturing industry and 6,440 in tourism. On commercial farms, agricultural workers are facing reduced demand for their labor, resulting in an additional 24,785 lost work days. This equates to a total of VT 46 million in lost wages.

Informal economy. Using the ratio of destroyed and damaged dwellings as a proxy, it was estimated that Tropical Cyclone Pam affected approximately 3,600 female microentrepreneurs (the "mammas") across the four disaster-affected provinces. Assuming that it would take a microentrepreneur on average six weeks to reconstruct and four weeks to repair a workplace,[61] the mammas have lost 141,110 work days. Additionally, 1,600 minibus drivers and 500 taxi drivers have suffered business interruptions due to blocked roads and reduced demand for their services in the absence of tourists, resulting in an estimated 104,000 lost work days. Agricultural workers hired by smallholder households are facing reduced demand for their labour, resulting in an additional 209,964 lost work days. The total personal income loss suffered in the informal sector is thus estimated at VT 1.5 billion.

[60] The assumption is based upon information received from the Department of Industry/Ministry of Trade, Tourism, Industry and Commerce.

[61] The assumption is based upon information received from the Vanuatu Women Development Scheme.

Sign erected in Port Vila in the aftermath of Cyclone Pam. © Colleen Butcher-Gollach, World Bank Group.

Table 63. Summary of Lost Work Days and Income by Sector

Sector	Work Days Lost	Income Lost (VT 1,000)	Private (%)	Public (%)
Agriculture	234,749	227,002	100	0
Commerce and Industry	170,861	487,192	100	0
Tourism	98,440	892,929	100	0
Total	**504,050**	**1,607,123**	**100**	**0**

Disaster Impact on Employment, Livelihoods, and Social Protection

Analyzing a disaster's impact on the well-being of households and communities in contexts where economic activity is primarily undertaken through the informal sector, subsistence farming, and unpaid family work is a challenging task, and in this regard, this PDNA provides an indicative rather than an exact quantification of the impact of Tropical Cyclone Pam. The following analysis of the disaster's impact on ELSP therefore outlines the *anticipated* impact in the short term (up to one year), medium term (two to three years), and long term (four years). The actual impact of the disaster will vary according to the pace and effectiveness of the reconstruction and recovery process.

Short-term impact on employment, livelihoods, and social protection

The majority of the affected smallholder households are unlikely to fully resume their economic activities within the next three months, depending on climate conditions and the output of the next harvest. Some agricultural households will therefore be unable to sustain their subsistence existence in the short term and instead need to purchase products they would otherwise have produced themselves. Searching for income-generating opportunities to provide for their families, some household members may consider relocating permanently or temporarily to urban centers such as Port Vila. As a consequence, common trades may be inundated with new workers (e.g., people seeking jobs as domestic servants or hawking goods and services on the street). This extra

supply of labor is likely to drive remuneration down and may result in an aggravation of the disaster's secondary impact on ELSP for all households engaged in common trades, even in cases where these households were not directly affected by the disaster.

Depending on the pace of recovery in the tourism sector, minibus drivers and the mammas may face a reduced demand for their services and products for a prolonged period of time, resulting in an overall reduction of money in the economy. If crucial community organizations, such as the microfinance provider VANWODS, are not fully operational in due time, female entrepreneurs are especially likely to struggle to find access to financial capital to rehabilitate damaged workshops and lost equipment.

Hoteliers are also likely to lay off additional workers until tourist activity has fully recovered. It is anticipated that hoteliers will keep staff positions typically occupied by men (such as managerial and ground staff) on the payroll, while positions typically occupied by women (such as housekeepers) are more likely to be laid off. Women are thus likely to be the first to lose their jobs. According to information received from the Department of Labour, 19 cruise ships cancelled their stopover in Vanuatu following Tropical Cyclone Pam, which will significantly impact Vanuatu's tourism industry. A surplus of labor supply is therefore to be expected in the immediate and short term, and this creates opportunities for temporary income-generating activities such as emergency employment programs.

According to the Vanuatu National Provident Fund, 30,000 people are expected to withdraw over VT 2 billion from the retirement fund in the weeks immediately following this PDNA, indicating that households require substantive financial support to rebuild their homes. An increased demand for construction-related work is therefore to be expected and opens up possibilities for short-term skills training programs.

Medium-term impact on employment, livelihoods, and social protection

Given Vanuatu's hazard-prone location, there is a high risk that future disasters could affect areas that have already been impacted by Tropical Cyclone Pam, thus undermining the local economic recovery. If preparedness mechanisms (e.g., better and more readily available baseline data) are not sufficiently established before future events, the self-employed who operate in the informal economy are likely to remain vulnerable to external shocks and will experience repeated income losses as a consequence of disasters. The impacts on new entrants to the labor market will be particularly critical, as employment outcomes of young people are especially sensitive to the economic cycle. Youth are generally the first to lose their jobs in times of economic contraction and the last to gain employment when the economy rebounds.

Long-term impact on employment, livelihoods, and social protection

The expected withdrawal of funds from the VNPF will potentially have a long-term impact on both the financial viability of the fund and the reduced pensions that participants will receive. According to the PCRAFI (2011) Vanuatu suffers on average more than US$45 million per year of economic losses caused by disasters (the third-highest rate in the Pacific region following Papua New Guinea and Fiji), so continued accessing of the VNFP resources is an unsustainable coping mechanism and risks depleting Vanuatu's only social security fund.

Recovery Strategy

Enabling households to recover their productive and income-generating activities as soon as possible, while also increasing the resilience of livelihoods to future shocks, must be a key component of

the reconstruction and recovery process. This component will require a joint effort by national, provincial, and traditional authorities, along with the private sector, civil society organizations (including workers' and employers' organizations), and international agencies. A comprehensive PASIFIK-ASIST strategy for disaster-resilient jobs is thus proposed, consisting of a package of interrelated downstream and upstream activities to bridge the continuum from immediate income generation to medium- and long-term employment recovery. It is estimated that all program activities facilitating transition from immediate income generation to medium- and long-term employment and livelihoods recovery would amount to VT 1.3 billion. The reconstruction process could be used as an opportunity both to generate income (for example through an emergency employment program) in the short-term and to foster employment recovery and job creation in the medium- to long-term. The short-term ELSP recovery needs are presented in Table 64 and the medium- to long-term needs are presented in Table 65.

Table 64. Short-Term ELSP Recovery Needs

Program of Activities	Value (VT 1,000)	Responsible Agencies
Training of DoL, VCCI, and VCTU on socially responsible enterprise restructuring	57,024	DoL, ILO
Rapid training of PWD island-based/community contractors in labor-based rehabilitation works in Tanna[a]	65,880	DoL, PWD, ILO
Emergency employment program (i.e., Cash For Work)	367,200	DoL, Provincial Council, PWD, ILO, UNDP, UN Women, UN-Habitat
Emergency employment services	5,400	DoL, ILO
Rapid construction skills training	32,400	DoL, APTC, Youth Challenge, Oxfam, ILO
Rapid assessment of participation of children in agricultural labor	1,080	DoL, VCTU ILO
Total	**528,984**	

Note: DoL = Department of Labour; VCTU = Vanuatu Council of Trade Unions ; ILO = International Labour Organization; APTC = Australian Pacific Technical College.

a. VT 110,000 has already been funded.

Table 65. Medium- to Long-Term ELSP Recovery Needs

Program of Activities	Value (VT 1,000)	Responsible Agencies
Local economic recovery program for microfinance institutions and MSMEs	432,000	DoL, ILO, VCCI, VANWODS, Commercial banks, UN Women
EIIP contractor development work	216,000	DoL, PWD, R4D, ILO
PDNA training for DoL, NSO, VCCI, and VCTU	1,296	ILO
Multi-hazard business continuity management training for VCCI, VANWODS, and others	8,640	ILO
CTA with essential support embedded in the DoL for 12 months to build up coherent labor market information system and expand national social protection program	44,712	DoL, VNSO, ILO
CTA embedded in the DoL for 6 months to build up coherent labor market information system and expand national social protection program	30,996	DoL, VNSO, ILO
Total	**733,644**	

Note: DoL = Department of Labour; EIIP = Employment Intensive Investment Programme; ILO = International Labour Organization; EIIP =; R4D = Roads for Development; CTA = Chief Technical Advisor; VCCI = Vanuatu Chamber of Commerce and Industry.

Gender Considerations for Recovery Strategy

The recovery program should strive to strengthen the informal sector, whose low capital requirements and low entry barriers facilitate women's active participation in the economy. In the short term, efforts should be made to facilitate trade by linking the women harvesting pandanus on islands such as Santos, which were not affected by Tropical Cyclone Pam, with the women in need of pandanus in the affected areas. Support should be provided to the mammas, through identification of alternate livelihoods that are less vulnerable to disasters and climate change (e.g., solid waste collection, recycling) than those they currently engage in. Recovery funds should also provide access to finance for the affected mammas to allow them to restock and restart their business.

4.2 Household and Community Livelihoods

Summary

Tropical Cyclone Pam has very badly harmed people's livelihoods, severely limiting their capacities to generate income for their household for the next few months. Community infrastructure was also extensively damaged or destroyed, disrupting daily life and requiring extra expenditures to repair or replace, at a time when incomes have been lost.

From April 1 to April 8, in coordination with the government of Vanuatu, the United Nations Development Programme (UNDP) sent a team of 17 assessors—10 women and seven men—to the four provinces covered by this PDNA. A total of 1,273 people were consulted in the field, 55% of them women and 45% men. Respondents included a mix of professions, including chiefs, provincial officials, health workers, teachers, and many heads of household.

The field visits make clear that Tropical Cyclone Pam has very badly harmed people's livelihoods, severely limiting their capacities to generate income for their household for the next few months. Community infrastructure was also extensively damaged or destroyed, disrupting daily life and requiring extra expenditures to repair or replace, at a time when incomes have been lost. Damage and losses are comparatively more apparent and extensive in Tafea and Shefa Provinces than in other provinces. In Tafea and Shefa, field observations found that approximately 95% of income-generating activities had been interrupted by the cyclone, with variable time frames for their reactivation. For Penama and Malampa, which had comparatively lighter damage overall, estimated loss of income sources is 75%.

A different set of detailed assessments currently under analysis by the Food Security and Agriculture Cluster shows that food availability, food accessibility, and sources of livelihood remain significantly affected, particularly for the priority 1 areas, which include the islands of Tanna, Erromango, North Efate, Shepherd, Pentecost, and Epi.

Data from FSAC assessments show that damage to agriculture is widespread. In the priority 1 areas, as much as 75% of coconut, 80% of coffee, 80% of leaf vegetables, 70% of taro, and 65% of kumala were so extensively damaged that they will not recover. Agricultural equipment and assets worth over VT 34.5 million were damaged or destroyed. In terms of small livestock, 69% of the total damage was to pigs, 26% was to poultry, and 5% was to beehives. A large amount of fishing equipment was also destroyed. This damage, together with the damage to livestock, will have a negative impact on the availability of protein for households.

Based on available background data, it is likely that women are somewhat more affected than men, given their higher poverty levels and their disproportionate share of family care work in Vanuatu. Both of these preexisting factors were aggravated by the cyclone impacts on income; and in the aftermath of the cyclone, women's unpaid work and family care requirements will increase. Although sex-disaggregated information on men's and women's incomes and relative poverty levels is scant, the 2013 *Vanuatu Hardship and Poverty Report* notes that a higher proportion of elderly women live below the basic needs poverty line than do elderly men (UNDP Pacific Centre 2013).

Logs that will be recycled through debris management system in Port Narvin, Erromango. © Karen Bernard, UNDP. Reproduced with permission; further permission required for reuse.

UN Women (2014, xvi) notes that "over three-quarters (77%) of all economically active women engage in subsistence agriculture and the production of root crops, fruit and vegetables including cash crops." Thus damage and losses in subsistence and cash crops have a substantial impact on women as well as men.

Assessment of Disaster Effects on Household and Community Livelihoods

Livelihoods

The following observations were made in regard to livelihoods as part of this PDNA:

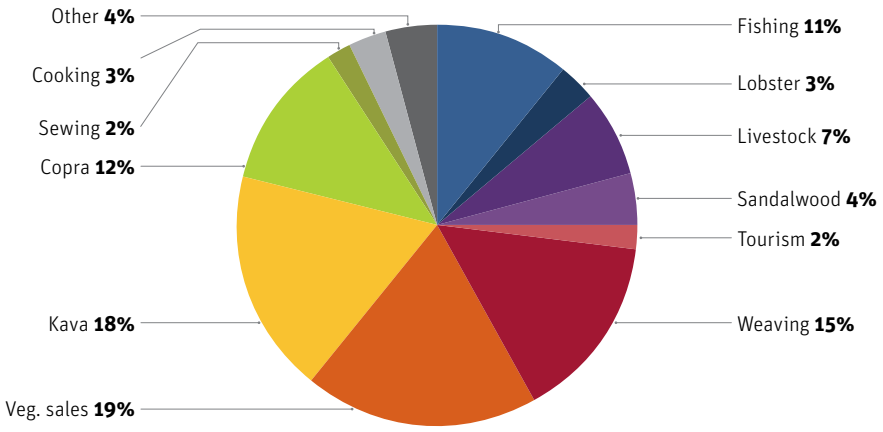
- Men and women showed significant differences in their usual livelihoods, and men's usual livelihoods were more economically profitable in general.
- Usual livelihoods for men include fishing (tuna, marlin, reef fish), trapping lobster, catching coconut crabs, farming sandalwood, and (on some islands) raising cash crops such as kava, copra, and cacao, as well as operating shops.
- Usual livelihoods for women include weaving mats and baskets, selling prepared foods at the markets, sewing clothes for sale, and maintaining vegetable gardens for subsistence and some sales.
- A gender overlap was noted in gardens and farming, in which both men and women tend to work for subsistence and also sell to local and national markets. In a few areas, there was also some gender overlap in services and accommodation for tourists.

- While fishing is dominated by men, women engage is some fishing from the shore and on the reef.

The livelihoods that predominate in the communities surveyed are kava and fishing, for men; weaving for the women; and vegetable sales for both men and women. Small-scale tourism services and livestock farming are also significant. An overview of the livelihoods across the impacted provinces is presented in Figure 11.

Figure 11. Livelihoods across All Four Affected Provinces

Note: The chart refers to the relative predominance of these livelihoods in Malampa, Penama, Shefa, and Tafea, as reported by communities during the field assessments conducted as part of this PDNA.



As noted in the agriculture section of this report, approximately 80% of Vanuatu's population relies on agriculture for their livelihood and food and nutrition security. Vanuatu's agriculture sector is dominated by semi-subsistence farmers using mostly household labor, who live in tiny village communities spread throughout the archipelago. Food is the most important household expenditure item among rural households, representing 56% of total household expenditure, with the large share of this expenditure for home consumption among subsistence farmers (HIES 2013). Among many rural households, kava, copra, or other crops are the source of income, and it is common for households to raise small livestock, such as chickens (64%), pigs (45%), and cattle (29%) (VNSO 2009). Thus the damage to crops and livestock inflicted by Tropical Cyclone Pam has a severe impact on household food security in the affected communities, which rely heavily on these subsistence activities. At the same time, the interruption to subsistence farming is not easily compensated by purchase of food, as virtually all sources of cash income have also been largely destroyed by the cyclone.

Table 66 summarizes the status of various key livelihood activities undertaken by men and women in the locations surveyed, their comparative profitability, and estimated timelines for restoring full productivity.

