Fiji

Post-Disaster Needs Assessment

May 2016

Tropical Cyclone Winston, February 20, 2016

Government of Fiji

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Front Cover Photo: Damaged village on north-east of Viti Levu. Photo by Chris Wensley, ADB

Back Cover Photo: Southern Taveuni Island, near Kanacea. Photo by Vlad Sokhin, World Bank

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Abbreviations and Acronyms

ADB	Asian Development Bank
AFL	Airports Fiji Limited
BBB	Building back better
BNPL	Basic Needs Poverty Line
BQA	Bilateral Quarantine Agreements
CCA	Climate change adaptation
CBDRM	Community-based disaster risk management
CI	Conservation International
CIU	Construction Implementation Unit
CPA	Child Protection Allowance
CPS	Care and Protection Scheme
DoE	Department of Energy
DoF	Department of Fisheries
DFAT	Department of Foreign Affairs and Trade
DRF	Disaster Recovery Framework
DRFI	Disaster Risk Finance and Insurance
DRM	Disaster risk management
DRR	Disaster risk reduction
ESLP	Employment, Livelihoods and Social Protection
EU	European Union
EUS	Employment and Unemployment Survey
F$	Fiji dollar
FAD	Fish aggregating device
FAO	Food and Agriculture Organization of the UN
FBOS	Fiji Bureau of Statistics
FCEF	Fiji Commerce & Employers Federation
FCOSS	Fiji Council of Social Services
FDPF	Fiji Disabled Peoples Federation
FEA	Fiji Electricity Authority
FIE	Fiji Institute of Engineers
FLMMA	Fiji Locally Managed Marine Area
FMS	Fiji Meteorological Service
FNPF	Fiji National Provident Fund
FPCL	Fiji Ports Corporation Limited
FRA	Fiji Roads Authority
FTUC	Fiji Trades Union Congress
FVP	Food Voucher Program
GDP	Gross domestic product
GFDRR	Global Facility for Disaster Reduction and Recovery
HART	Housing Assistance Relief Trust
HIES	Household Income Expenditure Surveys
ICOMOS	International Council on Monuments and Sites
ICT	Information and communication technology
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
MITT	Ministry of Industry, Trade and Tourism
MLGHE	Ministry of Local Government, Housing and Environment
MoA	Ministry of Agriculture
MOE	Ministry of Education
MoHMS	Ministry of Health and Medical Services
MoIT	Ministry of Infrastructure and Transport
MSAF	Maritime Safety Administration of Fiji
MWCPA	Ministry of Women, Children and Poverty Alleviation
NCOP	National Council of Older Persons
NDMC	National Disaster Management Council
NDMO	National Disaster Management Office
NEOC	National Emergency Operations Centre
NGO	Non-governmental organization
NTDTKE	National iTaukei Database for Traditional Knowledge and Expressions
PBS	Poverty Benefit Scheme
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PDNA	Post-Disaster Needs Assessment
PLWD	People living with disabilities
SGBV	Sexual and gender-based violence
SME	Small and medium enterprise
SPC	Pacific Community
SPO	Strategic Planning Office
SPREP	Secretariat of the Pacific Regional Environment Programme
SPS	Social Pension Scheme
TAG	Tourism Action Group
TC	Tropical Cyclone
TFL	Telecom Fiji Limited
TVET	Technical and Vocational Education Training
UNDP	United Nations Development Programme
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USP	The University of the South Pacific
VAT	Value Added Tax
VGM	Vatukoula Gold Mines
WAF	Water Authority of Fiji
WB	World Bank
WASH	Water, sanitation and hygiene
WEBC	Women Entrepreneurs Business Council
WHO	World Health Organization
WCS	Wildlife Conservation Society
YEC	Young Entrepreneurs Council

Acknowledgments

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Navitilevu village, Ra Province, Viti Levu
Source: Vlad Sokhin/World Bank

EXECUTIVE SUMMARY

On Saturday February 20, 2016, Tropical Cyclone (TC) Winston, an extremely destructive Category 5 cyclone, struck Fiji. TC Winston was the first Category 5 cyclone to directly impact Fiji and the most intense cyclone on record to affect the country.[1] Fiji's Eastern Division was the first to be struck, with Koro, Ovalau and Taveuni Islands sustaining severe damage. The cyclone swept across Fiji's islands, reaching its peak strength shortly before making landfall on the country's largest island, Viti Levu. Maximum average wind speeds reached 233km/hour and wind gusts peaked at around 306km/hour, making Winston one of the most powerful cyclones ever recorded in the Southern Hemisphere.[2] In addition to the extreme wind speeds, many islands were flooded by storm surges, including Koro Island and the southern coast of Fiji's second-largest island, Vanua Levu, which was inundated almost 200 meters inland in some areas.

Following TC Winston's passage from Fiji, reports emerged of widespread damage and destruction, with the cyclone impacting approximately 540,400 people, equivalent to 62 percent of the country's total population.[3] The storm brought down the power and communications systems linking the islands, with approximately 80 percent of the nation's population losing power, including the entire island of Vanua Levu, and 44 fatalities were subsequently confirmed. Entire communities were destroyed and approximately 40,000 people required immediate assistance following the cyclone.[4] 30,369 houses, 495 schools and 88 health clinics and medical facilities were damaged or destroyed. In addition, the cyclone destroyed crops on a large scale and compromised the livelihoods of almost 60 percent of Fiji's population.

Summary of Damage and Losses

The estimated value of disaster effects arising from TC Winston in Fiji is F$1.99 billion (US$0.9 billion), including F$1.29 billion (US$0.6 billion) in damage (i.e., destroyed physical assets) and F$0.71 billion (US$0.3 billion) in losses.[5]

Table 1: Summary of Disaster Effects by Sector

	Disaster Effects (F$ million)			Share of Disaster Effects[a] (%)	
	Damage	Losses	Total	Public	Private
Productive Sectors	**241.8**	**594.5**	**836.3**	**12**	**88**
Agriculture	81.3	460.7	542.0	7	93
Commerce and Manufacturing	72.9	69.9	142.8	49	51
Tourism	76.1	43.9	120.0		100
Mining	11.5	20.0	31.5		100
Social Sectors	**827.9**	**40.0**	**867.9**	**12**	**88**
Education	69.2	7.4	76.6	100	
Health	7.7	6.2	13.9	100	
Housing	751.0	26.4	777.4	2	98
Infrastructure Sectors	**208.2**	**40.4**	**248.6**	**84**	**16**
Transport	127.1	2.4	129.5	98	2
Water and Sanitation	16.9	7.9	24.8	100	
Electricity	33.0	8.1	41.1	100	
Communications	31.2	22.0	53.2	30	70
Cross-Cutting Issues	**239.6**	**660.1**	**899.7**	**4**	**96**
Environment[b]	232.5	629.8	862.3		100

[1] Fiji Meteorological Service

[2] These preliminary figures are from the Fiji Meteorological Service.

[3] Population and Labour Force Estimates, 2014.

[4] Fiji: Severe Tropical Cyclone Winston Situation Report No. 11 (as of 3 March 2016) (PDF) (Situation Report). ReliefWeb. United Nations Office for the Coordination of Humanitarian Affairs. Retrieved March 3, 2016.

[5] These figures exclude the environment sector, as environmental assets and flows of environmental services are not included in the national accounts.

	Disaster Effects (F$ million)			Share of Disaster Effects[a] (%)	
	Damage	Losses	Total	Public	Private
Culture and Heritage	5.1	0.8	5.9	23	77
Disaster Risk Management	2.0	29.5	31.5	100	
Total (Excluding Environment[c])	1,285.0	705.2	1,990.2	78	22
Grand Total	**1,517.5**	**1,335.0**	**2,852.5**	**84**	**16**

Source: Estimations by Assessment Team.

a. A breakdown of the public/private ownership for damage and loss (rather than the cumulative breakdown for disaster effects) is provided in Annex 1.

b. Estimation of environmental losses include ecosystem service losses for 2016-18 for native forests, mangroves and coral reefs. Total recovery time may stretch beyond this timeframe.

c. These figures exclude the environment sector, as environmental assets and flows of environmental services are not included in the national accounts.

The combined value of destroyed assets and disruptions in the production of goods and services is equivalent to about one fifth of the country's 2014 gross domestic product (GDP). TC Winston will, therefore, have a significant negative impact on the overall performance of the national economy and likewise on the quality of life.

TC Winston produced different effects across the various sectors, with the most significant impacts felt by the productive and social sectors. The individual sectors that sustained the greatest damage were housing, accounting for 58 percent of total damage costs, followed by transport, accounting for 10 percent of all damage. The highest level of production losses are expected in the agriculture sector and is estimated at 65 percent of total losses. The housing sector suffered the highest total effects from TC Winston (including both damage and losses), accounting for 39 percent of the total.[6]

If the value of destroyed environmental assets and losses in environmental services is added in, the total effects of the disaster reach F$2.85 billion (US$1.3 billion), with F$1.52 billion in damage (US$0.7 billion) and F$1.34 billion in losses (US$0.6 billion).

While the impacts of TC Winston are felt by all sectors, the consequences for the agriculture sector in particular are expected to last for several years due to continued production losses and associated higher production costs. High winds, flooding and storm surges have imposed substantial damage to permanent plantations for, which will need to be replanted, as well as damage to mangrove forests and coral reefs, which provide a habitat for fish species that have been forced to migrate. This means that those who work in the fisheries sector are unable to capture the same volume as before.

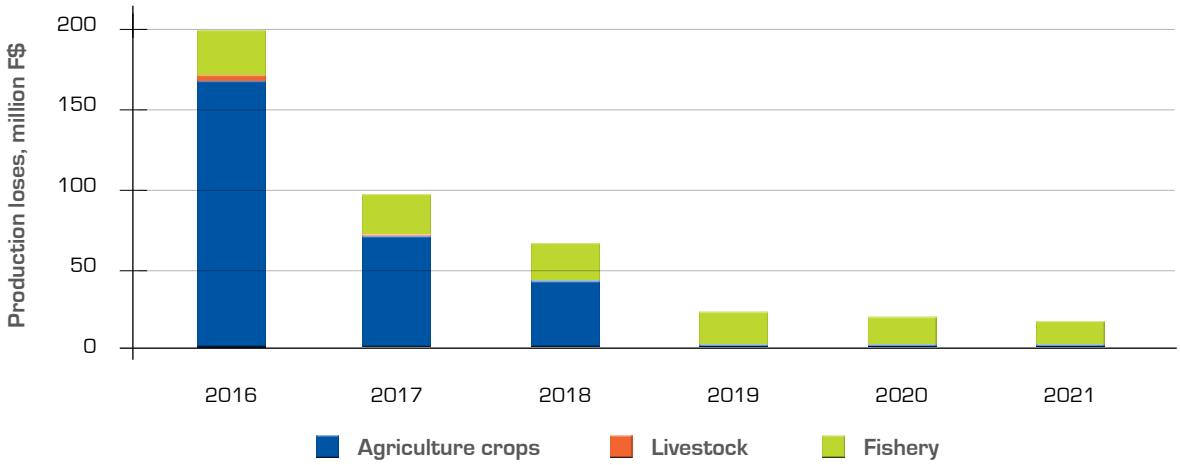


Figure 1: Projected Production Losses in the Agriculture Sector over Time

Source: Estimations by Assessment Team.

[6] These figures exclude the environment sector, as environmental assets and flows of environmental services are not included in the national accounts.

In some cases, production will not return to pre-disaster levels for five to 10 years. In the meantime, people's incomes will decline significantly in the affected areas. Figure 1 shows the time variation of production losses from TC Winston for the agriculture sector, including the subsectors of crops, livestock and fisheries. These production losses will also negatively impact on activities of the manufacturing and trade sectors due to their linkages through the food production chain.

Data collected provides evidence that private sector damage and losses from Winston far exceed those sustained in the public sector, accounting for 78 percent of all damage and losses (Figure 2). Such information provides an idea of the relative efforts that the government and private entities will be required to undertake as part of recovery and reconstruction.

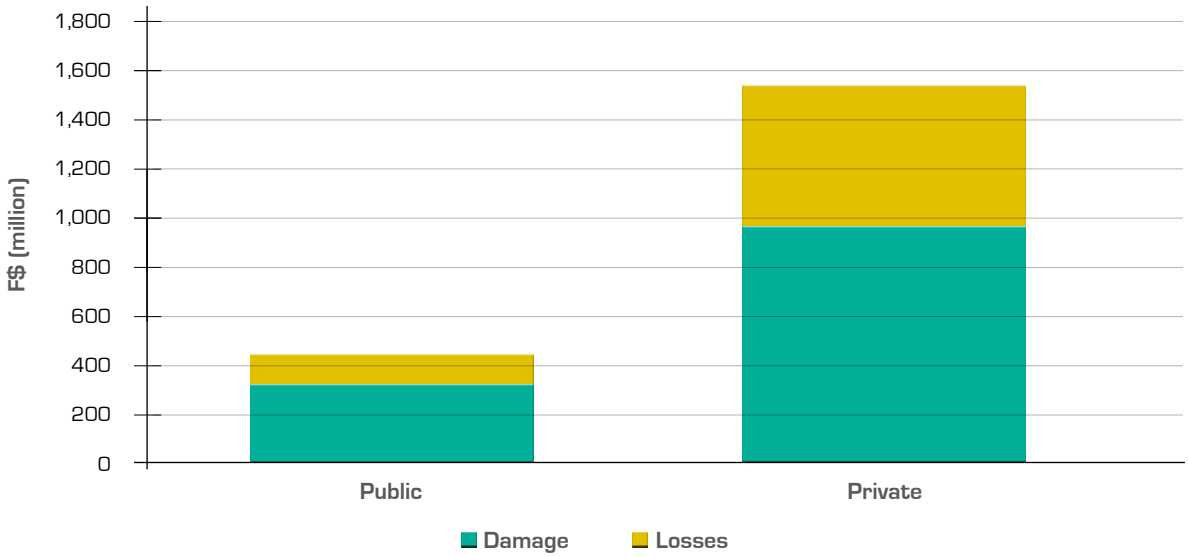


Figure 2: Ownership of Disaster Effects

Source: Estimations by Assessment Team.

Damage and losses were highest in the Western Division (49 percent of total disaster effects) and in the Northern Division (28 percent), while the Central and Eastern Divisions were affected to a lesser degree (Figure 3).

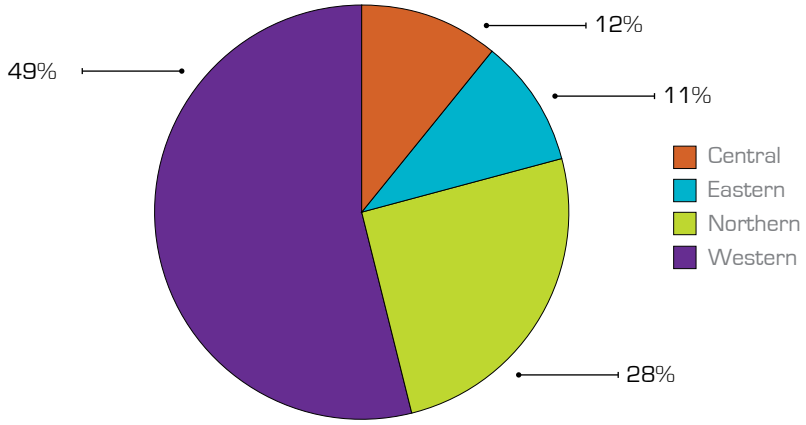


Figure 3: Share of Total Effects of TC Winston by Division

Source: Estimations by Assessment Team.

Table 2 and Figure 4 show the estimated values of disaster effects by province. The province of Ba was the most affected, with a total value of damage and losses of F$668 million, which constitutes 34 percent of the national total. Ra and Cakaudrove provinces were also significantly affected, suffering around F$315 million in total effects each.

Table 2: Total Damage and Production Losses Caused by TC Winston by Province (F$ million)

Province	Damage	Production Losses	Total Effects
Ba	526.0	142.0	668.1
Ra	230.8	86.1	316.9
Cakaudrove	183.2	131.5	314.7
Bua	57.4	94.0	151.3
Lomaiviti	102.3	45.5	147.8
Tailevu	53.9	66.8	120.7
Naitasiri	43.3	29.2	72.5
Macuata	15.5	28.1	43.5
Lau	23.5	13.3	36.8
Nadroga/Navasa	16.4	18.5	34.9
Rewa	5.6	2.5	8.1
Serua	1.3	1.1	2.3
Namosi	1.2	0.9	2.1

Source: Estimations by Assessment Team.

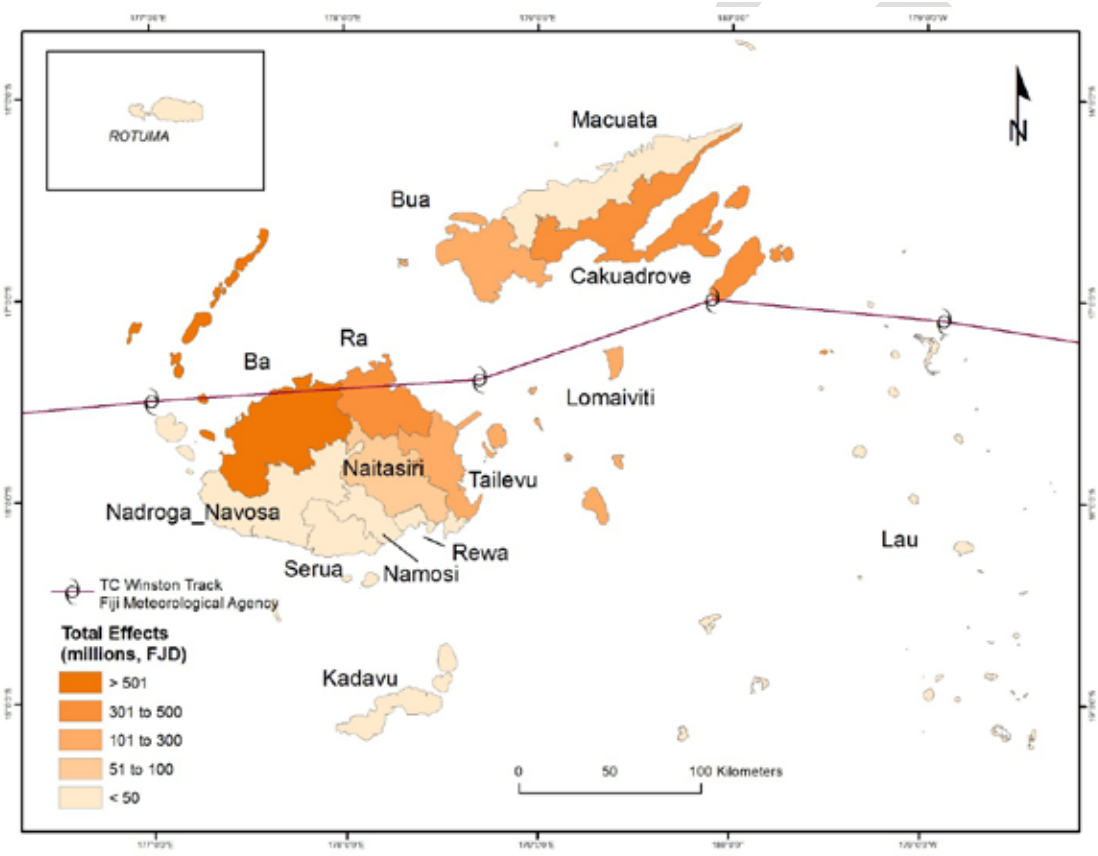


Figure 4: Geographical Distribution of Disaster Effects by Province

Source: Estimations by Assessment Team.

Table 3 below shows the average value of disaster effects sustained by the people residing in each of the affected provinces. People living in Ra, Bua and Lomaiviti sustained per capita disaster effects of between F$8,500 and just over F$10,000, which represents a significant proportion of household income. Residents of Cakaudrove were also significantly affected, at a per capita level of F$6,000, followed by residents of Lau and Tailevu who sustained per capita effects between F$3,200 and F$2,000.[7] In terms of damage, people living in Ra Province sustained the highest damage (F$7,400/person), while in terms of losses, the population of Bua Province sustained higher levels of damage (F$6,200/person).