Table 66. Overview of Status of Affected Livelihoods

Livelihood	Profitability (low/ medium/high)	Post-Cyclone Status and Issues	Estimated Time to Full Restoration
Men's Activities			
Fishing (tuna, marlin, reef fish)	High	Cannot be easily located	3 months
Trapping of Lobster and Coconut Crabs	High	Cannot be located, may be gone	6 months
Sandalwood Farming	High	Some seedlings destroyed, but trees mainly intact	3 months
Kava Cultivation	High	Largely wiped out	4 years
Copra Cultivation	High	Largely wiped out	12 months
Women's Activities			
Sales of Prepared Foods (local)	Low	Not possible in current conditions	6 months
Weaving Handicrafts	Medium	Pandanus all destroyed	12 months
Sewing (for local sale)	Low	Sewing machine damaged and lost	Variable
Activities Shared by Men and Women			
Vegetable and Fruit Sales (to Vila and Tanna)	Medium	Mainly destroyed	6 months
Tourist Services	Medium	Interrupted due to damage and lack of transport	Variable
Work in Guesthouses and Restaurants	Medium	Many damaged and closed	Variable
Cultivation of other Crops	Medium	Only root crops left in most locations	3–6 months

Community Infrastructure

The following observations about community infrastructure were made as part of this PDNA:

- While bigger buildings, such as schools, are already being fixed in most locations, there was widespread destruction of smaller community infrastructure, which people rely on for their daily lives and work.
- The community infrastructure most often reported as damaged and in need of repair includes (i) water tanks, taps, and wells; (ii) fences and enclosures for small livestock, such as pigs and chickens; (iii) kindergartens, for children aged three to six; (iv) toilets and latrines; (v) *nakamals*, community halls, and women's centers; and (vi) community kitchens.

There were marked differences in the incidence of community infrastructure reported as needing repair in the four provinces surveyed, as shown in Figure 12.

The highest incidence of damage to community infrastructure was reported in Shefa Province, and the second-highest in Tafea. Penama and Malampa Provinces reported much lower incidence of damage.

An overview of responses about damaged infrastructure is provided in Figure 13, which shows that community centers, household water systems (water tanks, taps, pipes, and rainwater harvesting systems), and debris on paths are among the biggest concerns.

A gender-differentiated summary of priorities expressed by survey respondents is included in Figure 14.

Figure 12. Community Infrastructure Reported Damaged by Province

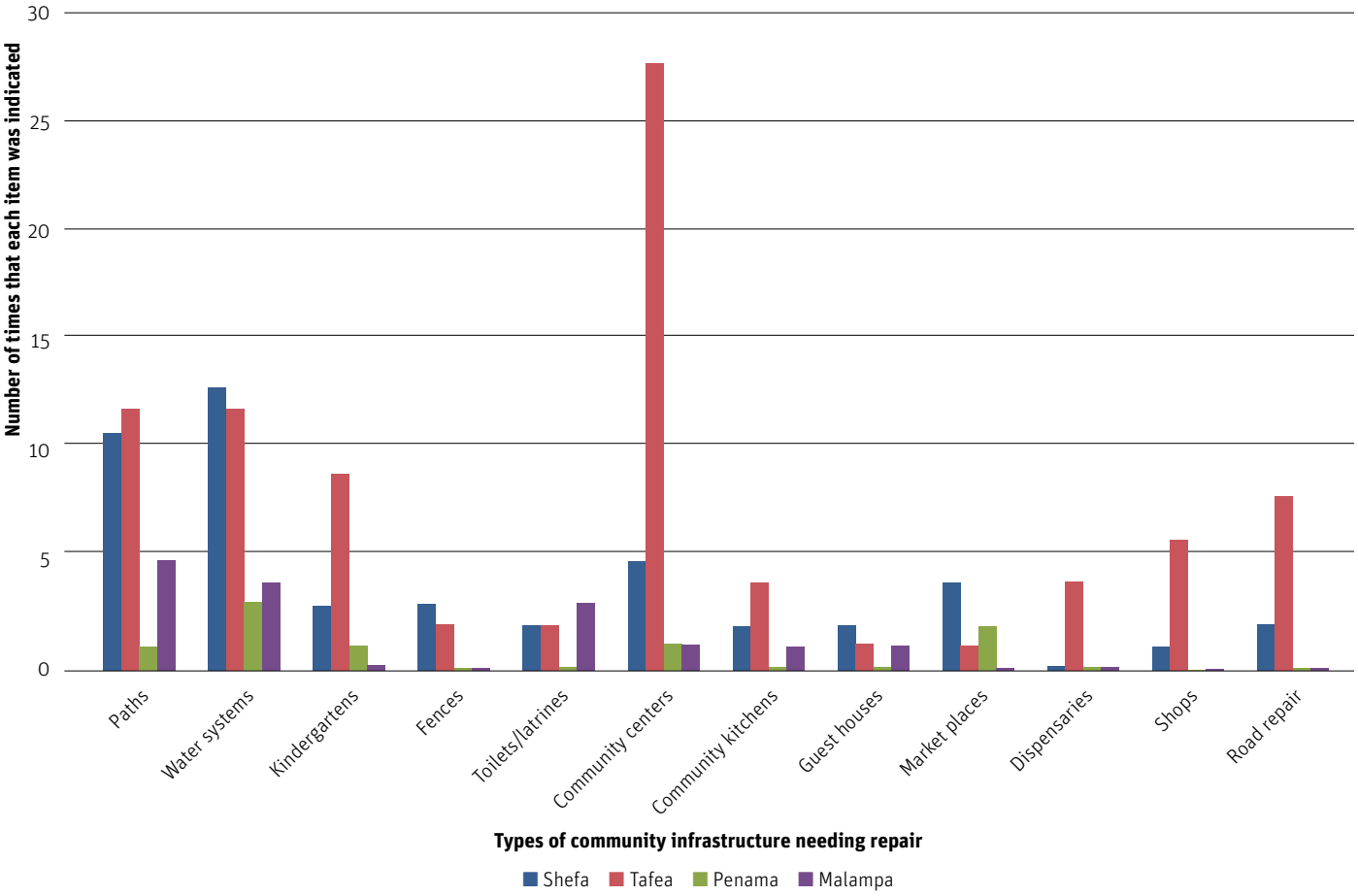
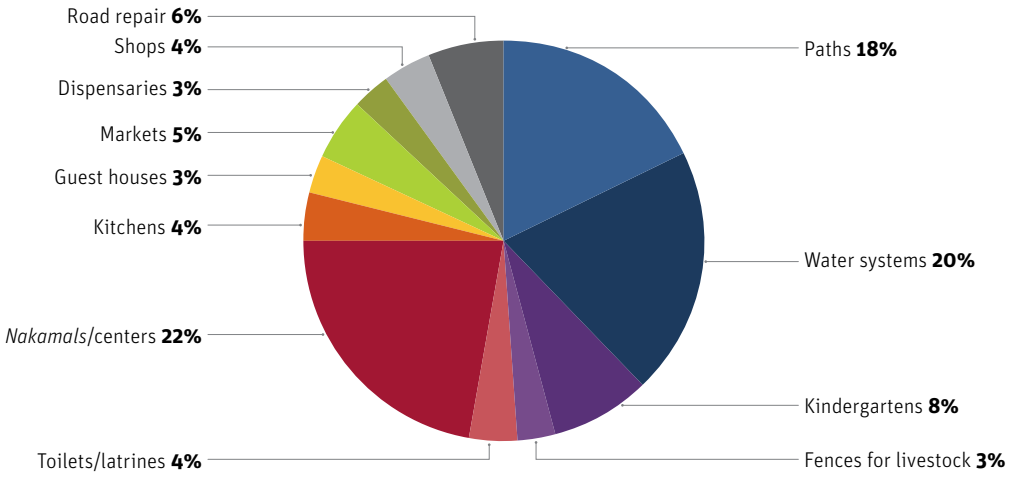


Figure 13. Community Infrastructure Needing Repair Across All Four Provinces

Note: The figure refers to the relative predominance of damage to these items in Malampa, Penama, Shefa, and Tafea, as reported during the field assessment.



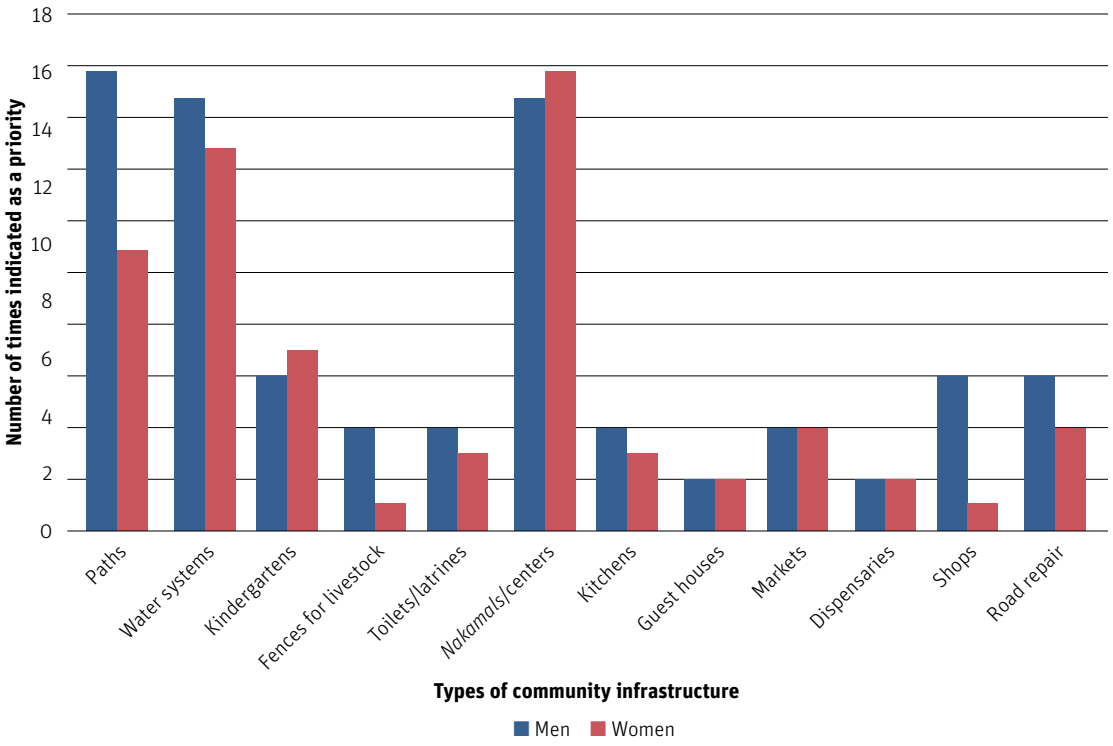


Figure 14. Gender Differences in Prioritization of Repair to Community Infrastructure

Women and men showed substantial similarities in their prioritization of community infrastructure requiring repair after the cyclone, although men had a moderate preference for clearing paths, repairing roads, and rebuilding shops—the latter are mainly owned by men. Damage to any of this community infrastructure creates hardships for people and prevents returning to normalcy. For example, destruction of kindergartens means that local women must spend much more time attending to small children. In most locations surveyed, approximately 30 children aged three to six years old attend each kindergarten. As reported in the education assessment included within this report (Chapter 3.2.3), Tafea Province had 120 ECCE centers/kindergartens prior to Tropical Cyclone Pam, only 8 of which are now functioning; the rest were destroyed by the cyclone. Recovery programming should therefore prioritize repair and rebuilding of kindergartens, to alleviate this burden on women, and enable them more free time and flexibility to participate alongside men in temporary employment or other key recovery activities.

It should also be noted that the damage to community infrastructure is hindering the replanting of crops and clearing of garden accessways, which urgently need to be completed. For example, in Williams Bay, Erromango, the community members consulted stated that the paths to their food gardens are 5–10km long and are now blocked by debris. Also, in many affected villages, pigs are now roaming freely due to broken fences, and are eating any crops newly planted. Thus fixing these two items—enclosures for livestock and clearance of secondary paths—is in many cases essential for reactivation of local agriculture.

Potential for Emergency Employment

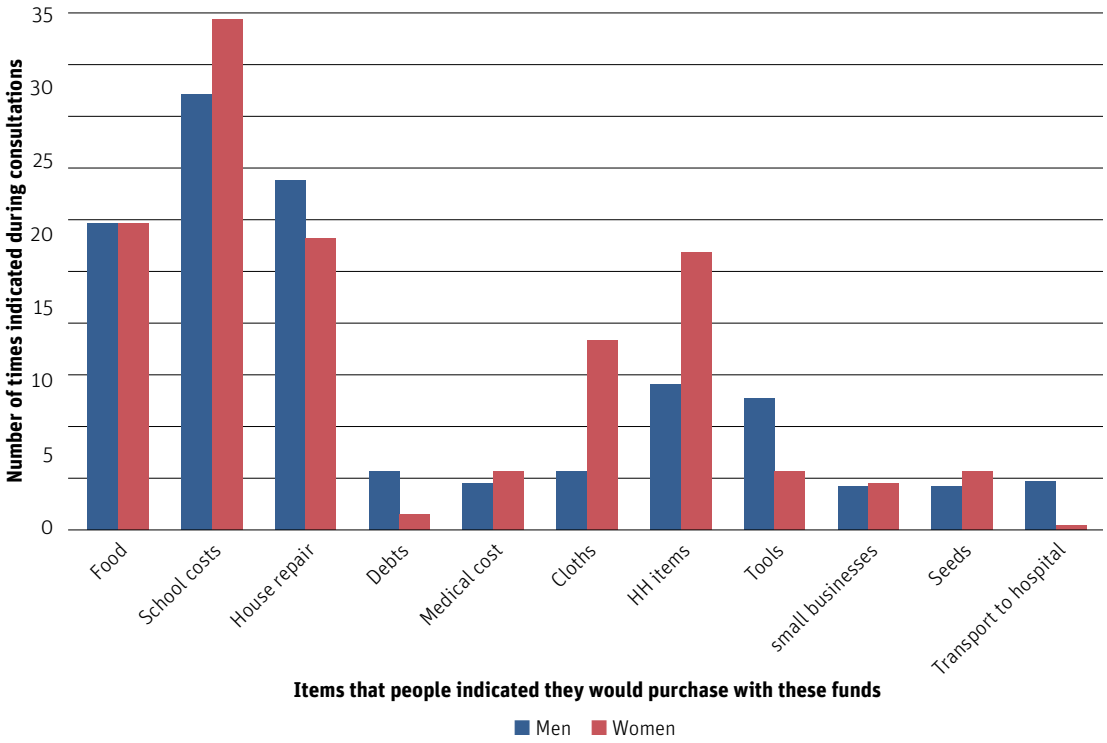
Emergency employment initiatives in a post-disaster context are sometimes referred to as "cash-for-work" or rapid or temporary employment. Such programs seek to assist post-disaster recovery by providing a temporary source of cash income in exchange for work (usually related to clean-up),

supplemented by skills training. They provide a quick way to inject cash into the local economy, and are flexible and empowering in that participants can determine individually on which items to spend the cash earned, based on their family's specific needs and priorities.

Given the cyclone's severe impact on incomes, community members were consulted on their interest in participating in any emergency employment scheme if one were initiated in their community. The overall response was very positive. Among both men and women who were consulted, 98–100% expressed interest in participating in an emergency employment program, if one were established. There were just a few exceptions; in Ipota and Umpon Yelongi (Tafea), only 50% of respondents expressed interest, and in Imaki (Tafea), only 75% of women expressed interest in such an initiative. In Asanvari village in Penama Province, women explained that they have limited time available for emergency employment, as they have to care for children and other family members, and must seek approval from their husbands in order to participate in any paid work in the village.

People consulted in the affected villages indicated what items they would most likely spend money on should they participate in an emergency employment program. A gender-differentiated summary of these findings is set out in Figure 15.

Figure 15. Comparison of How Men and Women Would Spend Funds Earned from Emergency Employment



As Figure 15 indicates, women showed substantially greater intention than men to spend cash on household items and clothes for the family. Men gave greater priority to buying tools, housing repair, and transportation to medical facilities. The most common household item people would spend the money on is soap. In terms of tools and equipment, women would most often purchase gardening tools, whereas men would purchase chainsaws, fishing gear, and construction tools.

Recovery Strategy and Needs

The short-term and medium- to long-term recovery needs for livelihoods are set out respectively in Table 67 and Table 68.