Table 3: Estimated Value of Per Capita Disaster Effects per Province (F$/person)

Province	Damage	Production Losses	Total Effects
Ra	7,368	2,747	10,115
Bua	3,786	6,204	9,990
Lomaiviti	5,915	2,629	8,544
Cakaudrove	3,491	2,505	5,996
Lau	2,054	1,164	3,218
Ba	2,153	581	2,734
Tailevu	915	1,133	2,048
Nadroga/Navasa	266	299	565
Naitasiri	257	173	430
Namosi	165	124	289
Serua	67	55	122
Rewa	53	24	77
Namosi	1.2	0.9	2.1

Source: Estimations by Assessment Team.

The map in Figure 5 shows the estimated values of per capita disaster effects in the affected provinces.

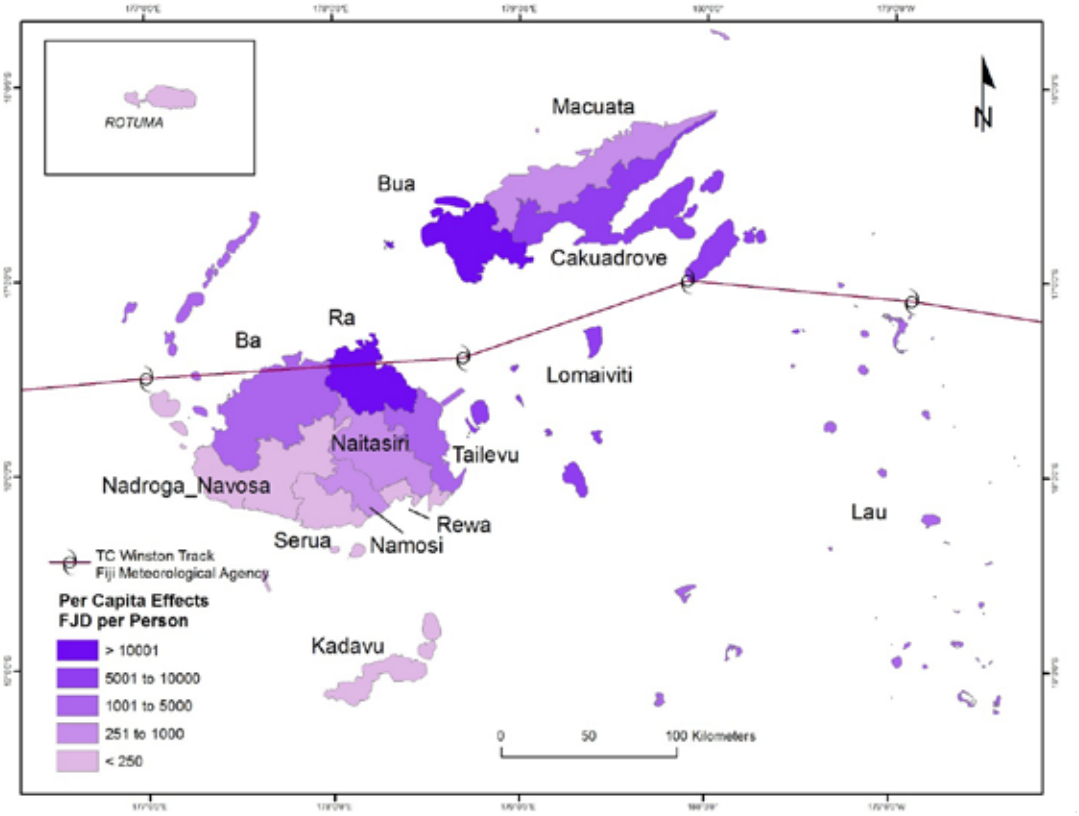


Figure 5: Geographical Distribution of Per Capita Disaster Effects

Source: Estimations by Assessment Team.

A comparison made of estimated per capita production losses with average annual household income (Figure 6) reveals that TC Winston has affected the most impoverished population strata of the country, which should inform recovery and reconstruction priorities. The population in the northern provinces of Bua and Cakaudrove (where average annual household income is F$14,100/per person) have sustained the greatest production losses.

[7] Despite the fact that Ba Province is where the highest value of damage and losses occurred, the per capita disaster effects for Ba residents are only of intermediate value, i.e., 2,700 F$/person.

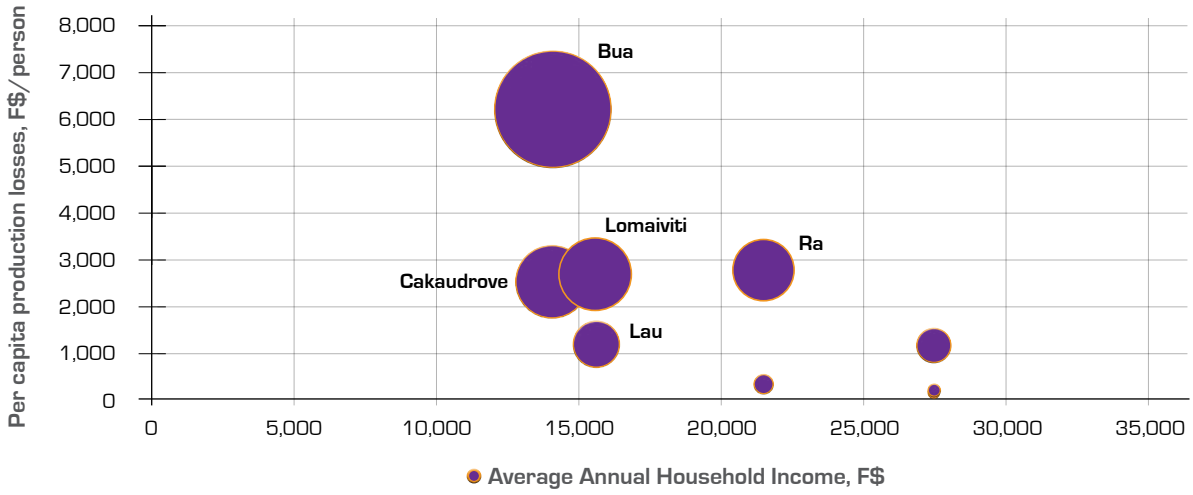


Figure 6: Relationship between Per Capita Production Losses and Average Annual Household Income Arising from TC Winston

Source: Estimations by Assessment Team.

Note: The sizes of the balls in the above figure represent the ratio between production losses and household income.

Summary of Economic and Social Impact

Summary of Economic Impact

The macroeconomic impact of TC Winston in 2016 is expected to be substantial given the significant damage incurred, particularly to key sectors, such as housing, transport, manufacturing, agriculture, electricity and communications. The losses resulting from TC Winston are estimated to reduce economic growth by 2.5 percent relative to the 2016 pre-cyclone forecast, bringing the growth rate down from 3.8 percent to 1.3 percent. However, taking into account the possible effect of recovery and reconstruction activities, assuming they start during 2016, the GDP growth rate is expected to be 2.4 percent, which is a decrease of 1.4 percent compared to the pre-cyclone baseline estimate. This revised growth also reflects the expected impact of TC Zena, which passed southeast of Fiji only six weeks after TC Winston, causing torrential rain and major flooding.

The impact of TC Winston on the performance of the balance-of-payments in 2016 will be quite substantial, due to exports declining relative to pre-cyclone forecasted levels. Total exports are now projected to decline by 1.2 percent in 2016 compared to over 17 percent growth anticipated prior to the cyclone. Imports will be higher than previously expected with an inflow of machinery, equipment and materials for reconstruction and replacement of infrastructure in the housing, education, telecommunication and transport sectors. Food imports are also expected to increase due to the loss of locally grown produce. These impacts will raise the trade in goods deficit by 18.5 percent this year, which, as a percent of GDP, is now estimated to increase from 27.3 percent to 32.4 percent in 2016. The cyclone had minimal impact on the tourism sector, which is expected to fully recover during 2016. Aid in-kind and cash grants have risen following the cyclone and reconstruction financing is expected to result in higher inflows during 2016 and beyond. Overall, Fiji's Balance of Payments Current Account deficit for 2016 is estimated to increase by 8.9 percent, driven by lower export earnings and higher import payments. This will raise the Current Account deficit to 12.9 percent of GDP (at market price) in 2016.

There will be a number of negative impacts on the government's fiscal balance. Government expenditure on disaster relief and early recovery activities are being funded through the reprioritization of line ministry budgets. Notable reallocations include top ups for social welfare programmes and food ration distribution. In addition, around F$70 million will be set aside for the upcoming residential rehabilitation and assistance programme (Help for Homes), and the diversion of funds into relief, recovery and reconstruction will reduce funds available for the government's existing development programmes. Large additional expenditures are expected to be required once the reconstruction and recovery programmes are fully specified. In terms of impacts on revenue, value added tax (VAT) collections are expected to decline by about F$61.9 million during 2016 and there will be reductions in the Service Turnover Tax as a result of losses in the tourism sector.

Summary of Social Impact

TC Winston affected approximately 540,400 people, or approximately 62 percent of Fiji's total population (estimated to be 865,611 at the end of 2014),[8] resulting in estimated losses of 14,450,129 work days and F$351.45 million in personal income. The largest proportion of the affected population was in the Western Division, followed by the Central, Northern and Eastern Divisions. An estimated 263,000 women may have been affected by the disaster.[9]

Table 4: Population Affected by TC Winston

Division	Deaths	Missing	Hospitalised	Injured	Number of people affected due to loss of livelihood of main bread winner	Number of people displaced	Total number of people affected
Central	6		2	24	162,698	5245	167,975
Eastern	22	1	3	59	30,222	7595	37,902
Northern	3		5	10	93,488	10210	103,716
Western	13		17	24	198,622	32145	230,821
Total	**44**	**1**	**27**	**117**	**485,030**	**55,195**	**540,414**

Source: Estimates based on Government of Fiji data.

The affected population is comprised of: (i) those who lost their lives, were injured or fell ill as a result of the cyclone (which together accounted for approximately 0.03 percent of the total affected population); (ii) those who were displaced, including those whose homes were totally destroyed (which accounted for approximately 10 percent of the total affected population); and (iii) those whose livelihoods were affected (which accounted for almost 90 percent of the total affected population). In terms of livelihoods affected, 57 percent relate to the agricultural sector, 17 percent to commerce, 10 percent to manufacturing, and 8 percent to tourism and transportation equally.

Overall, the government's social protection measures in response to TC Winston have translated into a financial contribution of F$344.7 million. In terms of impact on the population, the disaster may result in increasing subsistence economic activity, widening income inequality, deepening poverty, new challenges to social protection measures in light of increasing demand for support, and reduced entrepreneurial confidence among small and medium-sized enterprises required for job creation and entrepreneurship.

Summary of Recovery and Reconstruction Needs

Based on damage, losses and identified needs, and in order to promote social, economic, cultural and environmental wellbeing over the next two years, key recovery and reconstruction activities can be classified around the following themes:

- **Production Recovery**, which includes recovery of production levels in the productive sectors of agriculture (crops, fishery and livestock), commerce and manufacturing, mining and tourism.
- **Service Supply and Access Recovery**, focused on recovery of supply and access to basic services of education, health, housing, transport, communications, water supply and sanitation, and electricity.
- **Personal and Household Income Recovery**, with a focus on improving the livelihoods of those affected (i.e., through cash for work schemes, or training to facilitate the ability to generate diversified household income), particularly those who have lost income, and are vulnerable and below the poverty level.
- **Reconstruction**, or recovery of physical assets including infrastructure and buildings, in adherence to the principles of building back better.

[8] Population and Labour Force Estimates 2014.

[9] Population and Labour Force Estimates 2014 reported that women comprise 48.8 percent of the population.

Table 5 summarizes the estimated financial requirements to achieve overall recovery, reconstruction and resilience in affected sectors. Total costs are estimated at F$1.96 billion (US$0.9 billion). Of this amount, F$0.22 billion (US$0.1 billion) will focus on recovery needs, F$1.71 billion (US$0.8 billion) will focus on reconstruction and F$31 million (US$14 million) will focus on resilience activities.

Table 5: Recovery and Reconstruction Needs by Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Productive Sectors	**94.1**	**173.6**		**267.7**
Agriculture	65.3	96.1		161.4
Commerce and Manufacturing	17.8	43.5		61.3
Tourism	5.0	29.0		34.0
Mining	6.0	5.0		11.0
Social Sectors	**12.4**	**1,261.7**		**1,274.1**
Education		385.9		385.9
Health	12.1	18.8		30.9
Housing	0.3	857.0		857.3
Infrastructure Sectors	**15.3**	**250.7**	**18.8**	**284.8**
Transport	3.2	174.7		177.9
Water and Sanitation	3.6	20.7		24.3
Electricity	2.1	25.9	5.8	33.8
Communications	6.4	29.4	13.0	48.8
Cross-Cutting Issues	**63.0**	**27.4**	**12.0**	**99.7**
Environment	60.8	13.1		73.9
Gender	1.6	0.4		2.0
Culture and Heritage	0.6	8.5		9.1
Disaster Risk Management		2.7	12.0	14.7
ELSP	**31.5**			**31.5**
Total	**216.3**	**1,713.4**	**30.8**	**1,957.8**

Source: Estimations by Assessment Team.

Way Forward

Recovery needs identified during the Post-Disaster Needs Assessment process are driven by the sectoral needs analyses, but do not necessarily link to the availability or form of recovery funding. Given the extent of identified needs and the limited resources, the first step is 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 undertaken, the principles of which may include the following:

- Potential for direct and the 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 programme will be implemented under the government's leadership, in close and collaborative partnership with international donors, the private sector, civil society and the community as a whole. It will be guided by a detailed Disaster Recovery Framework that will provide guidance for the coordinated recovery and reconstruction efforts.

1.

Namuaimada village, Ra Province, Viti Levu
Source: Vlad Sokhin/World Bank

INTRODUCTION

1.1 Disaster Risk Profile of Fiji

Fiji is located in the tropical cyclone belt, experiencing frequent cyclones characterized by damaging winds, rain and storm surges, and, on average, one cyclone per year. It is also situated in a relatively quiet seismic area, but is surrounded by the Pacific Ring of Fire, which aligns with the boundaries of the tectonic plates and is associated with extreme seismic activity, volcanic activity, strong earthquakes and tsunamis. In addition, the country suffers from extreme events associated with climate variability, including sea-level rise, temperature extremes and droughts.

In the past few decades, Fiji has been affected by multiple devastating cyclones. In 2012 alone, Fiji experienced two major flooding events and one tropical cyclone (Evan). The effects of natural disasters in Fiji are far reaching, negatively impacting on, among other sectors, agriculture, housing, transport infrastructure, tourism and primary industries. Since 1980, disaster events in Fiji have resulted in average annual economic damage of around F$35 million and impacted around 40,000 people each year. In the same period, at least 186 people were killed by flooding and storm events alone.

Fiji is expected to incur, on average, F$158 million (US$85 million) per year in losses due to earthquakes and tropical cyclones. In the next 50 years, Fiji has a 50 percent chance of experiencing a loss exceeding F$1.5 billion (US$806 million), and a 10 percent chance of experiencing a loss exceeding F$3 billion (US$1.6 billion).[10] However, these figures may increase once the impacts of climate change are taken into consideration.

1.2 Socioeconomic Context of Fiji

Fiji is an archipelago of 332 islands (of which approximately 110 are inhabited), spread over a land area of approximately 18,300km^2 and a geographic area of almost 50,000km^2. The country's population of approximately 865,000[11] resides primarily on the two largest islands, Viti Levu and Vanua Levu. Fiji is the second largest country in the region after Papua New Guinea.

Fiji is geographically and culturally the centre of the Pacific, and has historically served as a regional hub for banking services and communications, as well as for flights and shipping to other Pacific islands. Fiji is one of the wealthier countries in the Pacific, with a gross domestic product (GDP) of US$4.53 billion and a gross national income of US$4,870 per capita (World Bank 2014). Economic growth has been strong in recent years, reaching 3.6 percent in 2013, 5.3 percent in 2014 and an estimated 4 percent in 2015, which is significantly above the 2 percent average for the period 1980–2012. Strong credit growth, buoyant remittances and improved labour market conditions have boosted consumer demand, and strong visitor arrivals and government spending on infrastructure also supported the above-trend growth. The economy is primarily based on agriculture, sugar and tourism, with tourism being the largest foreign exchange earner over the years.

Despite its larger size and positioning within the Pacific, Fiji faces some of the geographic and structural challenges common to other smaller Pacific island countries, including remaining vulnerable to external shocks and natural disasters. Remoteness, in conjunction with internal dispersion, imposes additional trade- and transportation-related costs. These same factors also increase the cost and complexity of providing public services and fulfilling some basic government functions.

While the country has achieved broad coverage in the provision of basic social services, 35 percent of Fijians live below the basic needs poverty line.[12] Although poverty has recently declined, a significant rural-urban variation remains, with 44 percent of the rural population living in poverty, compared to 26 percent of the urban population. Enrolment in primary education is almost universal, with a primary net enrolment rate of 96.8 percent.

1.3 Tropical Cyclone Winston

On Saturday February 20, 2016, Tropical Cyclone (TC) Winston struck Fiji as an extremely destructive Category 5 cyclone, the first such cyclone to directly impact Fiji and the most intense to ever to hit the country. Prior to the cyclone making landfall, the disaster management machinery was set in motion with the activation of the National Emergency Operations Centre (NEOC) and Divisional Emergency Operation Centres. Evacuation centres were opened in anticipation of people requiring shelter. The Regional Specialized Meteorological Centre in Nadi issued special media releases, identifying areas in Winston's path that could expect destructive hurricane force winds, and riverine and coastal flooding of low-lying areas.

[10] These figures are based on modelling from PCRAFI (2015).

[11] Population and Labour Force Estimates 2014.

[12] Data from the 2013/2014 HIES.

Fiji's Eastern Division was the first to be struck, with Koro, Ovalau and Taveuni Islands sustaining severe damage. The cyclone swept across Fiji's islands, reaching its peak strength shortly before making landfall on the country's largest island, Viti Levu, which has a population of 600,000. Maximum average wind speeds reached 233km/hour and wind gusts peaked at around 306km/hour, making Winston one of the most powerful cyclones ever recorded in the Southern Hemisphere.[13] Many islands were struck by storm surges, including Koro Island and the southern coast of Fiji's second-largest island, Vanua Levu, which occurred almost 200m inland.

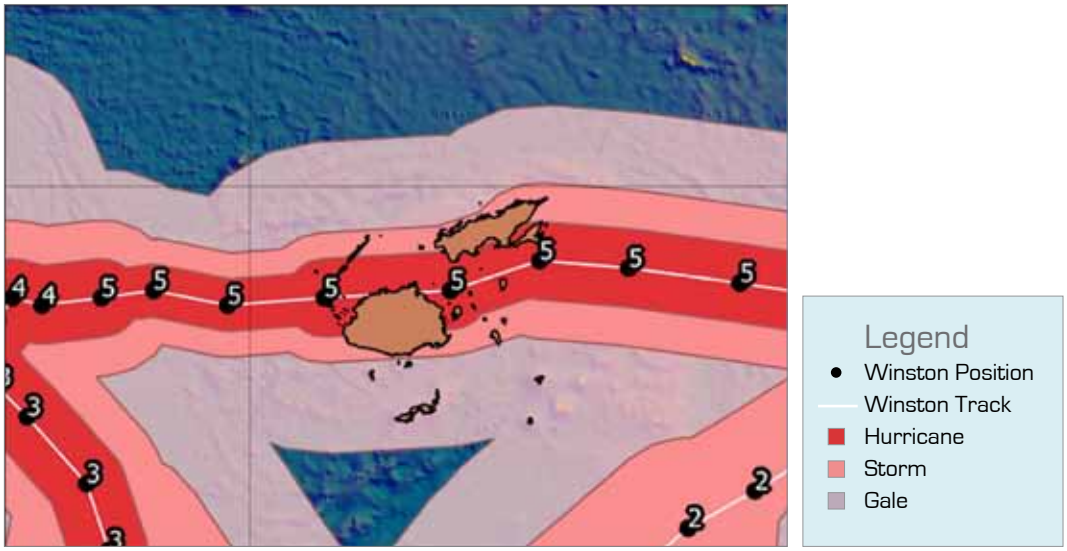


Figure 7: TC Winston Track across Fiji (East to West)
Source: Preliminary Fiji Met briefing.