Table 67. Short-Term Recovery Needs for Household and Community Livelihoods

Activity	Value (VT 1,000)	Responsible Agency
Repair and reopen marketplaces in Port Vila and other key locations, for handicrafts, food, and vegetable sales.	To be determined	Municipalities, DLA
Initiate gender-balanced emergency employment programs in Efate, Tafea, and Shefa	86,400	DLA, UNDP, other donors
Facilitate purchase of pandanus from unaffected islands, so that women in the affected locations can resume weaving	5,400	DLA, donors
Implement debris management programs in affected locations to clear paths and repair community infrastructure	54,000	DLA, UNDP
Establish local carpentry workshops, to recycle useable wood debris for housing repair and making furniture	19,440	DLA, UNDP
Open sandalwood season early, so that people can sell to earn income	No cost	MALFFB
Total	**165,240**	

Note: DLA = Department of Local Authorities.

Table 68. Medium- to Long-Term Recovery Needs for Household and Community Livelihoods

Activity	Value (VT 1,000)	Responsible Agency
Support rural women with micro-grants to reestablish small local businesses.	54,000	Department of Women at Ministry of Justice and Community Services, DLA, UN Women, UNDP
Implement and expand "Markets for Change" program to improve income and working conditions for women market vendors in rural and urban areas.	21,600	Department of Women, DLA, UN Women, UNDP
Provide solar-powered freezers for storage of fish for sale	27,000	Ministry of Climate Change, DLA, donors
Train men and women in the maintenance and repair of solar batteries and equipment, as an alternative livelihood	To be determined	Ministry of Climate Change, UNDP Global Environment Facility (GEF)
Provide solar-powered systems for copra drying	8,100	Ministry of Climate Change, UNDP GEF
Seek increased quota of ni-Vanuatu seasonal workers for fruit picking in New Zealand	No cost	Department of Labour/ Ministry of Internal Affairs
Total	**110,700**	

Women in Port Narvin interested in cash-for-work raise their hands. © Silke Von Brockhausen, UNDP. Reproduced with permission; further permission required for reuse.

4.3 Gender

Summary

The PDNA undertaken following Tropical Cyclone Pam demonstrates that certain social groups within the four affected provinces have experienced more severe impacts than others. Widespread gender inequality and discrimination against women and girls placed them at a disadvantage before the disaster hit. Women, girls, and FHHHs—as well as people living with disabilities and other vulnerable groups—are overrepresented in the lowest wealth quintiles, and therefore have fewer resources for coping with disaster impacts. Given the existing division of labor in the agricultural sector, the impact on subsistence farming means that women's resources to generate income and provide food and nutrition for their families have significantly decreased. With limited access to political and policy decision making, women may have difficulty influencing, participating in, and benefitting from recovery interventions and resources, especially at the community level. Post-disaster recovery should therefore create equal opportunities for women to benefit from resource allocations (in kind, work opportunities, or cash). In this way women's specific needs and interests could be taken into account, and disaster recovery would not perpetuate inequality and erode the resilience of women in the long term.

Post-disaster recovery should create equal opportunities for women to benefit from resource allocations (in kind, work opportunities, or cash).

Pre-Disaster Gender Situation

Vanuatu ranks relatively low on the gender inequality scale. It is number 132 out of 187 countries according to the UNDP Human Development report 2014[62]. Based on the 2009 census, women make up 48% of the ni-Vanuatu population, and the total fertility rate per woman is 4.2 births.

[62] United Nations Development Programme UNDP (2014): Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building

Females have a longer life expectancy than males (73 years compared to 70 years). The education gap between women and men is quite narrow—85% for men having primary school education or higher and 81% for women[63]. It is estimated that FHHHs make up 20% of the national households. Traditionally women are responsible for domestic works and small-scale income-generation activities, while men engage in community and family decision making and sell cash crops and livestock for income.

Women remain largely excluded from decision-making processes at different levels. Vanuatu has one of the lowest rates of women in parliament in the world, reflecting the entrenched traditional view that leadership is for men. Since independence, only five women have been elected to the national parliament, and currently the national parliament has no women members. In addition, women represent just 3% of total senior/executive government positions. The traditional customary structures that are present within all communities are led by male chiefs who hold significant decision-making authority over their community and often make decisions about the use of productive resources. Women do not take part in decision-making process in the public sphere.

Although women's participation in the formal economy has increased to around 36%, women still face many challenges accessing equal opportunities to paid employment in the nonagricultural sector. More women than men are economically inactive, most being full-time homemakers caring for children, the elderly, people with disabilities, and other family members. More women than men (49% and 41% respectively) are involved in the subsistence economy, which makes them more susceptible to poverty, disaster, and other livelihood stresses.

Violence against women in Vanuatu is alarmingly high, widely accepted, and complicated by the traditional ways of dealing with violence, which often occurs within families. A prevalent study[64] on violence against women and girls found that 60% of women between 15 and 49 experienced physical or sexual violence during their lifetime. Further, prevalence of sexual abuse against girls under the age of 15 is extremely high, and the majority of perpetrators are male family members or boyfriends.

Assessment of Effects and Recovery Needs[65]

Gender Implications of Damage to Infrastructure and Physical Assets

While the destruction of critical infrastructure such as health facilities, water supply systems, and housing has affected everyone, recovery efforts need to be informed by and respond to differential impacts based on gender roles at the community level. Data collected by WASH Cluster shows that 58% of all water collection in the affected provinces is done by women and children. Because Tropical Cyclone Pam has damaged and contaminated sources of drinking water, women and children must dedicate greater time and effort than men to obtaining water from more distant locations. This increased workload reduces the time they can allocate to income generation and education. It also

[63] Vanuatu National Statistical Office (2009): National Population and Housing Census; Gender Monograph 'Women and Men in Vanuatu'

[64] Vanuatu Women's Centre and Vanuatu National Statistics Office (2011): National Survey on Women's Lives and Family Relationship.

[65] The degree of integration of social issues into sectoral assessments was limited by the different assessment schedules, the level of field-based humanitarian assessment, and the household data surveys undertaken by the different sectors. The lack of sex-disaggregated data before the cyclone and in humanitarian needs assessment severely limited the costing of disaster losses by women and men.

exposes them to hazards such as violence or disease. As shown in Table 69, the effect on women and children of water supply and sanitation damage and loss is more than 58% (VT 295 million) of the total effect.[66]

Table 69. Gendered Disaster Effects on Water Supply and Sanitation

Province	Total Effects (VT 1,000)	Women and Children engaged in collection water (%)	Total Effects for Women and Children (VT 1,000)
Malampa	93,155	56	52,167
Penama	30,600	70	21,420
Shefa	210,410	59	124,142
Tafea	79,390	53	42,077
Total	**511,900**	**58**	**295,180**

For reasons of safety, household efficiency, and food production, restoration of water facilities should be prioritized. Concerning private housing, recovery efforts should target those households least able to restore homes because of endemic poverty and limited social networks or capital. In this regard, FHHHs should receive special consideration. The 2009 census indicates that 24% of the households in Vanuatu are female-headed, which translates into 3,840 households needing VT 1.9 billion (as set out in Chapter 3.2.1) for home restoration (VNSO 2009).

Of particular concern are the landless women in areas like Epi, where communities have to relocate because of saltwater intrusion and coastal erosion. Compounding this challenge are the barriers that women face in accessing and controlling productive assets and resources. Targeted assistance should be provided to FHHHs in the reconstruction of private housing, given that the support they normally rely on from the community has been reduced. Furthermore, rehabilitation and reconstruction programs should promote the participation of women so they can benefit from them along with men.

Table 70. Total Effect (Damage and Loss) for Female Headed Households (VT 1,000)

Province	Total Effect on Housing[a]	Total Effect on Female Headed Households[b]
Malampa	582,638	139,833
Penama	233,310	55,994
Shefa	6,863,256	1,647,181
Tafea	2,213,461	531,231
Total	**9,892,665**	**2,374,240**

a. Housing figures presented in Chapter 3.2.1

b. FHHH figures correspond to 24% of total effect on housing

[66] The calculation is based on the World Health Organization methodology (Hutton, Haller, and Bartram 2007; Hutton and Bartram 2008; Evans et al. 2004; OECD 2011), which estimates that US$1 in damage equals US$5 in lost economic output and that losses would be incurred until the preexisting level of service was recovered.

Gender Implications of Effects and Impact on Production, Supply of, and Access to Goods and Services

Agriculture. Agriculture is the mainstay for food security and the main source of income for women. More women than men (49% and 41% respectively) are dependent on subsistence agriculture. Although subsistence farming is not considered in national accounting, the small scale of these agriculture products represents an important source of income for women and enables their families to survive. For men, on the other hand, research suggests that a greater share of income goes to personal recreation.[67] Analysis on the impact on crops, shows that households suffered a total loss of VT 4 billion, VT2 billion of which comes from subsistence crops. This equates to VT 1082 billion for women compared with VT 0.921 billion for men.

Extensive destruction of food and cash crops has created new challenges for women's ability both to provide adequate food and nutrition and to generate income to support their families. Recovery needs should provide investment to reduce dependence on subsistence cropping for household income through skills capacity training and vocational training for women.

Commerce and industry. Women face challenges accessing equal opportunities to paid employment in the nonagricultural sector. It is anticipated that Tropical Cyclone Pam will disproportionately impact women who are employed within the private sector, especially the tourism sector, as they make up the bulk of unskilled workers. Recovery programs should aim to provide laid-off women with temporary employment (debris clearance, solid waste management, etc.) until the sector recovers. Over the medium term, training programs for women should aim to increase their skills and possibly their access to nontraditional livelihoods. The informal sector and marketplaces offer important venues to effect social and economic change for women, especially considering that women make up 90% of the market vendors. Strengthening of the informal market sector through recovery programs is a very good way to empower women economically and reduce unemployment because it has low capital requirements and low entry barriers.

Unpaid work. The unpaid work undertaken by women because of the disaster has to be considered during recovery. Women normally take on the bulk of unpaid work, 27.2 hours per week (80%), while men contribute 6.6 hours (20%).[68] Women's care burden has increased dramatically in the post-disaster context. This includes an increase in working hours for restoring homes and gardens, fetching water, searching for food, and taking care of children due to the closure of primary and kindergarten schools. These additional tasks have a cost, as they take away from time women could have dedicated to income generation. Considering that 16,000 houses were affected (Chapter 3.2.1) it is estimated that by working an additional two hours per day for three months, women could have earned a minimum of VT 432 million, based on the average domestic worker wage of VT 3,000 per week.[69] While it is important to ensure that women participate in and directly benefit from post-disaster recovery programs, efforts should be made not to increase their already high work burden. Recovery programs can take into account, for example, provision of temporary child care arrangements and prioritization of repair of damaged schools and kindergartens.

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[67] Bowman, C, Cutura, J, Ellis, A and Manuel, C 2009, Women in Vanuatu: Analysing Challenges to Economic Participation, World Bank, Washington DC

[68] Foundation of the People of South Pacific International (FSPI) Island Consulting (2000): Vanuatu Rural Time Use Survey: January to March 2000 time use Survey- Report to the Department of Strategic Management

[69] Calculated based on the assumption that women are now devoting additional time to domestic work in cleaning up their homes and kitchens, scouring for food, drawing water, and caring for children. Child care is assumed to have increased substantially due to destruction of schools and kindergartens (see Chapter 3.2.3).

Other social impacts

Gender-based violence. Vanuatu already has high rates of sexual and gender-based violence, and vigilance will be needed to prevent any escalation. A lack of separate sanitation facilities following destruction of existing facilities and an increase in the use of bushes often forces women to perform ablutions very early in the morning or at night for privacy, which puts them at a greater risk for sexual violence. This situation is made worse because avenues for reporting abuse are lacking. Given that sexual and gender-based violence is typically anticipated to increase during a crisis, monitoring of incidents and support for key organizations will be important in the upcoming months.

It is also critical that women's networks, women's centers, and referral for survivors be rebuilt and strengthened under the post-disaster recovery program.

Impacts on people living with a disability. According to the 2009 census (VNSO 2009), 5% of the ni-Vanuatu population has some form of disability. People living with disability, regardless of gender, are likely to face and will continue to face increased mobility challenges in light of debris, reconstruction of their homes, and damage to other infrastructure such as health facilities and water and sanitation facilities. DRM measures need to sensitize disaster response authorities to ensure that the needs of people living with disability are anticipated and met.

Estimation of the Economic Impact of Tropical Cyclone Pam on Women

Table 69 and 70 paint a partial picture of economic values of damage and loss incurred by women at the household level. They make visible the differential impact of the disaster on women. Though the quantifiable effect is minimal in the national accounting framework, the impact on women's lives is profound. Women's current social status means that they form the poorest bracket of the population and will struggle the hardest to recover from the disaster. Their relative lack of opportunities and access to resources impedes fast recovery, and the lack of specific focus at the micro level in the recovery programs can contribute to the poorest sectors remaining below the poverty line. At the same time, equitable post-disaster recovery could help to reduce women's disadvantaged condition and increase their overall resilience. In this sense it is very important to orient the recovery resources toward vulnerable groups and to strengthen the capacities and skills that they are already using to cope with the disaster. Women as well as men must have access to reconstruction and rehabilitation jobs, as well as public works, investment funds, and income-generating projects, to support their long-term economic recovery.

Recovery Strategy

Women's economic contributions to households have similar relevance to men's. One of the direct consequences of the disaster is women's loss of resources and decreased participation in productive and income-generating activities due to direct loss and time dedicated to emergency and rehabilitation activities as well as domestic and communitarian tasks. Post-disaster recovery strategies and resources must therefore strive to safeguard, restore, and promote women's economic engagement. These efforts must seek to redress inequalities and at the very least not perpetuate unequal access to power and resources. Recovery strategy activities should include the following:

- Women's economic recovery under the post-disaster recovery programs must be protected and accorded the same status and importance as that of men. Sectors that have high a representation of women—agricultural production, tourism, and the informal economy including urban and rural markets—must not be neglected.

- Subsistence agriculture is the current backbone of women's economy. There is an urgent need for extension services for women, who are often sidelined in favor of men and cash crops. Investment to reduce dependence on subsistence cropping for household income through skills capacity training and vocational training for women is also needed.

- Women who have lost jobs in the formal sector must be afforded the opportunity for alternative income through temporary employment such as in debris clearance, solid waste management, and repair of community infrastructure.

- Support should be given to establishing or restoring community child care arrangements, including temporary mechanisms and the prioritization for the rehabilitation of local kindergartens, in order to lighten women's time burden and allow them to participate in various recovery and reconstruction programs.

- To improve safety for women and children, initiatives to repair community infrastructure should give priority to repair and rehabilitation of damaged toilets and latrines, so that women do not need to resort to ablution in the bush.

- Considering the high number of female-headed households, priority should be given to efforts to support FHHHs and widows in relocation and in rebuilding their homes.

- Messaging aimed at preventing gender-based violence should be widely disseminated and psychosocial support made available to families confronting the stresses of dislocation. Given the likelihood of increased violence against women, local NGOs working in this area and response protocols should be strengthened.

5 Disaster Risk Management

Member of Williams Bay Community Disaster Council, Erromango, Tafea Province. © Silke Von Brockhousen, UNDP. Reproduced with permission; further permission required for reuse.

Summary

Consultations were undertaken with key national, regional, and global actors that have been providing support to Vanuatu following the impact of Tropical Cyclone Pam. Based on this feedback, a number of disaster preparedness and response capacity building measures can be undertaken to minimize future risk.

The key areas to be addressed are the strengthening of early warning systems (EWSs); strengthening of post-disaster assessment capacity, communications capability, and information management; and institutional strengthening and capacity building in disaster management. It is important to note that monitoring and warning services lie at the core of an effective EWS. There must be a sound scientific basis for predicting hazards and a reliable forecasting and warning system that operates without interruption around the clock. Continuous monitoring of hazard parameters is essential to generate accurate, timely warnings. Warning services for different hazards should be coordinated where possible to gain the benefits of shared institutional, procedural, and communication resources.