Following TC Winston's passage from Fiji, widespread damage and destruction was reported, and approximately 540,400 people were impacted by the cyclone or approximately 62 percent of the population.[14] The storm brought down the power and communications systems linking the islands, with approximately 80 percent of the nation's population losing power, including the entire island of Vanua Levu. This hampered initial efforts to obtain a comprehensive understanding of the full scale of the disaster's impacts.

Forty-four fatalities were subsequently confirmed, entire communities were destroyed and approximately 40,000 people required immediate assistance following the cyclone.[15] 30,369 houses, 495 schools, and 88 health clinics and medical facilities were damaged or destroyed, and crops were destroyed on a large scale, compromising the livelihoods of almost 60 percent of Fiji's population.

1.4 Response from the Government and Development Partners

A state of natural disaster was declared by the Government of Fiji for the Central, Western, Eastern and Northern Divisions on February 20, 2016. Following the event, the government declared a state of emergency, and has been leading response efforts, which are being coordinated by nine national humanitarian clusters[16] led by government ministries. Humanitarian partners, international and national non-governmental organizations (NGOs), foreign governments, donors and civil society are also supporting the government-led response. The government has implemented a range of social protection programmes to support households, including the provision of additional funds to households via the Poverty Benefit Scheme, the Food Voucher Programme and the Help for Homes initiative, which will provide affected households with vouchers for housing rehabilitation and reconstruction.

[13] These preliminary figures are from the Fiji Meteorological Service.

[14] Population and Labour Force Estimates 2014.

[15] Fiji: Severe Tropical Cyclone Winston Situation Report No. 11 (as of 3 March 2016) (PDF) (Situation Report). ReliefWeb. United Nations Office for the Coordination of Humanitarian Affairs. Retrieved 3 March 2016.

[16] The national humanitarian clusters are: Communications; Education; Food Security and Livelihoods; Health and Nutrition; Logistics; Public Works and Utilities; Shelter; Safety and Protection; and WASH.

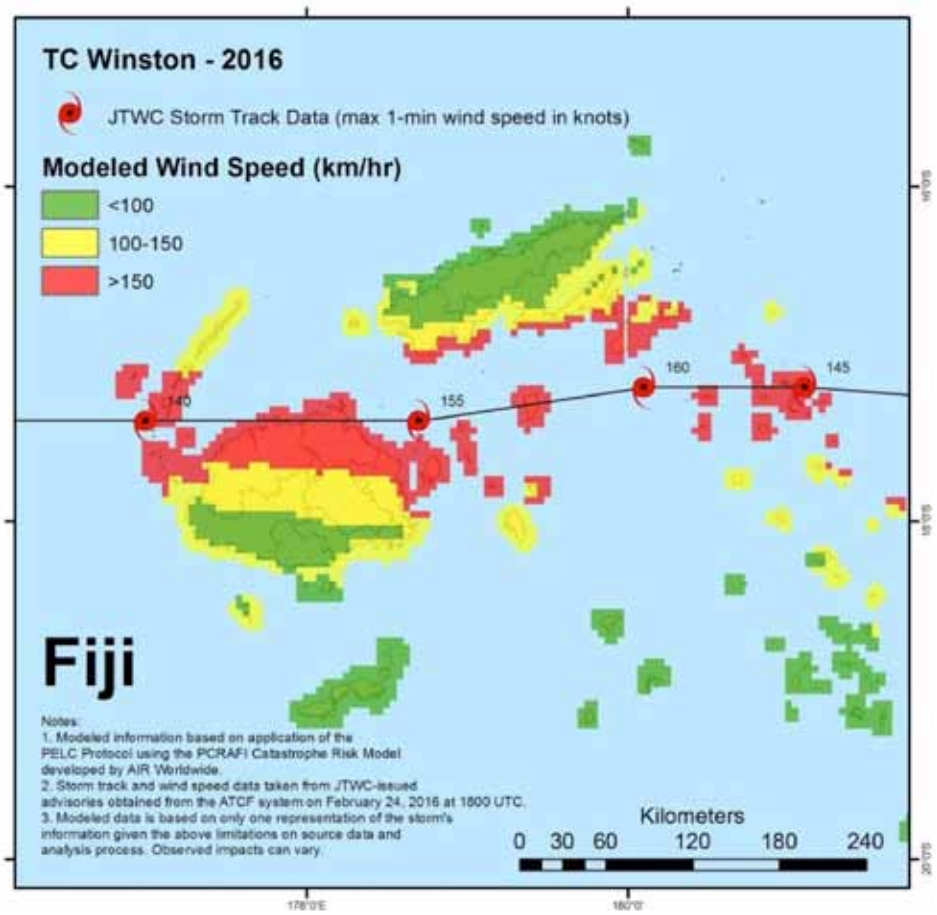


Figure 8: Modelled Maximum Wind Speed from TC Winston over Fiji

Source: Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) event brief, March 2016.

To assess the socioeconomic impact of TC Winston, and assist in mobilizing the resources needed for recovery and reconstruction, the Government of Fiji requested that a Post-Disaster Needs Assessment (PDNA) be conducted. As part of agreements on post-crisis cooperation, the assessment was supported by the European Union, United Nations (UN) and World Bank, as well as other regional organizations and bilateral partners, including the Asian Development Bank (ADB), and the government of Australia, the Secretariat of the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environmental Programme (SPREP).

This PDNA will form the basis of the Disaster Recovery Framework (DRF) to be prepared by the Government of Fiji, which will guide recovery and reconstruction within all sectors affected by TC Winston.

1.5 Post-Disaster Needs Assessment Methodology

The PDNA is an approach to analyzing disaster effects and impacts for the purpose of identifying recovery needs, as they are understood from human, sociocultural, 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 included the World Bank Group, the Global Facility for Disaster Reduction and Recovery (GFDRR), UN agencies, the ADB, SPC and other relevant stakeholders. The assessment methodology used is based on the PDNA guidelines (GFDRR, 2013), and 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, captures information about the effects of the event sector by sector, and aggregates the data to determine the event's total effects on 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 either totally or partially destroyed by the disaster.
- Losses are defined as the disruption of the production of and access to goods and services, and include both production decline and higher production costs. Losses occur until full economic recovery and reconstruction are achieved, which can, in some cases, take several years. Typical losses include the decline in output in productive sectors (i.e., agriculture, industry, commerce, mining and tourism), as well as the decline in delivery of basic services (such as education, health, electricity, water and sanitation).

1.5.2 Assessment of Disaster Impact

Within the PDNA methodology, disaster impact is defined as the consequences of disaster effects on economic and social development. Therefore, disaster impact is measured at the macroeconomic, macrosocial and household levels.

- Economic impact at the macro level includes estimation of the disaster's likely effects on economic performance and the temporary macroeconomic imbalances that may arise from the disaster, in the external and fiscal sectors of the economy.
- Social and household impact includes impacts of the disaster on household and community livelihoods and employment, as well as gender-specific impacts.

1.5.3 Quality of Life

TC Winston has not only had a significant negative impact on the national economy, but it has also caused an immediate and prolonged decline in the quality of life and wellbeing of affected households and communities. Existing sectoral baseline information and the estimated value of the main disaster effects were used to estimate sectoral indicators that define quality of life. The quality of life index is a composite index conceived to:

1. Comprehensively and quantitatively measure the disaster's impact on quality of life through a set of key socioeconomic indicators;
2. Identify the geographical location and demographic characteristics of the most affected population in order to assist decision makers in prioritizing and targeting prospective recovery interventions; and
3. Provide a readily available post-disaster baseline that will enable national authorities and international partners to periodically monitor the improvement (or indeed further deterioration) of the quality of life during the recovery and reconstruction process.[17]

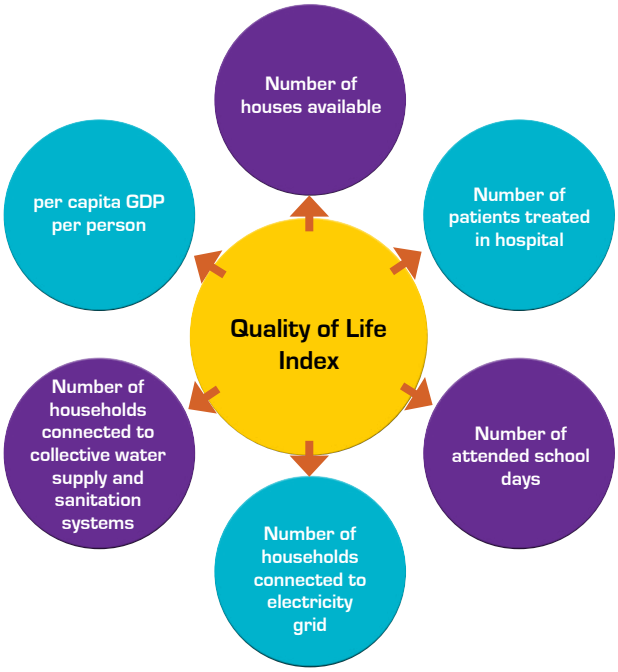


Figure 9: Quality of Life Weighted Indicators
Source: Roberto Jovel.

The quality of life index is composed of several equally weighted indicators that are assessed prior to the disaster, immediately after the disaster, and periodically during the recovery and reconstruction process (see Figure 9).

The composite quality of life index derived for the case of TC Winston focuses on recovery priorities in several ways. It provides a measure of negative disaster impacts on the affected population's living conditions, shows the impact's geographical distribution, and provides a quantitative means to measure progress in achieving recovery over time. The quality of life index may be reevaluated periodically to determine progress in achieving recovery and reconstruction.

[17] For more detail on the quality of life index, refer to Chapter 2.4 of this PDNA.

1.5.4 Recovery and Reconstruction Strategy and Needs

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).[18] The Government of Fiji has publicly reiterated the importance of BBB to avoid such effects from similar disaster events in the near future. BBB has been selectively applied across and within sectors to ensure a cost-optimized, multi-hazard reconstruction.

The identified recovery needs form the basis for determining recovery, reconstruction and resilience interventions through a recovery strategy. Accordingly, the PDNA's main goal 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.

Financial requirements for recovery and reconstruction are estimated as a function of the values of destroyed assets, changes in the flows of the economy, and the decline in personal or household income, obtained in the assessment of disaster effects, as follows.

- Recovery needs in the productive sectors (agriculture, commerce and manufacturing, mining and tourism) are equivalent to the amounts of working capital required by producers to achieve recovery of production levels. The needs for recovery in the services sectors (education, health, culture, transport, communications, electricity, and water and sanitation) are the amounts required to restore supply to, and access by, the population. The estimation of personal or household income decline, arising from the previously estimated drop in production at sectoral levels, is used to determine the possible financial requirements for "cash-for-work" and other income-assistance programmes for the affected population. Recovery needs typically have a value that is equivalent to a fraction of the value of estimated losses in sectoral production combined with higher costs of production.
- Reconstruction needs are estimated on the basis of the value of destroyed physical, durable assets duly supplemented to incorporate an additional cost for improved, disaster-resilient standards, which adhere to the principles of BBB. Reconstruction needs are usually slightly higher than the estimated value of damage or destruction of assets, as rebuilding will include the introduction of disaster-resilient design and construction standards.

For both recovery and reconstruction needs, the value of any existing insurance proceeds should be deducted.

1.5.5 Specific Context of this PDNA

The geographical context of this PDNA covers all four divisions of Fiji (Central, Eastern, Northern and Western), as all were impacted by TC Winston. Annex 9: Map of Fiji provides a map of Fiji that clearly shows all the divisions.

1.5.6 Limitations of this Assessment

This assessment was completed 65 days after TC Winston, and reports only on data received at the time of writing. Undertaking field surveys was hindered due to flooding and the threat of TC Zena during 6-7 April 2016. This had some impact on the collection of damage and loss data, particularly for the commerce and manufacturing sector.

[18] BBB is a reconstruction approach that seeks to reduce vulnerability and improve living conditions, while promoting more effective and sustainable reconstruction. It uses the opportunity of having to rebuild following a disaster event to examine the suitability and sustainability of reconstruction activities.

2.

Southern Taveuni, Vuna village
Source: Vlad Sokhin/World Bank

ECONOMIC AND SOCIAL IMPACTS

2.1 Macroeconomic Impact

2.1.1 Pre-Disaster Economic Outlook

Gross Domestic Product

The Fijian economy grew at an average of 3.8 percent per annum from 2012 to 2014 on the back of higher government spending (particularly on infrastructure) and strong performances in the manufacturing, wholesale and retail, transport, tourism and financial sectors, among others. In October 2015, the Macroeconomic Committee estimated Fiji's GDP growth at 4 percent in 2015 and 3.5 percent in 2016, driven by broad-based growth in most sectors. For 2017 and 2018, GDP growth was estimated at 3.1 percent (Figure 10).

Before assessing the impact of TC Winston, the PDNA macroeconomic team had to reconsider the Macroeconomic Committee's October 2015 forecasts in order to establish baseline estimates for 2015 to 2018, taking into account that the government's revised 2015 and 2016 budget projections and data from key industries were not factored into the October 2015 forecast. This was to ensure that the impact of TC Winston could be properly captured based on the latest data, particularly the potential impact of the disaster on tourist arrivals and agriculture production. This led to the adoption of baseline GDP growth projections of 4.2 percent and 3.8 percent for 2015 and 2016, respectively (Figure 10).

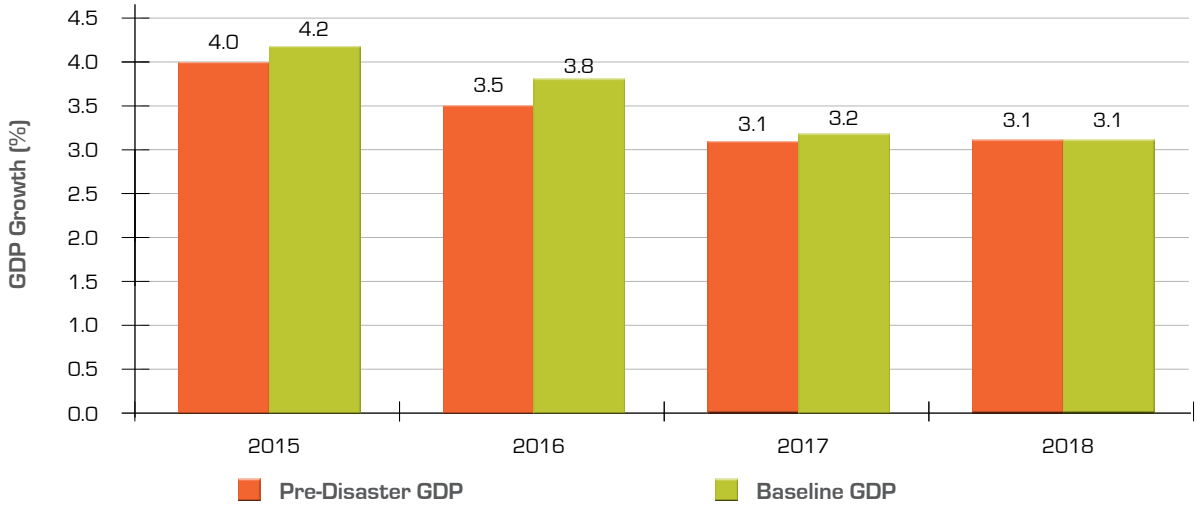


Figure 10: Pre-Disaster and Baseline GDP Forecast for 2015–2018

Source: Estimations by Macro Assessment Team.

Trade

Fiji's exports have grown by an annual average rate of 14.2 percent from 2010–2014, while imports have grown by 12.9 percent per annum over the same period. Export goods are comprised of such commodities as sugar, which is vulnerable to adverse weather conditions. Other major domestic exports include molasses, timber, fish, fruit and vegetables, coconut oil, gold, garments and mineral water. According to baseline projections, exports were anticipated to decline by 12.9 percent in 2015 (due to decreased exports of sugar, fruits and vegetables, and lower re-exports of mineral fuels and fish) and grow by 17.5 percent in 2016.

Fiji is a net importer, which means that it is susceptible to volatility in global commodity price fluctuations, which together accounted for about 45 percent of total imports, on average, from 2010 to 2014. Baseline projections expect imports to decline by 7.3 percent in 2015 due in part to lower expected mineral fuel imports. For 2016, imports were projected to grow by 7.8 percent.

Balance of Payments

The Current Account deficit as a percent of GDP (at market price) indicated an overall increase from 2010 to 2014, growing from 4.7 percent to 7.2 percent of GDP. Import of goods, in particular mineral fuels, continued to be the underlying reason behind the Current Account deficit throughout the period, even though it was offset by the significantly improved performance in the services and secondary income account, of which tourism receipts from strong visitor arrivals and remittances are the main contributors. Tourism earnings and remittances have shown steady growth from 2010–2014, averaging around 18.1 percent and 4.5 percent of GDP, respectively. This trend is expected to continue.

2.1.2 Post-Disaster Economic Outlook

Gross Domestic Product

The macroeconomic impact of TC Winston in 2016 is expected to be substantial given the massive extent of damage incurred, especially to key sectors, such as housing, transport, manufacturing, agriculture, electricity, communications and environment. The impact of the cyclone is estimated to reduce economic growth to 1.3 percent in 2016 compared to the pre-cyclone estimate of 3.8 percent (Figure 11). However, recovery and reconstruction activities during 2016 (if started opportunely) are estimated to boost GDP back up to 2.4 percent, a decrease of 1.4 percent compared to the pre-cyclone baseline estimate. This revised growth also reflects the expected impact of TC Zena, which passed southeast of Fiji only six weeks after TC Winston, causing torrential rain and major flooding. TC Zena's impact is expected to be felt mainly in the agriculture sector.

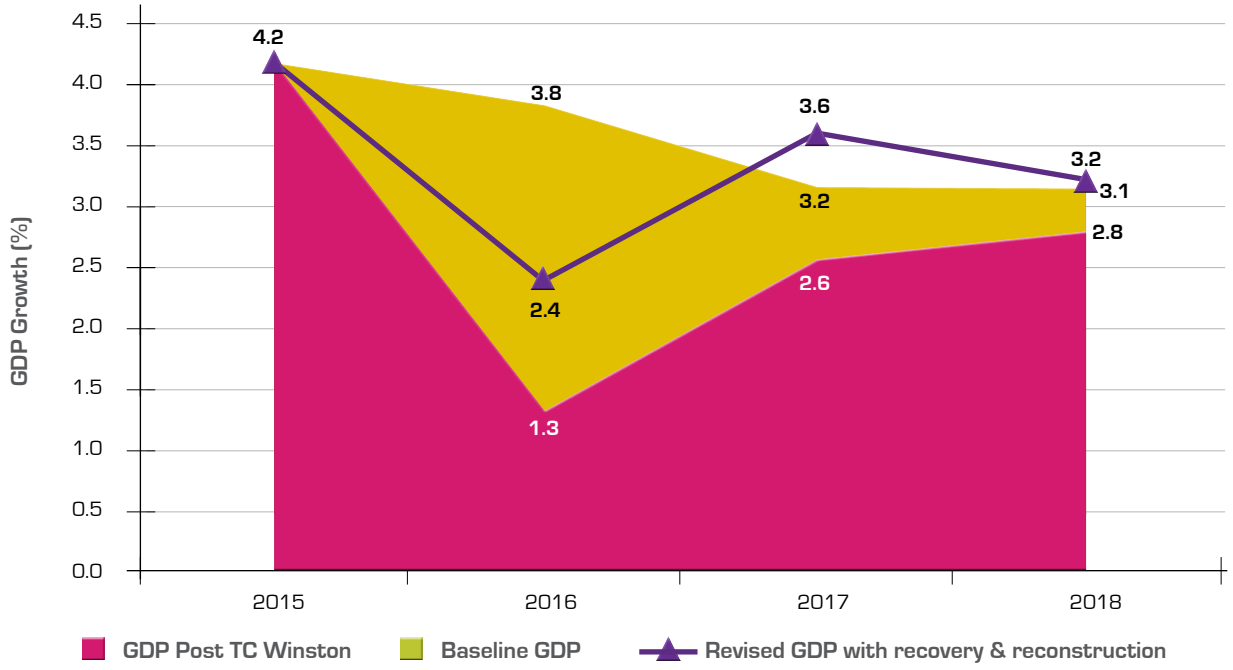


Figure 11: Post-Disaster GDP Forecast 2015–2018

Source: Estimations by Macro Assessment Team.