The total estimated needs associated with the replacement of early warning infrastructure and equipment managed by the Vanuatu Meteorology and Geo-Hazards department is VT 478 million.

There must be a sound scientific basis for predicting hazards and a reliable forecasting and warning system that operates without interruption around the clock.

Legislative Framework

The national disaster risk management arrangements are stipulated under two separate legislations:

- The National Disaster Act (Cap 276) of 2000 sets out the umbrella national arrangements for the management of disaster arising from natural and other hazards. Following the promulgation of the act, the NDMO developed in consultation with stakeholders the draft National DRM Arrangements (National Disaster Plan) in 2008.

- The Meteorology Act (Cap 204) (Act No. 4 of 1989) sets out the national arrangement for monitoring and warning for severe weather, including tropical cyclones and other meteorological hazards, in Vanuatu. The geohazard responsibilities were transferred to the VMGD following the Council of Ministers Decision 33/2010 in 2010.

Costs of Damage to the National Multi-hazards Early Warning System

The national Multi-hazards Early Warning System (MHEWS) was severely impacted by Tropical Cyclone Pam, with observation stations and communication equipment damaged. The cost to replace the damaged equipment and communication network is estimated at VT 227 million, based on an assessment conducted by the VMGD.

Experiences and Lessons Learned

In the face of the severe conditions imposed by one of the strongest cyclones ever recorded in the Pacific Islands, the VMGD was able to keep the public informed on the progress of Tropical Cyclone Pam and the dangers they faced. While 11 people were killed during the storm, much greater loss of life was likely prevented by the timely and accurate warnings and the public's responsiveness to them. The Vanuatu Tropical Cyclone Warning Centre (VTCWC), which is managed and operated by the VMGD, benefitted from its close proximity to the NDMO (they share the same building). As the cyclone approached, warnings were transmitted via SMS (text messaging), phone calls, HF (high frequency) radio, and the Internet. The cellular towers and HF radio antennas went down early on, but warnings were still sent over the Internet. This demonstrates the importance of having a range

of communications options. As of April 10, communications were still down in the hardest-hit areas; backup communications and spare parts for the HF radio network (a widely used communications option that can be repaired relatively quickly) are needed. Another issue faced by VMGD, one not unique to the region, was the combination of people's reliance on alternative information sources (including some that predicted the earlier arrival of Tropical Cyclone Pam) and the reluctance of some to heed warnings.

Key Needs and Recovery Strategy

The experiences from Tropical Cyclone Pam have highlighted the need for a complete review of the DRM arrangements to cover disaster preparedness, response, and early warning as well as DRM arrangements across all of government, the private sector, and communities. The short- and medium-long term recovery needs are presented below in Table 71 and 72 respectively. More information is available in Annex 5.

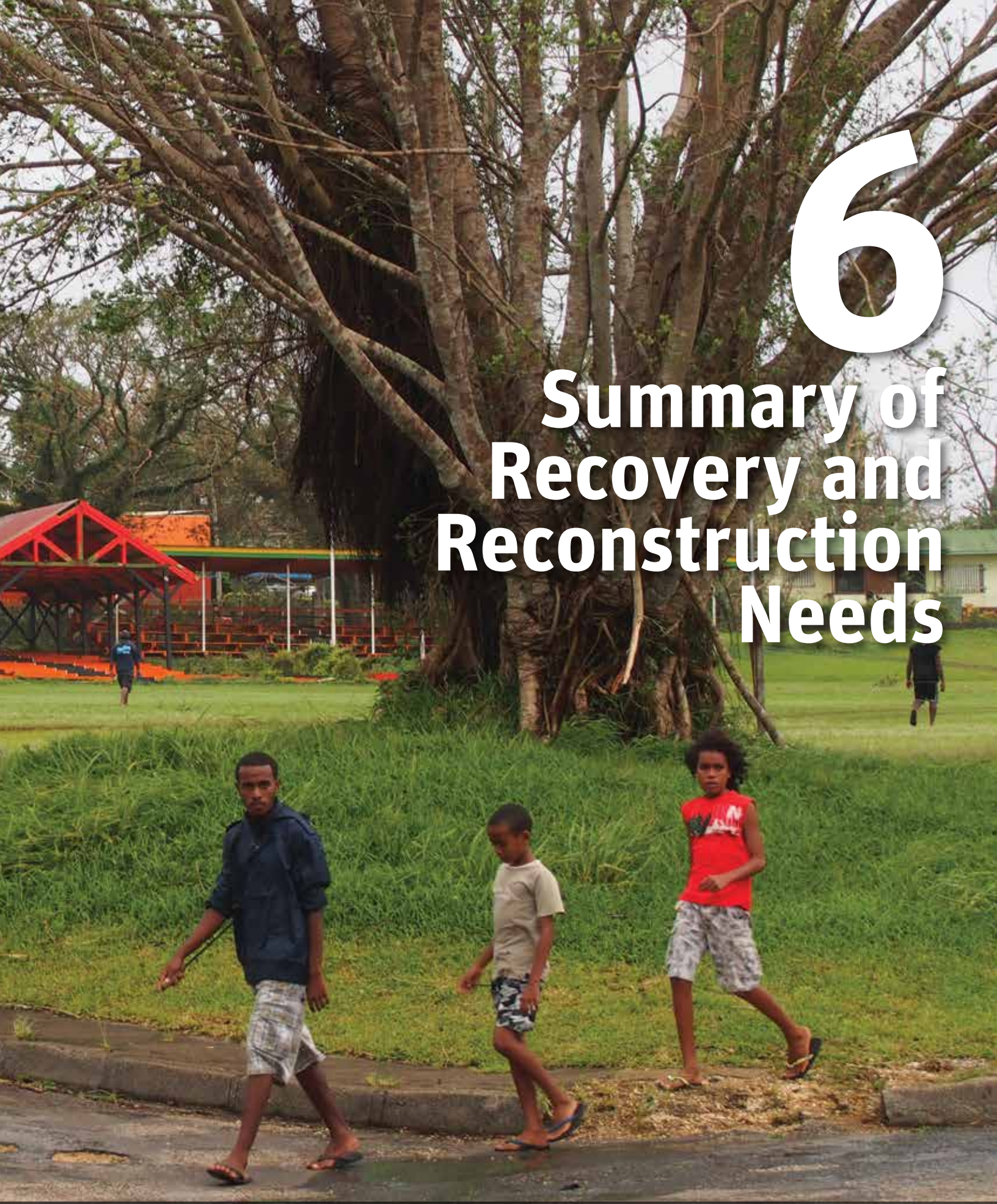
Table 71. Short-Term Recovery Needs and Estimated Costs for DRM Arrangements and Early Warning Systems

Program of Activities	Value (VT 1,000)	Responsible Agencies
Refurbishment of Bauerfield and Outer Islands Observation Stations	274,725	To be confirmed
Total	**274,725**	

Table 72. Medium- to Long-Term Recovery Needs and Estimated Costs for DRM Arrangements and Early Warning Systems

Program of Activities	Value (VT 1,000)	Responsible Agencies
Institutional Strengthening and Development of Regulatory Frameworks	5,494	To be confirmed
Human Resources Development	10,989	To be confirmed
Development of Standard Operating Procedures and Warning Protocols	32,967	To be confirmed
Information Management	10,989	To be confirmed
Communication Infrastructure for DRM & EWS	54,945	To be confirmed
Retrofitting of Existing Public Facilities for Evacuation Centers	87,912	To be confirmed
Total	**203,296**	

6 Summary of Recovery and Reconstruction Needs



Damage to sports field in Port Vila. © Becky Last, Vanuatu Dept. of Tourism.

The private sector accounts for 69% of the total disaster effects, so the recovery and reconstruction strategy should cater for the needs of both the private and the public sectors in order to ensure an effective overall recovery.

The primary objective of the recovery strategy is to enable all people to improve their overall well-being by restoring their physical assets, livelihoods, and socio-cultural and economic status. The private sector accounts for 69% of the total disaster effects, so the recovery and reconstruction strategy should cater for the needs of both the private and the public sectors in order to ensure an effective overall recovery.

Productive sectors, which are predominantly private, account for 39% of the total disaster effects. Of this, around half is attributable to effects on the tourism sector. Social sectors account for around 31% of the total disaster effects, with most of these effects found in private housing (66% of total social sector effects). Infrastructure sectors follow with 19% of the disaster effects. In infrastructure, the bulk of the energy and water is provided by the private sector.

The recovery strategy for the public sector should consider short-term financing needs required by the government to meet increased expenditures in the services sectors under its purview. The medium- to long-term needs for reconstruction in the public sector—including health, education, transport, environment, water supply and sanitation, and public buildings—represent the amount required both to rebuild destroyed assets so that they meet improved standards of quality and modernization, and to establish disaster-resilient norms to reduce risk to potential future disasters. The needs also include any technical assistance activities to support the sectors' long-term resilience.

The primary focus of the recovery strategy for the private productive sectors (commerce and industry, tourism, and agriculture) should be to provide access to a line of financing or production inputs to ensure that the private sector entities and individuals obtain sufficient working capital or inputs to reinitiate their productive activities. The line of financing would be targeted and support only a portion of the overall needs of the private sector. The rest is expected to be financed by the businesses or individuals themselves. The public sector is also looking into supporting the tourism revival through enhanced marketing campaigns. Private sector assets in communication, energy, and water are insured and would be compensated through the market mechanisms. All recovery needs are net of insurance (where data are available).[70]

Housing reconstruction was initiated by affected individuals supported by the government of Vanuatu and humanitarian agencies in the early stage of the recovery phase. Recovery planning is under way, with the aim to supplement the existing resilience and coping systems of the ni-Vanuatu people and assist them in BBB, specifically by distributing building materials and offering technical assistance to make self-repaired houses more durable and weatherproof.

In regard to the social side of the assessment, post-disaster requirements were estimated using qualitative methods that involved field assessments, interviews with affected persons, and other means of identifying needs. Requirements and recommendations for reducing disaster risk were estimated based on a preliminary risk analysis for Vanuatu and on workshop discussions with key stakeholders; they include activities that correlate to best practices regionally and globally.

Table 73 summarizes the quantification of short- and medium- to long-term recovery needs for all the sectors. Please refer to the individual sector chapters for further details.

[70] This excludes the recovery needs of the private sector within the communication sector, which have not been included in this PDNA and will largely be met by insurance coverage.

Table 73. Summary of Recovery Needs (VT 1,000)

Sector Name	Short-Term		Medium- to Long-Term		Total
	Activities	Needs	Activities	Needs	
Productive Sectors		**4,510,172**		**1,321,378**	**5,831,550**
Agriculture	Inputs and equipment support for crops, livestock, and agriculture	651,062	Rehabilitation of damaged infrastructure Cash crops, livestock, and fisheries sector long-term recovery	1,162,378	1,813,440
Commerce and Industry	Technical assistance on microinsurance markets; Reconstructions costs (partly to be financed by low-cost line of credit and partly by business owners)	2,280,000	N/A	Not available	2,280,000
Tourism	Marketing Reconstructions costs (partly to be financed by low-cost line of credit and partly by the business owners)	1,579,110	Marketing	159,000	1,738,110
Social Sectors		**1,235,593**		**18,728,547**	**19,931,382**
Housing	Public sector technical assistance	325,000	Housing reconstruction	11,931,283	12,256,283
Health	Additional cost of health services Damage reconstruction and equipment	773,723	N/A	N/A	773,723
Education	Curriculum printing Replacement of teaching equipment	100,389	Reconstruction of schools, teachers' houses, etc.	6,748,764	6,849,153
Culture & Religious Buildings	Emergency repairs to cultural assets Church repairs	36,481	Restoration of cultural assets	48,500	84,981

Table 73. Continues

Sector Name	Short-Term		Medium- to Long-Term		
	Activities	Needs	Activities	Needs	Total
Infrastructure Sectors		**3,573,817**		**2,609,994**	**6,183,811**
Transport	Clearing of roads and temporary repairs	2,188,612	Reconstruction of road, aviation, and maritime infrastructure	1,734,035	3,922,647
Public Buildings	Repairs	297,245	Reconstruction	295,114	592,359
Water Supply Sanitation	Temporary access to water and sanitation services	365,160	Reconstruction of water supply and sanitation systems	570,845	936,005
	Additional cells for landfill				
Energy	Cost of providing electricity to peri-urban areas	3,000	Backup generators for critical facilities	10,000	13,000
Communications	Repair to iGov network	719,800		–	719,800
	Broadcasting network repairs				
	Repairs to Vanuatu Post damage				
Cross Cutting Sector		**37,500**		**90,000**	**127,500**
Environment	Community outreach	37,500	Replantation of lost ecosystems	90,000	127,500
	Detailed assessments				
Social and Household		**694,224**		**844,344**	**1,538,658**
Employment, Household and Community Livelihoods	Emergency employment	694,224	Microfinance and micro-grants	844,344	1,538,658
	Skill trainings		Skill trainings		
	Repair and improvement of market facilities		Provision of equipment		
Disaster Risk Management		**274,725**		**203,296**	**478,021**
Disaster Risk Management	Refurbishment of observation stations	274,725	Human Resource and institutional development	203,296	478,021
			Retrofitting of evacuation centers		
Total	**10,326,031**		**23,797,559**		**34,123,590**

Note: N/A = not applicable.

7 Way Forward

Preparation for aerial photography survey by remote controlled drone. *Source:* © UAE. Reproduced with permission; further permission required for reuse.

The recovery needs that have been identified during the PDNA process are not linked to the availability or form of recovery funding, but are driven by the sectoral needs analyses that have been undertaken. Given the extent of identified needs and the limited resources, the first step would be to prioritize the sectors for recovery and reconstruction based on the available financial envelope and a number of strategic considerations. A criteria-based prioritization of recovery needs across competing sectors will be necessary, the principles of which could include the following:

- Potential for direct and widest humanitarian impact
- Potential to generate sustainable livelihoods
- Inclusive (pro-poor and pro-vulnerable strategies)
- Balance between public and private sector recovery
- Restoration and rebuilding of critical infrastructure and services

The recovery program, while implemented under the government's leadership, is anticipated to be carried out in close and collaborative partnership with the private sector and civil society of the nation as a whole, and should be guided by a detailed recovery framework.

The rehabilitation and refinancing of the private sector will come from savings, debt, grants, subsidies, or duty waivers. Those who can borrow from banks will be faced with repair bills and diminished income, or will have extra working capital needs to fund the reconstruction. While the RBV has eased monetary policy and made available short-term facilities, there is still a significant demand for funding to meet the VT 17.3 billion (U$157 million) shortfall on insured damage. The amount that can be supported will be a determining factor. Listed below are several key considerations to guide government.

7.1 Low-Cost Debt Facility

Discussions with industry, RBV, commercial banks, and VNPF suggest there is an appetite for a low-cost debt facility that can be made available to the banks to on-lend for reconstruction. The ideal facility would include VT 1.6 billion–VT 5.4 billion (US$15 million–US$50million), in the form of a 10-year loan that did not distort the market. Retail deposits are raised at 3.5–4.0% interest, and this would be the benchmark rate for borrowing through the RBV. This rate and funding could be achieved by blending approximately VT 1.1 billion (US$10 million) in International Development Association (IDA) funding and VT 1.1 billion (US$10 million) in commercial funding. At 3.5–4.0% interest, the cost of funds would translate to a customer interest rate of 7–8% on the basis that the banks carry the loss risk. This would reduce current lending rates by 3–4%. This could be further reduced by putting a first loss of around 10% into the facility. The mechanism of on-lending through commercial banks has a number of benefits for the restructure. The money can be targeted at income-generating operations, operations that are in need of funding to rebuild, and key sectors (small and medium enterprises, agriculture, tourism, etc.). The mechanism would ensure that the rebuild is insured at the appropriate levels and that the governance and reporting is well established, in accordance with existing RBV practices. The benefit to the government of Vanuatu would be that the IDA money is payment-free for 10 years, and all costs would be covered by the private sector. After this period the government could either repay the IDA funding to avoid further debt stress or use it for other purposes. This facility would target existing bank customers. A portion of this facility could be reserved for micro, small, and medium enterprises at a different rate.

7.2 Agriculture Recovery

The agriculture sector represented approximately 25% of the VT 75.8 billion GDP in 2013. Approximately 80% of Vanuatu's population relies on agriculture (mainly crops, livestock, and fisheries) for livelihood and food and nutrition security, and at least 71% of the rural population derives some income from agricultural activities. The total value of recovery needs within the agriculture sector is estimated at VT 1.8 billion, of which VT 0.6 billion is short-term needs and VT 1.2 billion is medium- to long-term needs. The recovery and rehabilitation efforts in agriculture should primarily aim to support the revival of economic activity across the sector and to strengthen the capacity of the sector to sustain similar shocks in the future. The bulk of people in the agricultural sector would not be eligible for credit, and the 20 commercial firms within the sector would be covered under the low-cost facility. The government of Vanuatu would need to provide emergency assistance of approximately VT 0.6 billion to this sector, and longer-term assistance of VT 1.2 billion in the form of cash payments for goods, starter stock, food subsidy, and grants for the rehabilitation of the sector. This equates to indirect/direct support to 71% of the population in approximately 46,000 households (based on 2010 HIES) whose average weekly household expenditure was VT 7,259 in 2010. This comes to provision of VT 58,000 per household in affected areas. Various mechanisms for disbursing these funds to predominantly unbanked rural people can be considered.

7.3 Commerce Recovery

For the Commerce Sector, the total damage following Tropical Cyclone Pam is estimated at VT 1.2 billion, and the economic losses are estimated at VT 2.2 billion and hence the total effect of VT 3.3 billion. The economic cost of recovery is estimated at VT 645 million and reconstruction needs are estimated at VT 1.6 billion. This brings the total recovery cost for the commerce sector to VT 2.3 billion. For the tourism sector, it is estimated that Tropical Cyclone Pam has produced damage of around VT 5.9 billion and will lead to losses of VT 3.6 billion over the next six months. The corresponding total effect on the tourism sector is VT 9.5 billion. The tourism rebuild is estimated at VT 1.5 billion. There are 620 insurance claims across the residential, commerce and tourism sectors totalling VT 11.2 billion. VT 3.8 billion is allocated to the residential sector, where damages have been estimated at over VT 11.6 billion. VT 5 billion of claims are accounted for and have been excluded from the rebuild cost for the tourism and commerce sectors, leaving VT 2.2 billion to cover a rebuild of VT 3.8 billion. This gap is before assessment and disputes.

The government of Vanuatu may need to provide some finance in the form of an "insurance" payout to repay damage to the housing, agriculture, commerce and tourism sectors, at a capped amount. It would be preferable for the insurers undertake the process of collecting and assessing claims.

7.4 Social Recovery Considerations

Overall, taking into account Tropical Cyclone Pam's impacts on the population and all sectors, it should be noted that some groups—such as youth, women in general, women who head households, and persons living with disabilities—were hit especially hard by the associated shocks and stresses. Other sectors and groups are less vulnerable, have more resources at their disposal, and will proceed to self-recover more easily. The government should therefore consider strategically allocating some of its funds and those of donors to directly assist the more vulnerable groups. This can be done by explicitly requiring that vulnerable groups be equitably included in general activities, such as

purchase and repair of community assets and infrastructure as well as any temporary employment and clean-up activities. These groups are at risk of sliding into poverty or deeper poverty, and given their disadvantages and scant access to resources, they will most likely not be able to recover their former standard of living within this year. Two-year waivers of fees (such as school fees, medical fees, taxes, etc.) should be targeted to these groups, and they should also be offered micro-grants, technical assistance, and training to restore income sources or find new employment.

7.5 Longer-Term Housing Reconstruction

In a country as vulnerable as Vanuatu to frequent extreme weather events and geohazards, the longer-term reconstruction strategy will include the need to recognize and safeguard the self-resilience of communities and individuals and to enhance existing coping mechanisms. However, there is also a role to be played by the government (with assistance where appropriate from external support partners) to ensure that individuals and communities are provided with necessary technical and social support throughout the reconstruction phase, particularly in regards to housing reconstruction. Any additional support will be clearly and transparently targeted for the benefit of the most vulnerable, i.e., those who may not be able to self-recover at the same pace as the wider community (following the "no person is left behind" principle). This is particularly important in urban and peri-urban settings, where traditional structures may not be as strong as on the outer islands.

In the more dense urban settlements, there is a particular need to identify new lands not prone to hazards that are suitable for future growth and settlement. For example, VNPF has a pilot project that will create 2,000 low-cost houses (at a cost of VT 750,000–1,500,000 per structure) for its members. This scheme relies on access to 20-year money at commercial rates of around 7% and uses members' contributions as pseudo-equity/collateral. Low-cost housing is important to Vanuatu and these concepts should be pursued, as they result in affordable cyclone-quality buildings that are insured through the scheme.

7.6 Proposed Public Sector Recovery Program

The rehabilitation and financing of the public sector will come from public financing with the support of the country's traditional donors. At this stage it is difficult to know the amount of public resources that will be available to the program. Funding will probably be a mix of grants, credits, and loans along with contributions from the budget. The financing strategy should be based on the needs assessment summarized below for the proposed public sector recovery program.[71] A donors' meeting led by the authorities will be held as soon as more details on the specific public sector needs and geographical locations are better estimated. Table 74 provides and overview of the proposed recovery program for the public sector. It amounts to some VT 15.7 billion (about US$145 million), with 37% for education, 23% for transport, 8% for health, 7% for communication, and the remainder split between other sectors. Based on the amount of resources available, the proposed program could be phased to address the most pressing priorities first, and prepared and implemented accordingly.

[71] To assess the cost of the proposed public sector recovery program, some assumptions have been made: (i) 30% additional cost to cover the cost of restoring the investment made before Tropical Cyclone Pam to a more-resilient condition; (ii) 10% to cover detailed design, engineering, and supervision of works; and (iii) 10% of the base costs for implementation, coordination, and monitoring and evaluation of the proposed program.

Table 74. Proposed Public Sector Recovery Program

	Cost without Contingencies		Cost with Contingencies (at 15%)		Percentage of Total Cost Estimate
	VT millions	US$ millions	VT millions	US$ millions	
Water, Sanitation, and Solid Waste Management	160	1	184	2	1%
Communication	990	9	1,139	11	7%
Transport	3,200	30	3,680	34	23%
Public Buildings	690	6	794	7	5%
Health	1,120	10	1,288	12	8%
Education	5,080	47	5,842	54	37%
Culture	40	0	46	0	0%
Engineering and Sector Support	1,130	10	1,300	12	8%
Program Management	1,240	11	1,426	13	9%
Total	**13,650**	**126**	**15,698**	**145**	**100%**

Preparation of the Proposed Program

One of the key issues to be addressed as a priority will be the identification of quasi-immediate resources to finance the program preparation (detailed design, preparation of bidding documents, social and environmental safeguard requirements, fiduciary aspects, etc.). These could amount to some 3–5% of the program cost before contingencies, or around VT 0.4 billion.

The institutional setup and implementation strategy should be defined at an early stage, to enable swift implementation following preparation of the recovery activities. It is important that existing implementation capacities be taken into consideration and that a mix of skills (in particular for procurement, financial management, and safeguard requirements) should be made available to support the program's processes and procedures. A specific implementation framework will need to be discussed with the financiers, but efficient and fast delivery on the ground remains a key priority for the government.

Implementation Strategy

Several options for implementing public sector recovery activities would be feasible. These include centralized implementation with a multisector approach and project management support to ensure quick delivery, or sector-by-sector implementation, which will be slowed down by the lack of existing capacities and by logistic difficulties. It is estimated that proposed public sector recovery activities would be dispersed across more than 20 islands in the most affected provinces (Shefa and Tafea). Not all recovery options present the same rationalization of risks, and as such the government will devise a strategy that (i) allows efficient and fast delivery; (ii) prioritizes the most affected groups and population; and (iii) ensures quality of services and integration of improved resilience to future hazards.

Panoramic view of Efate. © Benkrut | Dreamstime.com.

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Annex 2: Details on Damage and Losses Summary Results

	Damage		Losses		Total Effects	
	VT (millions)	Percentage of total	VT (millions)	Percentage of total	VT (millions)	Percentage of total
Productive Sectors	**8,526**	**29**	**10,403**	**54**	**18,928**	**39**
Agriculture	1,421	5	4,641	24	6,062	12
Commerce and Industry	1,196	4	2,152	11	3,348	7
Tourism	5,908	20	3,610	19	9,518	20
Social Sectors	**14,339**	**49**	**630**	**3**	**14,969**	**31**
Housing (Private)	9,452	32	440	2	9,893	20
Health	869.793	3	106.91	1	977	2
Education	3,908	13	79	0	3,987	8
Culture	108.651	0	3.428	0	112	0
Infrastructure Sectors	**6,403**	**22**	**2,926**	**15**	**9,329**	**19**
Transport	3,017	10	2,137	11	5,155	11
Public Buildings	532.359	2	12	0	544	1
Water	414	1	284	1	697	1
Energy	179.4	1	105.5	1	285	1
Communication	2,261	8	387	2	2,648	5
Cross-Cutting Sector	**0**	**0**	**5328**	**28**	**5328**	**11**
Environment	0	0	5,328	28	5,328	11
Grand Total	**29,268**	**100**	**19,286**	**100**	**48,554**	**100**

Table A3-1. Summary of Damage and Loss by Sector

	Private Sector		Public Sector		Total Damage
	VT million	Percentage of total damage	VT million	Percentage of total damage	VT million
Productive Sectors	**%**	**41**	**97**	**1**	**8,526**
Agriculture	1,324	6	97	1	1,421
Commerce and Industry	1,196	6	0	0	1,196
Tourism	5,908	28	0	0	5,908
Social Sectors	**9,571**	**46**	**4,768**	**56**	**14,339**
Housing (Private)	9,452	45	0	0	9,452
Health	10	0	860	10	870
Education	0	0	3,908	46	3,908
Culture	109	1	0	0	109
Infrastructure Sectors	**2,776**	**13**	**3,627**	**43**	**6,403**
Transport	841	4	2,176	26	3,017
Public Buildings	0	0	532	6	532
Water	260	1	154	2	414
Energy	179	1	0	0	179
Communication	1,496	7	765	9	2,261
Cross-Cutting Sector	**0**	**0**	**0**	**0**	**0**
Environment	0	0	0	0	0
Grand Total	**20,776**	**100**	**8,492**	**100**	**29,268**

Table A3-2. Summary of Damage by Public/ Private Ownership for Sectors

Table A3-3.
Summary of Losses By Public/Private Ownership for Sectors

	Private Sector		Public Sector		Total Loss
	VT million	Percentage of total loss	VT million	Percentage of total loss	VT million
Productive Sectors	**10,086**	**86**	**317**	**4**	**10,403**
Agriculture	4,324	37	317	4	4,641
Commerce and Industry	2,152	18	0	0	2,152
Tourism	3,610	31	0	0	3,610
Social Sectors	**520**	**4**	**109**	**1**	**630**
Housing (Private)	440	4	0	0	440
Health	1	0	106	1	107
Education	79	1	0	0	79
Culture	0	0	3	0	3
Infrastructure Sectors	**1,173**	**10**	**1,753**	**23**	**2,926**
Transport	596	5	1,541	21	2,137
Public Buildings	0	0	12	0	12
Water	178	2	106	1	284
Energy	106	1	0	0	106
Communication	293	2	94	1	387
Cross-Cutting Sector		**0**	**5,328**	**71**	**5,328**
Environment	0	0	5,328	71	5,328
Grand Total	**11,778**	**100**	**7,507**	**100**	**19,286**

Table A3-4.
Summary of Total Effects by Public/ Private Ownership for Sectors

	Private Sector		Public Sector		Total Effect
	VT million	Percentage of total effect	VT million	Percentage of total effect	VT million
Productive Sectors	**18,514**	**51%**	**414**	**3%**	**18,928**
Agriculture	5,648	16%	414	3%	6,062
Commerce and Industry	3,348	9%	-	0%	3,348
Tourism	9,518	26%	-	0%	9,518
Social Sectors	**13,891**	**38%**	**1,078**	**9%**	**14,969**
Housing (Private)	9,893	27%	-	0%	9,893
Health	11	0%	966	8%	977
Education	3,987	11%	-	0%	3,987
Culture	-	0%	112	1%	112
Infrastructure Sectors	**3,944**	**11%**	**5,385**	**44%**	**9,329**
Transport	1,437	4%	3,718	30%	5,155
Public Buildings	-	0%	544	4%	544
Water	438	1%	259	2%	697
Energy	285	1%	-	0%	285
Communication	1,784	5%	864	7%	2,648
Cross-Cutting Sector	**-**	**0%**	**5,328**	**44%**	**5,328**
Environment	-	0%	5,328	44%	5,328
Grand Total	**36,349**	**100%**	**12,205**	**100%**	**48,554**

Table A3-5. Summary of Total Effects by Public Ownership for Sectors

	Private Sector Damage		Private Sector Loss		Total Private Sector Effect
	VT million	Percentage of total private sector damage	VT million	Percentage of total private sector loss	VT million
Productive Sectors	**8,429**	**0**	**10,086**	**86**	**18,514**
Agriculture	1,324	6	4,324	37	5,648
Commerce and Industry	1,196	6	2,152	18	3,348
Tourism	5,908	28	3,610	31	9,518
Social Sectors	**9,571**	**46**	**520**	**4**	**10,091**
Housing (Private)	9,452	45	440	4	9,893
Health	10	0	1	0	11
Education	0	0	79	1	79
Culture	109	1	0	0	109
Infrastructure Sectors	**2,776**	**13**	**1,173**	**10**	**3,949**
Transport	841	4	596	5	1,437
Public Buildings	0	0	0	0	0
Water	260	1	178	2	438
Energy	179	1	106	1	285
Communication	1,496	7	293	2	1,789
Cross-Cutting Sector	**0**	**0**	**0**	**0**	**0**
Environment	0	0	0	0	0
Grand Total	**20,776**	**100**	**11,778**	**100**	**32,554**

Table A3-6. Summary of Total Effects by Public Ownership for Sectors

	Public Sector Damage		Public Sector Loss		Total Public Sector Effect
	VT million	Percentage of total public sector damage	VT million	Percentage of total public sector loss	VT million
Productive Sectors	**97**	**0**	**317**	**4**	**414**
Agriculture	97	1	317	4	414
Commerce and Industry	0	0	0	0	0
Tourism	0	0	0	0	0
Social Sectors	**4,768**	**56**	**109**	**1**	**4,878**
Housing (Private)	0	0	0	0	0
Health	860	10	106	1	966
Education	3,908	46	0	0	3,908
Culture	0	0	3	0	3
Infrastructure Sectors	**3,627**	**43**	**1,753**	**23**	**5,380**
Transport	2,176	26	1,541	21	3,718
Public Buildings	532	6	12	0	544
Water	154	2	106	1	259
Energy	0	0	0	0	0
Communication	765	9	94	1	859
Cross-Cutting Sector	**0**	**0**	**5,328**	**71**	**5,328**
Environment	0	0	5,328	71	5,328
Grand Total	**8,492**	**100**	**7,507**	**100**	**15,999**

Table A3-7. Summary of Total Effects by Sector for the Affected Provinces

	Damage			Losses			Total Effects	
	VT million	% of total damage	% of total Province	VT million	% of total loss	% of total Province	VT million	% of total effects
Malampa	1,435	5	49	1,481	8	51	2,916	6
Penama	909	3	29	2,174	11	71	3,083	6
Shefa	20,558	70	64	11,389	59	36	31,947	66
Tafea	6,178	21	60	4,137	21	40	10,315	21
Sanma	0	0	0	94	0	100	94	0
Geographic location not available	187	1	94	11	0	6	199	0
Total	**29,268**	**100**	**60**	**19,286**	**100**	**40**	**48,554**	**100**