In the agriculture sector, the cyclone's impact on sugar cane production is expected to be substantial in 2016, given that it hit during the planting season. Production is expected to be around 1.4 million tonnes this year, compared to 1.8 million tonnes in 2015. Total losses for the agriculture sector as a whole are estimated at around F$171.1 million in 2016, with the worst impacts felt in the Cakaudrove, Bua, Naitasiri, Lomaiviti, Ra and Tailevu Provinces. Other cash crops also suffered major damage, such as coconuts, yaqona, taro, cassava, yams, vegetables and pawpaw.

Lower sugar production is expected to impact on the manufacturing subsector, while other manufacturing and commerce activities were temporarily affected by disruptions to water and electricity supply.

The social sectors suffered major damage and losses as well in terms of housing damage and disruptions to education services, as a number of schools in affected areas were utilized as evacuation centres. Infrastructure sectors (water, electricity, transport and communications) sustained minimal damage in comparison. Cross-Cutting Issues, such as culture, disaster risk management (DRM) and environment, suffered extensive damage; however, their impact on GDP is difficult to ascertain given that Fiji does not measure these sectors in its national accounts.

Trade and Balance of Payments

The impact of TC Winston on Fiji's balance of payment position in 2016 will be quite substantial. Total exports are now projected to decline by 1.2 percent in 2016 compared to over 17 percent growth anticipated before the cyclone. This decline is driven primarily by expected decreases in sugar, dalo, coconut oil and yaqona exports. Yaqona plantations sustained damage to both young and matured plants and the impact will likely be realized in the medium term as the plant yields to maturity after about three years. In addition, coconut oil exports are expected to significantly decline in the short

to medium term. Imports will be higher than previously expected with an inflow of machinery, equipment and materials for reconstruction for the replacement of infrastructure in the housing, telecommunication and transport sectors. Food imports are also expected to increase due to the loss of locally grown produce. These impacts will raise the trade in goods deficit by 18.5 percent this year, which, as a percent of GDP, is now estimated to increase from 27.3 percent to 32.4 percent in 2016.

The cyclone had minimal impact on the tourism sector, which is expected to fully recover during 2016. Aid in-kind and cash grants have risen following the cyclone and reconstruction financing is expected to result in higher inflows during 2016 and beyond. Overall, Fiji's Current Account deficit for 2016 is estimated to increase by 8.9 percent driven by lower export earnings and higher import payments. This will raise the Current Account deficit to 12.9 percent of GDP (at market price) in 2016.

Table 6: Balance of Payments: Trade in Goods (F$ million)

	2015 Baseline	2016 Baseline	% change	2016 Post-cyclone	% Change: 2015 to 2016 Post-Cyclone
Exports	2,004	2,356	17.5	1,980	-1.2
Imports	4,645	5,006	7.8	5,110	10.0
Balance on Trade in Goods	-2,641	-2,651	0.4	-3,130	18.5

Source: Estimations by Macro Assessment Team.

Fiscal Impact

Government expenditure on disaster relief and early recovery activities are being funded through reprioritization of line ministry budgets. Notable reallocations included top ups for social welfare programmes and food ration distribution. In addition, around F$70 million will be set aside for the upcoming Help for Homes residential rehabilitation and assistance programme, and the diversion of funds into relief, recovery and reconstruction will reduce funds available for the government's existing development programmes. Large additional expenditures are expected to be required once the reconstruction and recovery programmes are fully specified.

In terms of the disaster impact on revenue collections, based on expected production flow losses for 2016 estimated in this PDNA, value added tax (VAT) collections are expected to decline by about F$61.9 million this year. In addition, there will be reductions in the Service Turnover Tax as a result of losses in the tourism sector.

2.2 Employment, Livelihoods and Social Protection

2.2.1 Summary

TC Winston affected approximately 540,400 people or 62 percent of the national population of Fiji (estimated as 865,611 at the end of 2014).[19] TC Winston has resulted in the loss of 14,450,129 work days and F$351.45 million in personal income. Table 7 presents the distribution of the affected population by division. The largest proportion of the affected population was in the Western Division followed by the Central, Northern and Eastern Divisions. An estimated 263,000 women may have been affected by the disaster.[20]

The affected populations comprise those who lost their lives, were injured or fell ill due to the cyclone (together accounted for about 0.03 percent); the displaced (those whose homes were totally destroyed accounted for about 10 percent); and those whose livelihoods were affected (accounted for some 89.75 percent) as a result of TC Winston. In terms of livelihoods affected, 57 percent relate to the agricultural sector, 17 percent to commerce, 10 percent to manufacturing, and 8 percent to tourism and transportation equally.

[19] Population and Labour Force Estimates 2014.

[20] Population and Labour Force Estimates 2014 reported that women comprise 48.8 percent of the population.

Table 7: Population Affected by TC Winston

Division	Deaths	Missing	Hospitalised	Injured	Number of people affected due to loss of livelihood of main bread winner	Number of people displaced	Total number of people affected
Central	6		2	24	162,698	5245	167,975
Eastern	22	1	3	59	30,222	7595	37,902
Northern	3		5	10	93,488	10210	103,716
Western	13		17	24	198,622	32145	230,821
Total	**44**	**1**	**27**	**117**	**485,030**	**55,195**	**540,414**

Source: Estimates based on Government of Fiji data.

Overall, the government's social protection measures in response to TC Winston have translated into a financial contribution of F$$344.7 million. In terms of impact on the population, the disaster may result in increasing subsistence economic activity, widening income inequality, deepening poverty, introducing new challenges to the social protection measures in light of increasing demand for support, and reducing entrepreneurial confidence among the small and medium enterprises (SMEs) required for job creation and entrepreneurship.

Recommendations for recovery highlight the need to strengthen the information base of informal workers and to: develop an informal economy policy; provide training in non-traditional skills for youth and women to support the expected labour demand in the construction sector; develop agricultural insurance for small farm holders to share the risk; establish emergency employment programmes designed to immediately improve livelihoods; create income generation targeting poor beneficiaries; and include people with disabilities.

Southern Taveuni, Vuna Village
Source: Vlad Sokhin/World Bank

2.2.2 ESLP Sector Background

Employment and Livelihoods

Fiji faces a paradox of a low unemployment rate with high informal sector employment, high underemployment, and significant and pervasive engagement in subsistence activities.

In 2010/2011, Fiji's population aged 15 and over (working age population) totaled just below 600,000 (Figure 12). Approximately 64.4 percent of this population (or around 386,000) participated in the labour market (81.5 percent for men and 46.6 percent for women). Among labour force participants, 95.3 percent were employed while 4.7 percent were unemployed. Among the employed, almost 60 percent were in informal employment, defined as employed people not making contributions to the Fiji National Provident Fund (FNPF), leaving the majority of workers without income security for old age or to deal with shocks.

Some 24 percent of the employed labour force is involved with subsistence work, which is concentrated in the agriculture sector. Only five percent of agricultural workers contribute to the FNPF. Self-employed people and students aged 15 and over can voluntarily join the fund, but voluntary contributions remain limited (just one percent, or F$2.3 million out of F$375.7 million in 2014).[21] Almost 79 percent of rural workers are informally employed, compared with less than 40 percent of urban workers.

The labour market also shows significant gender disparities, with men representing almost two-thirds of the labour force in 2010/2011. While the proportion of males in informal employment accounted for 57 percent (2010/11), females accounted for about 65 percent of informal employment. A gender gap of 34.9 percent in labour force participation rates suggests significant opportunity to engage more women to meet the challenges of sustainable development.

Unemployment rates for youth aged 15-24 in 2010/11 was 15 percent, almost four times higher than people aged 25-44 and almost 14 times higher than the 45-64 age group. Young women, in particular, have trouble finding jobs, with an unemployment rate of 19.5 percent compared with 12.9 percent for young men. A significant number of young women and men are also not receiving an education. In 2010/2011, the share of people aged 15-24 who were neither employed nor educated was 17.6 percent, down from 18.6 percent in 2004/2005. However, this share is three times higher for young women (27.5 percent) than young men (8.8 percent), primarily because women are responsible for more household duties.[22]

Three siblings stand on what was once a vegetable farm
Source: Murray Lloyd/UN Women

[21] FNPF 2014.

[22] ILO/ADB Fiji Creating Quality Jobs: Employment Diagnostic Study 2015.

The disability baseline study "Making Women with Disabilities Visible" (2010) found that 89 percent of people with disabilities were unemployed, 53 percent of whom were men and boys, while women and girls comprised the remaining 47 percent.

The 2015 ILO Rapid Assessment on Child Labour in Fiji found that out of 186 working children interviewed, 50 percent were working in hazardous conditions in agriculture, construction, scrap metal collection, fishing and diving, in garages, and in illicit activities and commercial sexual exploitation.

Poverty

Poverty is a multifaceted issue in Fiji and while it can be seen and classified in many developing countries as extreme, poverty in Fiji is generally viewed as a hardship and instances of extreme poverty are very rare. This means that hardships in Fiji are generally related to lack of access to a fully nutritional diet, clean drinking water, improved sanitation, quality education and health care, and employment or income earning opportunities.[23] The country's strong community-based agricultural and fishing traditions and traditional safety nets allow for an individual to be cared for within the community. This makes those living in poverty in Fiji far better off relative to those living in extreme poverty in some other countries.