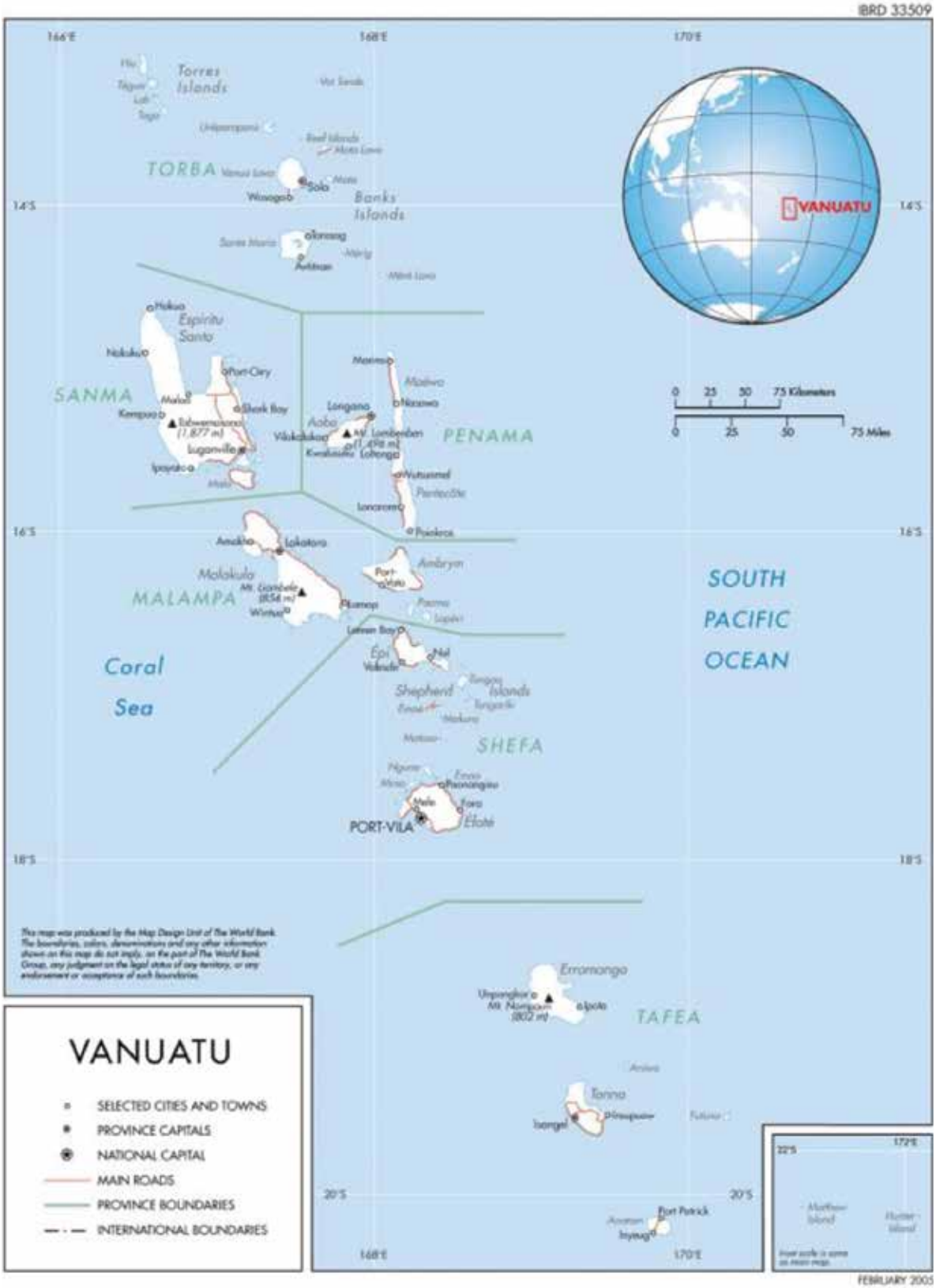
Table A3-8. Summary Total Effects by Sector for Shefa Province (most affected province)

	Disaster Effects (VT million)			Disaster Effects Percentage of Total			Percentage share of damage and loss for sector in Province	
	Damage	Losses	Total	Damage	Losses	Total	Damage	Losses
Productive Sectors	**7,652**	**6,718**	**14,370**	**26%**	**35%**	**30%**	**53%**	**47%**
Agriculture	715	1,151	1,866	2%	6%	4%	38%	62%
Commerce and Industry	1,161	2,112	3,273	4%	11%	7%	35%	65%
Tourism	5,776	3,455	9,231	20%	18%	19%	63%	37%
Social Sectors	**8,272**	**387**	**8,659**	**28%**	**2%**	**18%**	**96%**	**4%**
Housing (Private)	6,558	305	6,863	22%	2%	14%	96%	4%
Health	513	60	573	2%	0%	1%	90%	10%
Education	1,092	19	1,111	4%	0%	2%	98%	2%
Culture	109	3	112	0%	0%	0%	0%	0%
Infrastructure Sectors	**4,634**	**2,732**	**7,367**	**16%**	**14%**	**15%**	**63%**	**37%**
Transport	2,507	2,137	4,644	9%	11%	10%	54%	46%
Public Buildings	228	1	228	1%	0%	0%	100%	0%
Water	210	169	379	1%	1%	1%	56%	44%
Energy	140	85	225	0%	0%	0%	62%	38%
Communication	1,549	341	1,890	5%	2%	4%	82%	18%
Cross-Cutting Sector	**0**	**1551.68**	**1551.68**	**0%**	**8%**	**3%**	**0%**	**100%**
Environment	0	1,552	1,552	0%	8%	3%	0%	100%
Grand Total	**20,558**	**11,389**	**31,947**	**70%**	**59%**	**66%**	**64%**	**36%**

Table A3-9. Summary of Total Effects by Sector for Tafea Province (second-most affected Province after Shefa)

	Disaster Effects (VT million)			Disaster Effects Percentage of Total			Percentage share of damage and loss for sector in Province	
	Damage	Losses	Total	Damage	Losses	Total	Damage	Losses
Productive Sectors	**623**	**1,091**	**1,714**	**2%**	**6%**	**4%**	**36%**	**64%**
Agriculture	463	1,020	1,483	2%	5%	3%	31%	69%
Commerce and Industry	33	38	72	0%	0%	0%	46%	54%
Tourism	127	32	159	0%	0%	0%	80%	20%
Social Sectors	**4,636**	**183**	**4,819**	**16%**	**1%**	**10%**	**96%**	**4%**
Housing (Private)	2,113	100	2,213	7%	1%	5%	95%	5%
Health	214	34	248	1%	0%	1%	86%	14%
Education	2,310	48	2,358	8%	0%	5%	98%	2%
Culture	0	0	0	0%	0%	0%	0%	0%
Infrastructure Sectors	**919**	**92**	**1,010**	**3%**	**0%**	**2%**	**91%**	**9%**
Transport	273	0	273	1%	0%	1%	100%	0%
Public Buildings	117	0	118	0%	0%	0%	100%	0%
Water	79	46	125	0%	0%	0%	64%	36%
Energy	39	21	60	0%	0%	0%	66%	34%
Communication	409	26	435	1%	0%	1%	94%	6%
Cross-Cutting Sector	**0**	**2771.5**	**2771.5**	**0%**	**14%**	**6%**	**0%**	**100%**
Environment	0	2,771	2,771	0%	14%	6%	0%	100%
Grand Total	**6,178**	**4,137**	**10,315**	**21%**	**21%**	**21%**	**60%**	**40%**

Annex 3: Map of Vanuatu



Annex 4: Macroeconomic Assessment

Table A4-1. Consumer Price Inflation forecast – Pre and Post Tropical Cyclone Pam

	2014	2015	2016	2017
Pre Tropical Cyclone Pam	1.1%	3.1%	3.2%	2.9%
Post Tropical Cyclone Pam	1.1%	3.6%	3.2%	2.9%

Source: RBV estimates, 2014-2017

Table A4-2. Statement of Government Operations using GFSO1 Classification: Pre-Cyclone and Post-Cyclone Scenarios for Budget 2015

		Pre-Cyclone								Post-Cyclone		
GFS code	GFS description	Actual	Preliminary	Budget	Jan-Sept	Budget	Revised budget after Hong Kong PR Programme suspension	Forecast	Forecast	Budget	Forecast	Forecast
		2012	2013	2014	2014	2015	2015	2016	2017	2015	2016	2017
Transactions affecting net worth												
A1	**Revenue**	**13,612**	**14,574**	**15,253**	**11,428**	**16,097**	**15,507**	**16,965**	**17,503**	**15,709**	**16,149**	**17,000**
A11	Taxes	12,000	13,069	13,615	10,262	14,069	13,119	14,818	15,283	13,119	13,964	14,687
A111	*Taxes on income, profits, and capital gains*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
A112	*Taxes on payroll and workforce*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
A113	*Taxes on property*	*548*	*360*	*354*	*336*	*520*	*520*	*551*	*569*	*520*	*560*	*593*
A114	*Taxes on goods & services*	*8,871*	*10,071*	*10,544*	*8,042*	*10,853*	*9,903*	*11,415*	*11,765*	*9,903*	*10,501*	*11,021*
A115	*Taxes on international trade and transactions*	*2,580*	*2,638*	*2,717*	*1,884*	*2,696*	*2,696*	*2,852*	*2,949*	*2,696*	*2,903*	*3,073*
A116	*Other taxes*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
A12	Social contributions	0	0	0	0	0	0	0	0	0	0	0
A13	Grants	0	0	0	0	0	360	0	0	360	0	0
A131	*Grants from foreign Governments*	*0*	*0*	*0*	*0*	*0*	*360*	*360*	*360*	*360*	*0*	*0*
A14	Other revenue	1,613	1,506	1,638	1,166	2,029	2,029	2,147	2,220	2,231	2,185	2,313
A144	*Voluntary transfers other than grants - current*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
A145	*Capital Claims*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*202*	*0*	*0*

GFS code	GFS description	Pre-Cyclone								Post-Cyclone		
		Actual	Preliminary	Budget	Jan-Sept	Budget	Revised budget after Hong Kong PR Programme suspension	Forecast	Forecast	Budget	Forecast	Forecast
		2012	2013	2014	2014	2015	2015	2016	2017	2015	2016	2017
A2	**Expense**	**13,876**	**13,936**	**14,214**	**11,082**	**15,271**	**15,271**	**15,709**	**16,160**	**15,833**	**17,090**	**17,812**
A21	Compensation of employees	8,164	8,183	8,303	6,012	8,488	8,488	8,743	9,005	8,632	9,349	9,760
A22	Use of goods and services	2,930	2,981	2,990	2,544	3,555	3,555	3,662	3,772	3,663	3,967	4,142
A23	Consumption of fixed capital	0	0	0	0	0	0	0	0	0	0	0
A24	Interest	465	555	597	509	684	684	684	684	684	684	684
A25	Subsidies	0	0	60	0	0	0	0	0	0	0	0
A26	Grants	1,459	1,384	1,423	1,197	1,239	1,239	1,276	1,315	1,239	1,342	1,401
A27	Social benefits	310	248	210	229	467	467	481	495	519	562	586
A28	Other expense	549	585	631	590	837	837	863	888	1,096	1,187	1,239
GOB	Gross operating balance	-263	638	1,039	346	826	236	1,256	1,343	-124	-941	-812
NOB	Net operating balance	-263	638	1,039	346	826	236	1,256	1,343	-124	-941	-812
Transaction in nonfinancial assets												
A31	**Net Acquisition of Nonfinancial Assets**	**311**	**248**	**448**	**169**	**213**	**213**	**219**	**226**	**5,315**	**7,033**	**5,331**
A311	Fixed assets	311	248	448	169	213	213	219	226	5,315	7,033	5,331
A312	Change in inventories	0	0	0	0	0	0	0	0	0	0	0
A313	Valuables	0	0	0	0	0	0	0	0	0	0	0
A314	Non-produced assets	0	0	0	0	0	0	0	0	0	0	0
NLB	Net lending / borrowing	-574	390	591	177	614	23	1,037	1,117	-5,439	-7,974	-6,143
Transactions in financial assets and liabilities (financing)												
A32	Net acquisition of financial assets	478	231	0	-93	0	-590	500	581	-6,052	-8,510	-6,679
A321	Domestic	478	231	0	-93	0	-590	500	581	-6,052	-8,510	-6,679
A322	Foreign	0	0	0	0	0	0	0	0	0	0	0
A323	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0
A33	Net incurrence of liabilities	1,052	-159	-591	-269	-614	-614	-537	-537	-614	-537	-537
A331	Domestic	1,389	306	0	263	163	163	0	0	163	0	0
A332	Foreign	-336	-465	-591	-532	-776	-776	-537	-537	-776	-537	-537

Table A4-3. Statement of Donor Operations using GFS01 Classification: Pre-Cyclone and Post-Cyclone Scenarios for Budget 2015

GFS code	GFS description	Pre-Cyclone								Post-Cyclone		
		Actual	Preliminary	Budget	Jan-Sept	Budget	Revised budget after Hong Kong PR Programme suspension	Forecast	Forecast	Budget	Forecast	Forecast
		2012	2013	2014	2014	2015	2015	2016	2017	2015	2016	2017
Transactions affecting net worth												
A1	**Revenue**	**2,176.3**	**1,799.9**	**1,827.8**	**1,637.0**	**2,891.7**	**2,891.7**	**1,793.3**	**1,739.3**	**3,364.6**	**1,793.3**	**1,739.3**
A11	Taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A111	Taxes on income, profits, and capital gains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A112	Taxes on payroll and workforce	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A113	Taxes on property	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A114	Taxes on goods and services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A115	Taxes on international trade and transactions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A116	Other taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A12	Social contributions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A13	Grants	2,176.3	1,799.9	1,827.8	1,637.0	2,891.7	2,891.7	1,793.3	1,739.3	3,295.8	1,793.3	1,739.3
A131	Grants from foreign Governments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	404.1	0.0	0.0
A14	Other revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.8	0.0	0.0
A144	Voluntary transfers other than grants - current	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.8	0.0	0.0
A145	Capital Claims	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A2	**Expense**	**1,879.6**	**1,773.4**	**1,827.8**	**1,046.8**	**2,891.7**	**2,891.7**	**1,793.3**	**1,739.3**	**3,222.7**	**1,793.3**	**1,739.3**
A21	Compensation of employees	245.8	254.1	231.4	143.3	355.8	355.8	220.6	214.0	355.8	220.6	214.0
A22	Use of goods and services	1,187.6	1,171.3	1,244.1	715.5	2,068.0	2,068.0	1,282.5	1,243.9	2,068.0	1,282.5	1,243.9
A23	Consumption of fixed capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A24	Interest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A25	Subsidies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A26	Grants	430.0	219.6	302.3	176.9	448.9	448.9	278.4	270.0	448.9	278.4	270.0
A27	Social benefits	1.8	96.4	31.7	0.2	3.4	3.4	2.1	2.1	334.5	2.1	2.1
A28	Other expense	14.3	32.1	18.3	10.9	15.5	15.5	9.6	9.3	15.5	9.6	9.3
GOB	Gross operating balance	296.7	26.5	0.0	590.2	0.0	0.0	0.0	0.0	141.9	0.0	0.0
NOB	Net operating balance	296.7	26.5	0.0	590.2	0.0	0.0	0.0	0.0	141.9	0.0	0.0

GFS code	GFS description	Pre-Cyclone								Post-Cyclone		
		Actual	Preliminary	Budget	Jan-Sept	Budget	Revised budget after Hong Kong PR Programme suspension	Forecast	Forecast	Budget	Forecast	Forecast
		2012	2013	2014	2014	2015	2015	2016	2017	2015	2016	2017
Transactions in nonfinancial assets												
A31	Net Acquisition of Nonfinancial Assets		461.8	506.4	99.0	5,858.1	5,858.1	6,944.9	7,813.1	6,000.0	6,944.9	7,813.1
A311	Fixed assets	826.8	461.8	506.4	99.0	5,858.1	5,858.1	6,944.9	7,813.1	6,000.0	6,944.9	7,813.1
A312	Change in inventories	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A313	Valuables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A314	Non-produced assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NLB	Net lending / borrowing	296.7	(435.3)	(506.4)	491.2	(5,858.1)	(5,858.1)	(6,944.9)	(7,813.1)	(5,858.1)	(6,944.9)	(7,813.1)
Transactions in financial assets and liabilities (Financing)												
A32	Net acquisition of financial assets	-545.1	-435.3	0.0	491.2	0.0	0.0	289.4	326.5	0.0	289.4	326.5
A321	Domestic	(545.1)	-435.3	0.0	491.2	0.0	0.0	289.4	326.5	0.0	289.4	326.5
A322	Foreign	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A323	Monetary gold and SDRs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A33	Net incurrence of liabilities	0.0	0.0	506.4	0.0	5,858.1	5,858.1	7,234.3	8,139.6	5,858.1	7,234.3	8,139.6
A331	Domestic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
A332	Foreign	0.0	0.0	506.4	0.0	5,858.1	5,858.1	7,234.3	8,138.6	5,858.1	7,234.3	8,138.6

Table A4-4. Consolidated Operations using GFSO1 Classification: Pre-Cyclone and Post-Cyclone Scenarios for Budget 2015

GFS code	GFS description	Pre-Cyclone								Post-Cyclone		
		Actual	Preliminary	Budget	Jan-Sept	Budget	Revised budget after Hong Kong PR Programme suspension	Forecast	Forecast	Budget	Forecast	Forecast
		2012	2013	2014	2014	2015	2015	2016	2017	2015	2016	2017
Transactions affecting net worth												
A1	Revenue	15,789	16,374	17,080	13,065	18,989	18,399	18,758	19,242	19,074	17,943	18,739
A11	Taxes	12,000	13,069	13,615	10,262	14,069	13,119	14,818	15,283	13,119	13,964	14,687
A111	Taxes on income, profits, and capital gains	0	0	0	0	0	0	0	0	0	0	0
A112	Taxes on payroll & workforce	0	0	0	0	0	0	0	0	0	0	0
A113	Taxes on property	548	360	354	336	520	520	551	569	520	560	593
A114	Taxes on goods & services	8,871	10,071	10,544	8,042	10,853	9,903	11,415	11,765	9,903	10,501	11,021
A115	Taxes on international trade & transactions	2,580	2,638	2,717	1,884	2,696	2,696	2,852	2,949	2,696	2,903	3,073
A116	Other taxes	0	0	0	0	0	0	0	0	0	0	0
A12	Social contributions	0	0	0	0	0	0	0	0	0	0	0
A13	Grants	2,176	1,800	1,828	1,637	2,892	3,251	1,793	1,739	3,655	1,793	1,739
A131	Grants from foreign Governments	0	0	0	0	0	360	360	360	764	0	0
A14	Other revenue	1,613	1,506	1,638	1,166	2,029	2,029	2,147	2,220	2,300	2,185	2,313
A144	Voluntary transfers other than grants - current	0	0	0	0	0	0	0	0	69	0	0
A145	Capital Claims	0	0	0	0	0	0	0	0	202	0	0
A2	**Expense**	**15,755**	**15,710**	**16,042**	**12,128**	**18,163**	**18,163**	**17,502**	**17,899**	**19,056**	**18,883**	**19,551**
A21	Compensation of employees	8,410	8,437	8,534	6,155	8,844	8,844	8,964	9,219	8,988	9,569	9,974
A22	Use of goods and services	4,117	4,152	4,234	3,259	5,623	5,623	4,945	5,016	5,731	5,250	5,386
A23	Consumption of fixed capital	0	0	0	0	0	0	0	0	0	0	0
A24	Interest	465	555	597	509	684	684	684	684	684	684	684
A25	Subsidies	0	0	60	0	0	0	0	0	0	0	0
A26	Grants	1,889	1,603	1,725	1,374	1,688	1,688	1,555	1,585	1,688	1,620	1,671
A27	Social benefits	312	345	242	229	470	470	483	497	853	564	588
A28	Other expense	563	617	649	601	853	853	872	898	1,111	1,196	1,248
GOB	Gross operating balance	33	665	1,039	937	826	236	1,256	1,343	18	(941)	(812)
NOB	Net operating balance	33	665	1,039	937	826	236	1,256	1,343	18	(941)	(812)

GFS code	GFS description	Pre-Cyclone								Post-Cyclone		
		Actual	Preliminary	Budget	Jan-Sept	Budget	Revised budget after Hong Kong PR Programme suspension	Forecast	Forecast	Budget	Forecast	Forecast
		2012	2013	2014	2014	2015	2015	2016	2017	2015	2016	2017
Transactions in nonfinancial assets												
A31	Net Acquisition of Nonfinancial Assets	311	710	954	268	6,071	6,071	7,164	8,039	11,315	13,978	13,144
A311	Fixed assets	1,137	710	954	268	6,071	6,071	7,164	8,039	11,315	13,978	13,144
A312	Change in inventories	0	0	0	0	0	0	0	0	0	0	0
A313	Valuables	0	0	0	0	0	0	0	0	0	0	0
A314	Non-produced assets	0	0	0	0	0	0	0	0	0	0	0
NLB	Net lending / borrowing	(277)	(45)	85	668	(5,245)	(5,835)	(5,908)	(6,696)	(11,297)	(14,919)	(13,956)
Transactions in financial assets and liabilities (financing)												
A32	Net acquisition of financial assets	(67)	(204)	(0)	399	0	(590)	790	907	(6,052)	(8,221)	(6,353)
A321	Domestic	(67)	(204)	(0)	399	0	(590)	790	907	(6,052)	(8,221)	(6,353)
A322	Foreign	0	0	0	0	0	0	0	0	0	0	0
A323	Monetary gold and SDRs	0	0	0	0	0	0	0	0	0	0	0
A33	Net incurrence of liabilities	1,052	(159)	(85)	(269)	5,245	5,245	6,698	7,603	5,245	6,698	7,603
A331	Domestic	1,389	306	0	263	163	163	0	1	163	0	1
A332	Foreign	(336)	(465)	(85)	(532)	5,082	5,082	6,698	7,602	5,082	6,698	7,602

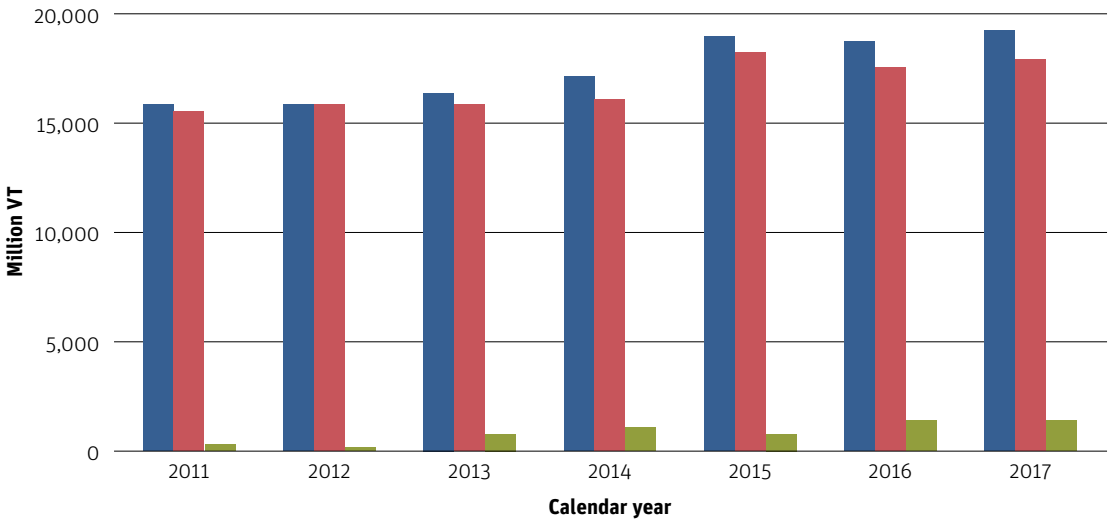


Figure A4-1. Pre Tropical Cyclone Pam Government Revenue, Expenditure and Fiscal Balance

Source: Treasury.

Table A4-5. Constant Price GDP by Industry (VT millions, 2006 Base Year)

		Estimate			Forecast		
		2,012	2013 (p)	2014 (p)	2015	2016	2017
Agriculture, fishing and forestry		**12,386**	**12,978**	**13,492**	**14,011**	**14,333**	**14,696**
A1	Crop production	9,390	9,715	10,007	10,375	10,539	10,737
A2	Animal production	1,695	1,886	2,027	2,117	2,212	2,312
A4	Forestry	809	866	928	967	1,008	1,051
A5	Fishing	492	511	530	551	573	596
Industry		**4,064**	**4,461**	**4,617**	**5,276**	**6,181**	**7,358**
B	Mining and quarrying	19	16	46	75	121	196
C	Manufacturing	1,751	1,642	1,714	1,748	1,792	1,845
D	Electricity and water supply	1,222	1,245	1,270	1,353	1,440	1,534
F	Construction	1,073	1,559	1,587	2,101	2,827	3,783
Services		**38,761**	**38,805**	**39,592**	**41,275**	**42,977**	**44,277**
G1	Wholesale and retail trade and repair of motor vehicles	820	828	820	848	877	907
G2	Other wholesale trade	2,371	2,254	2,277	2,309	2,341	2,374
G3	Retail trade	7,050	7,081	7,251	7,664	7,909	8,083
H	Transport	4,475	3,463	3,546	3,693	3,894	4,011
I J	Accommodation and food services	2,973	3,084	3,100	3,277	3,523	3,636
J	Information and communication	3,101	3,359	3,633	3,941	4,135	4,268
K	Finance and insurance	3,954	4,273	4,191	4,377	4,593	4,824
L	Real estate	4,653	4,739	4,845	5,147	5,488	5,772
M,N	Professional, scientific, technical and administrative services	1,520	1,506	1,529	1,576	1,636	1,685
O	Public administration	6,764	7,199	7,350	7,357	7,456	7,556
P,Q,R,S,T	Education, health, recreation and other services	1,080	1,019	1,051	1,087	1,124	1,162
Plus taxes, less subsidies on production		6,114	6,292	6,436	6,604	6,868	7,129
Less imputed bank service charge		(2,468)	(2,517)	(2,718)	(2,936)	(3,102)	(3,242)
Gross Domestic Product		**58,857**	**60,019**	**61,419**	**64,230**	**67,257**	**70,218**
		1.8%	**2.0%**	**2.3%**	**4.6%**	**4.7%**	**4.4%**

Table A4-6. Revised post Tropical Cyclone Pam Constant Price GDP by Industry (VT millions, 2006 Base Year)

		Estimate			
		2,014	**2,015**	**2,016**	**2,017**
Agriculture, fishing and forestry		**13,492**	**13,632**	**13,976**	**14,362**
A1	Crop production	10,007	10,027	10,212	10,431
A2	Animal production	2,027	2,104	2,199	2,300
A4	Forestry	928	958	999	1,042
A5	Fishing	530	544	566	589
Industry		**4,617**	**5,700**	**7,199**	**8,084**
B	Mining and quarrying	46	130	190	244
C	Manufacturing	1,714	1,462	1,812	1,859
D	Electricity and water supply	1,270	1,275	1,440	1,534
F	Construction	1,587	2,833	3,757	4,447
Services		**39,592**	**39,260**	**43,716**	**44,815**
G1	Wholesale and retail trade and repair of motor vehicles	820	851	891	917
G2	Other wholesale trade	2,277	2,307	2,341	2,374
G3	Retail trade	7,251	7,616	7,982	8,136
H	Transport	3,546	3,377	4,382	4,369
I J	Accommodation and food services	3,100	2,401	3,598	3,691
J	Information and communication	3,633	3,717	4,135	4,268
K	Finance and insurance	4,191	4,319	4,578	4,808
L	Real estate	4,845	5,000	5,494	5,777
M,N	Professional, scientific, technical and administrative services	1,529	1,286	1,660	1,702
O	Public administration	7,350	7,357	7,456	7,556
P,Q,R,S,T	Education, health, recreation and other services	1,051	1,029	1,197	1,217
Plus taxes, less subsidies on production		**6,436**	**6,604**	**6,868**	**7,129**
Less imputed bank service charge		**2,718**	**2,936**	**3,102**	**3,242**
Gross Domestic Product		**61,419**	**62,259**	**68,656**	**71,149**
			1.4%	**10.3%**	**3.6%**

Table A4-7. Pre and Post Tropical Cyclone Pam Balance of Payments (VT millions)

					Pre-Tropical Cyclone Pam			Post-Tropical Cyclone Pam		
	2011	2012	2013	2014	2015	2016	2017	2015	2016	2017
Current Account	**5,318**	**6,773**	**1,013**	**1,163**	**-1,300**	**-1,400**	**-500**	**-2,700**	**-4,600**	**-6,600**
Goods CR (exports)	6,011	5,071	3,653	6,160	5,000	4,600	5,000	400	4,200	4,300
% of GDP	10	9	6	10	8	7	7			
Goods dr. (Imports)	-23,290	-23,453	-25,481	-26,735	-30,000	-32,000	-34,000	-33,000	-35,000	-36,000
%of GDP	-40	-40	-42	-44	-47	-48	-48			
Services CR	25,302	27,942	33,399	32,396	34,000	36,000	39,000	31,000	32,000	34,000
Tourism earnings	19,924	22,347	27,207	24,979	25,500	27,000	26,500	23,000	26,000	27,000
% of GDP	34	38	45	41	40	40	38			
Services DR	-12,357	-13,514	-14,093	-13,757	-1,400	-1,400	-1,400	-1,500	-1,400	-1,400
Primary Income CR	3,711	3,368	3,101	3,457	3,700	3,700	3,700	3,800	3,900	4,000
RSE	1,652	1,746	1,870	2,037	2,150	2,300	2,500	2,150	2,300	2,500
% of GDP	3	3	3	3	3	3	4			
Primary Income DR	-5,804	-7,780	-3,544	-3,434	-3,500	-3,500	-3,500	-3,000	-3,200	-3,400
Secondary Income CR	1,294	1,855	2,373	3,624	4,000	4,300	3,800	10,000	8,000	5,000
Grants	1,250	1,798	1,189	1,751	1,500	1,400	1,400	5,000	35,000	3,000
% of GDP	2	3	2	3	2	2	2			
Secondary Income DR	-184	-261	-420	-548	-500	-500	-500	-500	-500	-500
Capital Account	**2,129**	**2,096**	**1,986**	**3,083**	**3,500**	**3,000**	**2,500**	**3,000**	**3,000**	**3,000**
Public external debt		10,126	9,830	12,646	17,001	22,132	24,261			
% of GDP		17	16	21	26	33	35			
Reserve assets	1,158	504	932	1,220	-385	-800	-350	1,800	-2,300	-550
Exchange rate										
Average Vatu/AUD	91.6	95.36	95.4	87.58						
Average Vatu/USD	94.6	92.64	90.5	97.07						

Annex 5: Disaster Risk Management in Vanuatu

Key Issues and Challenges

The experience with Tropical Cyclone Pam highlighted key issues and challenges to effective disaster risk management (DRM) and use of the Multi-hazards Early Warning System (MHEWS). They are as follows:

National Multi-hazards Early Warning System

1. Vanuatu Tropical Cyclone Warning Centre (VTCWC) Internal Instruction 2014–2015 Season outlines the criteria for when information, advisories, and warnings are issued for a tropical depression or a tropical cyclone. However, some communities or individuals raised concern that before the Vanuatu Meteorology and Geo-Hazards Department (VMGD) had issued information on Tropical Cyclone Pam, they were already receiving or accessing such information from other sources.
2. It was noted that DRM and the MHEWS, including the VTCWC, are generally not set up to deal with vulnerable members of society, especially those with disability.
3. Several weather observation stations (including communication capacities) have been severely damaged or destroyed.
4. The upper-air weather observation station and equipment at the Bauerfield Airport are damaged.
5. The damaged upper-air weather station building has exposed historical climate paper records to deterioration.
6. The rain gauge network, which is part of the national MHEWS and critical for climate and flood warning services, has also been severely impacted; over 170 manual and 12 automatic rain gauges, plus six agro-meteorological stations, need to be replaced.
7. The geohazards network, which is also part of the national MHEWS, sustained significant damage, and essential monitoring stations and communications networks will have to be replaced to ensure effective volcanic and seismic monitoring can be sustained.
8. The VMGD weather forecasting processing system, which is also used to generate information, advisories, and warnings on tropical cyclones, was not completely operational during Tropical Cyclone Pam.
9. The main VMGD building needs significant repairs and the forecasting office area requires installation of cyclone shutters.

Assessments

1. In terms of initial assessments, it was apparent that language barriers and the sensitivity of some of the questions (e.g., related to issues of protection of women and children) prolonged survey interviews, as more time was required to fully explain the intent of such questions. In turn, the need for such explanations created additional challenges, given that enumerators were not fully conversant with the assessment rationale. Some consideration needs to be given to addressing these issues in responses to future events.
2. The use of a variety of assessment templates by teams—rather than those developed by the National Disaster Management Office (NDMO) in consultation with stakeholders prior to the event—created confusion in communities affected by Tropical Cyclone Pam.

Communications and Information Management

1. Communication remains a challenge. Communication from the national level to the provincial and community levels was problematic in the immediate post-impact period.
2. The flow of information between clusters and the central coordination apparatus and the community needs to be improved.

Governance

1. It was noted that the NDMO staff were unable to perform effectively in their assigned roles. This was due in part to the massive influx of external humanitarian personnel in the National Emergency Operations Centre (NEOC). A further part of the challenge is that the current established national operational system is not consistent with developments that have taken place—e.g., the cluster system and the need to strengthen interoperability between key response agencies. Given that the NDA is not reflective of the developments in DRM since 2000, a comprehensive review of the national arrangements is required, and a new system should be introduced.

Operational Effectiveness

1. The introduction of an additional mechanism (central agency unit) to manage the response to Tropical Cyclone Pam required an adjustment in the established system, so that reporting/accountability lines needed clarification.
2. Heavy reliance on external assistance raises questions about the capability of national agency resources and suggests a need for more innovative approaches to preparedness and response.
3. There was apparent duplication of roles in some areas. For example, while a Logistics Cluster is in existence, the NEOC also provides for a logistics role (among others). Clarity needs to be provided in terms of the scope of responsibility of each.
4. There is a lack of understanding of operational protocols. Standard operating procedures (SOP) should be documented, and the relevant personnel need to be trained in them.
5. There is no monitoring and evaluation system to enable the NDMO to provide feedback to the government on the effectiveness of operations.
6. The timely movement of relief supplies was hindered by logistics that were at times uncoordinated. There were limited resources available to move supplies around where and when they were needed. This was a challenge particularly at some provincial locations.
7. In terms of assisting communities with early recovery, the process of distributing seedlings needs to be improved, including the formula for calculating distribution to households, which was not defined.
8. The lack of appropriate safety gear and equipment put those involved in assessments and relief distribution at risk of injury.
9. The cluster system needs to take into account the needs of the most vulnerable, both in terms of the focus of the work and (wherever possible) the representation. It was noted that the Protection Cluster did not have representation from the group(s) representing the disabled.
10. Government and other organizations do not have business continuity plans to enable them to function effectively in the immediate post-disaster period.
11. There was limited operational coordination and tasking between the NEOC and the Police Joint Planning Operational Centre.
12. The NDMO was storing and distributing relief items, but should not have needed to do so; there is a need for a single logistics setup.

13. There is a need to improve messaging to the public to provide clarity about the purpose of relief items. For example, the initial 15-day food ration distribution was intended to supplement and not replace local food sources.

Lack of Public Experience with Category 5 Cyclones

1. Although preparedness is an ongoing activity supported by the NDMO, VMGD, and other organizations, the majority of the population had not experienced a large cyclone and so could not fully anticipate potential impact. The last major cyclones of widespread impact were Tropical Cyclones Eric and Nigel in 1985, which were assessed to have impacted 117,500 people at that time (P. Dalo 2015), and Tropical Cyclone Uma in 1987. Based on statistics provided by the Vanuatu National Statistics Office (VNSO), of the overall population of approximately 270,000 (as of March 2015), only 23% (adults over 30) would have some recollection of the impact of Tropical Cyclones Eric and Nigel.

Human Resources Development

1. There is a need for more training and awareness across the government's agencies and the wider system(s) of disaster/emergency response. This would facilitate greater understanding of the roles and responsibilities of structures and key personnel, thus supporting a more streamlined and coordinated approach in the future.
2. Training of the NDMO staff, personnel of other agencies, and other stakeholders needs to focus on developing competencies in the various preparedness and emergency response roles. Generalist training in DRM is inadequate to properly prepare individuals for the roles they are expected to perform.

Traditional Coping Capacity

There is a concern that the availability of food relief following events may create a sense of dependency and thus less reliance on traditional food preservation, which can sustain especially rural communities following cyclones.

Building Code

The resilience of buildings and infrastructure to withstand Category 5 winds requires a more serious consideration of the development, implementation, and enforcement of a national building code.

Emergency Shelter

There are no purpose-built emergency shelters, so the public takes shelter in public buildings such as schools and community halls. Given resource constraints, attempts must be made at minimum to retrofit designated shelters to cyclone-proof standard.

Recommendations

Taking into consideration the practices that worked well during the response to Tropical Cyclone Pam and the key issues and challenges that arose, a series of recommendations has been developed. The recommendations are for three different time frames:

- Short term: To be implemented within 6 to 12 months
- Medium term: To be implemented within one to two years
- Long term: To be implemented within two to five years

The recommendations are categorized under a series of strategic themes as follows:

1. Multi-hazards Early Warning System
2. Assessments
3. Communication and information management
4. Governance
5. Operational effectiveness
6. Lack of public experience with Category 5 cyclone
7. Human resources development
8. Traditional coping capacity
9. Building codes
10. Emergency shelters

Multi-hazards Early Warning System

Short Term

a. VMGD and NDMO should work with relevant stakeholders, including the media, to review the VTCWC Directive and Internal Instruction for each cyclone season, in particular the criteria for when information, advisories, and warnings are issued for a tropical depression or a tropical cyclone, to ensure effective communication to the communities.
b. VGMD and NDMO should work with the relevant stakeholders to address the fact that DRM and the national MHEWS are generally not set up to deal with vulnerable members of society, especially those with disability.
c. There are seven synoptic stations throughout Vanuatu that play an important role in the national MHEWS. Two of these stations will be upgraded to automatic observations stations within the next three months. The remainder ought to be replaced with similar capability to provide a modern and comprehensive surface observation network. In particular this will ensure security and continuity of observations while keeping staff safe during severe weather events.
d. The upper-air weather observation station at the Bauerfield Airport needs to be repaired and upgraded to withstand future severe cyclonic impact.
e. Communications from the outer stations needs to be replaced and upgraded, and backup communications need to be put in place.
f. Manual and automatic rain gauges and agro-meteorological stations are severely damaged and need to be replaced.
g. There is a need to restore and replace the geohazards network, including monitoring stations and communications networks, to ensure effective volcanic and seismic monitoring is sustained.
h. The main VMGD building needs significant repairs and the forecasting office area requires installation of cyclone shutters.
i. The national MHEWS experiences and lessons learned should be documented.
j. Historical climate paper records stored at the upper-air weather station building at the Bauerfield Airport should be salvaged and digitized.

Medium Term

a. Repair VMGD headquarters building and install cyclone shutters.
b. Review the VTCWC Tropical Cyclone Information, Advisories and Warnings Summary of Procedures and Internal Instruction, through stakeholders consultation process.
c. Conduct a post–Tropical Cyclone Pam assessment of impacted island communities.

d. Review the national MHEWS lessons learned and implement necessary changes.
e. Install forecasting/visualization software and hardware such as SmartMet, a tool that collates, views, analyzes, and interprets weather data and also composes, edits, disseminates, and archives weather forecasts in graphical and text formats.

Long Term

a. Review MHEWS lessons learned in a regional context; evaluate strength, weaknesses, opportunities, threats (SWOT analysis) regionally.
b. Introduce impacts and risks-based tropical cyclone information, advisories, and warnings.

Assessments

Short Term

a. Improve the NDMO national assessment form template to address potentially sensitive questions for some community members.
b. Strengthen the assessment process to more comprehensively cover immediate relief needs at the community level, especially to include the needs of the most vulnerable groups, such as women, children, the elderly, and the disabled.
c. Streamline the flow of assessment data to enable thorough analysis and timely decision making for response and early recovery.
d. Strengthen the information management system to allow for standardized compilation of survey data and a faster turnaround time of information compiled during assessments.

Medium Term

a. Strengthen the conduct of initial damage assessments and follow-up comprehensive damage and loss assessments by using relevant methodologies in partnership with stakeholders.

Communication and Information Management

Short Term

a. Develop a functional inventory of communication infrastructure and a directory of communication services/channels that can be used during emergencies.
b. Review the information management setup in the NEOC, including the use of information technology.

Medium Term

a. Develop and resource a maintenance plan for communications infrastructure.
b. Develop a centralized information system, building on existing databases (such as those maintained by the VNSO) and others (like the Pacific Risk Information System maintained by the Secretariat of the Pacific Community), to capture all relevant data and information for support of post-disaster assessment and subsequent relief and early and long-term recovery. Such data should include sex disaggregation and identify those living with disability.
c. Clearly establish communication protocols and ensure personnel of the relevant agencies and organizations at national and provincial levels are fully trained to manage communications in the period before and after disaster events.
d. Establish an improved layout for the NEOC to allow for the use of a standardized incident management system, which can then be mirrored at subnational levels as appropriate.

Governance

Short Term

a. Undertake a comprehensive review of the national arrangements of the NEOC.
b. Develop SOP for the NEOC and its coordination with other national agencies.

Medium Term

a. Undertake a comprehensive review of the current DRM arrangements to achieve the following:
    i. Streamline and strengthen links and operational relationships between the national mechanisms, for example the NDC, NDMO, national Cluster system, National Advisory Board for Climate Change & DRM (NAB), and regional/international humanitarian and development community.
    ii. Develop and strengthen the alignment and relationships between key emergency service organizations such as the NDMO and Fire Services currently under the Vanuatu Mobile Force.
    iii. Strengthen relationships between the government and the regional and international humanitarian community through the NDMO, VHT, and established clusters and ensure clarity in the roles of each stakeholder group.
    iv. Strengthen information management between all parts of the emergency management apparatus.
    v. Institute the formal establishment of a national emergency services volunteer scheme that will augment capacities at national and provincial levels for disaster preparedness and response.
b. Develop new legislation to support a more relevant and flexible system of DRM arrangements.

Operational Effectiveness

Short Term

a. Develop innovative approaches to preparedness and response to disaster.
b. Develop clear Terms of Reference and scope of responsibilities for the Logistics Cluster and the NEOC in relation to logistics; develop a single national logistics setup.
c. Develop and improve understanding of operational protocols such as SOP.
d. Develop a monitoring and evaluation system to enable the NDMO to provide feedback to the government on the effectiveness of operations.
e. Develop SOP for movement of relief supplies.
f. Review processes and roles for monitoring relief distribution at national and provincial levels.
g. Develop methodologies for distributing seedlings to households.
h. Provide appropriate safety gear and equipment for all who are involved in assessments and relief distribution.
i. Government and other national organizations should develop business continuity plans to enable them to function effectively in the immediate post-disaster period.
j. Develop and implement a coordination mechanism between the NEOC and the Police Joint Planning Operational Centre.

k. Undertake a comprehensive review of the national arrangements of the NEOC.
l. Develop SOP for the NEOC and its coordination with other national agencies.
m. Review current SOP to improve interoperability among clusters based on experiences and lessons learned.
n. Review the NDMO and NEOC layout with a view to providing ample space for NEOC operational functions, cluster liaison, and cluster teams.
o. Review and update NDMO SOP.
p. Update SOP for collaboration between the NDMO and the PJPOC .

Human Resources Development

Short Term

a. Undertake a comprehensive "lessons learned" exercise within one month of major events and ensure that any resulting recommendations approved by the government are implemented.
b. Strengthen the involvement of traditional chiefs in the disaster preparedness and response activities.
c. Ensure gender balance and inclusion of people with disabilities in training and membership of committees.
d. Improve agency understanding of roles and responsibilities for preparedness, response, and early recovery phases of a disaster.
e. Train the VMGD staff to assist the NDMO and NEOC during emergencies.
f. Retrain NDMO and VMGD staff in the management of the NEOC.
g. Conduct regular training between the NEOC and the JPPOC staff.
h. Develop and implement the training of personnel from NDMO and related agencies in specialist NEOC roles such as logistics, planning, and communications.

Medium Term

a. Introduce a competency-based system of training in order to strengthen the performance of individuals in designated roles at the national and provincial levels.
b. Strengthen community participation in all facets of DRM and provide greater and more meaningful recognition of the contribution of the most vulnerable groups, including women, children, the elderly, and people with disability.

Long Term

a. Develop, implement, and enforce a national building code.
b. Strengthen police capability in maritime search and rescue.

Traditional Coping Capacity

a. Increase the awareness and practice of traditional coping mechanisms to help build community resilience and lessen dependency on organized food relief following disasters.

Implementation

In order to ensure the implementation of the above recommendations (subject to the approval of the government), the following outlines an approach for an integrated program of capacity building.

1. ***Form a steering group*** to guide the implementation program. Such a group should be a subcommittee of the NAB. This will help to ensure the consistency and complementarity of planned activities with existing DRM and EWS initiatives currently under way.
2. ***Develop a communications strategy*** (or public relations strategy) to clearly indicate to the public and wider stakeholder community the government's intentions to bring about improvements in the overall system of DRM and EWS in the wake of Tropical Cyclone Pam. Such a strategy should ensure ongoing publicity in relation to the various institutional strengthening and capacity-building interventions and facilitate feedback in order to strengthen ownership of the impending changes among the members of the community.
3. ***Develop an implementation plan and a monitoring and evaluation framework.*** Under the guidance of the steering group, a core team of relevant government officials and representatives of selected partner organizations should develop a detailed plan to implement approved recommendations. Part of the process of developing the implementation plan will involve mapping of proposed interventions against existing/funded initiatives. This will provide the government with a realistic indication of the costs related to the capacity building exercise. Linked to the implementation plan, a monitoring and evaluation framework should be set in place for a capacity-building program. Ideally this will use the system already established by the government through the NAB.
4. ***Establish a donor/partner liaison*** to galvanize support for implementation. Preliminary indications are positive of partner interest and support on this front. For example, the EDF10 ACP-EU project "Building Safety & Resilience in the Pacific" is managed by the Secretariat of the Pacific Community and the Pacific Risk Resilience Programme supported by the UNDP, which are keen to explore opportunities to facilitate their support.

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Between March 12 and 14, 2015, Tropical Cyclone Pam struck Vanuatu as an extremely destructive Category 5 cyclone, with estimated wind speeds of 250 km/h and wind gusts that peaked at around 320 km/h. An estimated 65,000 people were displaced from their homes. Approximately 17,000 buildings were damaged or destroyed, including houses, schools and medical facilities. Crops were destroyed on a large scale and the livelihoods of at least 80% of Vanuatu's rural population were compromised. The Government of Vanuatu conducted this Post-Disaster Needs Assessment in order to assess the impact of Tropical Cyclone Pam on key sectors, gain a full understanding of the scale of the economic impact, and assist in mobilizing the resources needed for recovery and reconstruction.

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