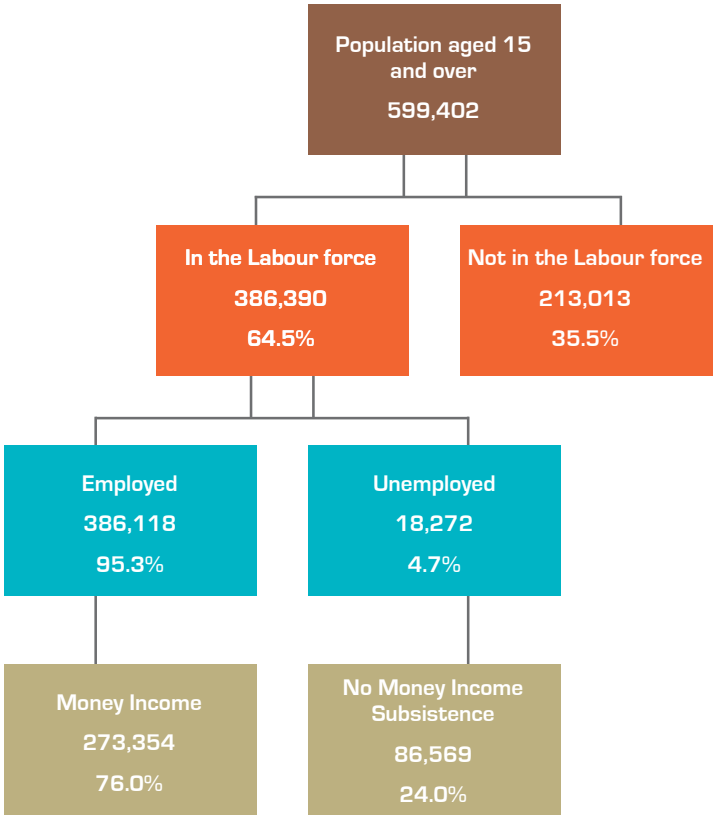
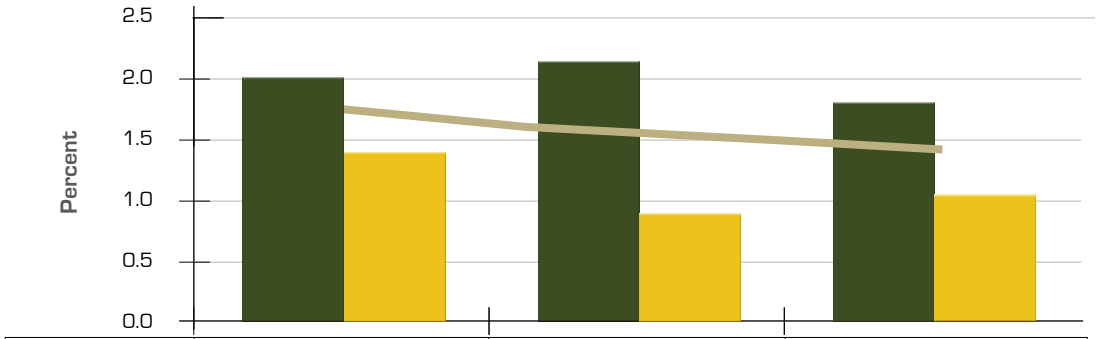


Figure 12: Labour Force Classification, 2010/2011

Source: Fiji Creating Quality Jobs: Employment Diagnostics Study. ILO/ADB 2015.



	2002/03	2008/09	2013/14
Rural	40	43	36.3
Urban	28	17	20.8
National	35	31	28.4

Figure 13: Incidence of Poverty in Urban and Rural Areas

Source: Fiji Bureau of Statistics. Household Income Expenditure Surveys 2002/2003, 2008/2009 and 2013/2014.

The Fiji Bureau of Statistics (FBOS) has conducted three Household Income Expenditure Surveys (HIES)[24] over the years. Figure 13 shows that the overall incidence of poverty in Fijian households decreased from 35 to 28.4 percent between the

[23] Pacific Financial Inclusion Programme (009.

[24] Fiji Bureau of Statistics. HIES 2002/2003, 2008/2009 and 2013/2014.

[25] Percent of the population below the Basic Needs Poverty Line (BNPL) popularly referred to as the head count ratio.

[26] Preliminary findings from the 2013/2014 survey presented by the government statistician.

2002/2003 and the 2013/2014 HIES,[25,26] whereas the incidence of poverty in urban areas declined from 28 to 18 percent between 2002/2003 and 2008/2009 before increasing slightly to 20.8 percent as reported by the 2013/2014 survey.[27] The growing population living in more than 200 informal settlements in major towns and cities is contributing to this increase.

Additionally, rural poverty increased slightly between the 2002/2003 and the 2008/2009 surveys due to the decline in the sugar industry and reduced loans to agriculture. However, the 2013/2014 HIES indicated a decline in the incidence of rural poverty, taking it below the 2002/2003 level, which is a result of the broader spread of economic opportunities emanating from the various government programmes that have targeted rural communities through training programmes and job creation.[28]

Table 8: Incidence of Poverty (percent) by Division

	Household Income Expenditure Surveys	2002/2003	2008/2009	2013/2014	Total Population	Population Living below the Basic Needs Poverty Line during the Period 2013/2014
Urban	**Central**	24	16	8.0	259,941	20,795
	Eastern	42	30	29.3	3,661	1,073
	Northern	39	38	34.8	33,205	11,555
	Western	33	17	22.1	133,944	29,602
Rural	**Central**	29	36	35.8	98,335	35,204
	Eastern	35	40	42.5	35,824	15,225
	Northern	57	51	52.1	101,116	52,681
	Western	38	43	26.5	179,239	47,498
	National	35	31	28.4	845,265	240,055

Source: Fiji Bureau of Statistics. Household Income Expenditure Surveys 2002/2003, 2008/2009 and 2013/2014.

In examining the incidence of poverty by division, the Northern Division continues to record the highest rate.[29] While the Western Division has the highest absolute number of rural people falling below the basic needs poverty line, the division has the lowest incidence of rural poverty (26.5 percent) as a proportion of the population. This level is half that of the rural north and almost ten percent less than the rural parts of the Central Division. The rural poverty rate fell sharply in the Western Division between 2009 (43 percent) and 2013/2014 (26.5 percent), which largely reflects the increase in employment associated with the tourism sector.

Social Protection

The government has put in place a range of social protection programmes to help those families struggling to meet their basic needs, including the: Poverty Benefit Scheme (PBS); Child Protection Allowance (CPA); Food Voucher Programme (FVP); Social Pension Scheme (SPS); the Bus Fare Subsidy; and the Expanded Food Voucher Programme for pregnant women in rural areas. These programmes are monitored by the Ministry of Women, Children and Poverty Alleviation, which ensures that assistance reaches the targeted groups.

Since 2012, the government has allocated more than F$125 million to the four major social protection programmes, with a similar amount every year since then (Figure 14). While overall basic needs poverty levels have improved slightly, these figures show that the demand for social protection from vulnerable families has remained constant over time. It also shows the government's commitment to provide social protection for the poor and vulnerable sectors of the population. Annex 3: Supplementary Material for Employment, Livelihoods and Social Assessment provides a comprehensive overview of the various poverty alleviation programmes implemented by the government since 2009 and the corresponding budget allocations for each programme.

[27] According to the National Housing Policy 2011, over 15 percent of the urban population resides in over 200 informal settlements (squatters) in Fiji's major towns and cities. The Greater Suva area, including Nasinu, has the largest number of squatters.

[28] Draft National Development Plan.

[29] The BNPL has two components; the Food Poverty Line (FPL) and the Non-Food Poverty Line. The FPL consists of a basket of foods which for the 2002/2003 analysis was derived from the expenditure patterns derived from the middle quintile (20 percent) of the rural and urban groups of the major ethnic groups.

As of March 2016, the total number of households receiving benefits under three major social protection programmes are as follows: 22,802 households under the PBS; 3,313 households under the CPA; and 17,782 households under the SPS. In 2015, the FVP for pregnant women in rural areas benefitted a total of 4,221 rural pregnant mothers from a F$1 million budget allocation.

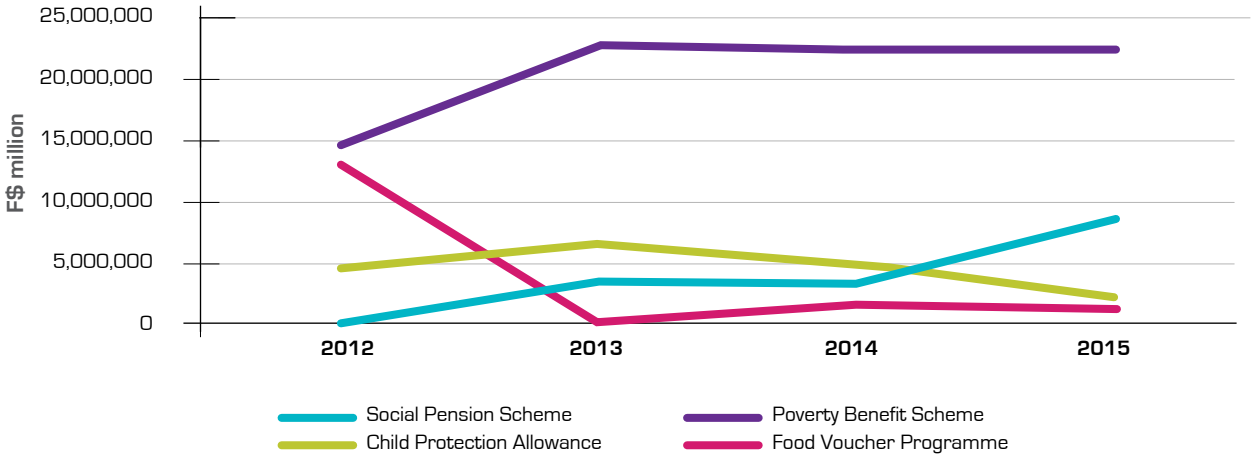


Figure 14: Social Protection Budget (2012–2015)

Source: Fiji Budget Esimates (2012–2015).

Vulnerable Children

Children comprise approximately one third of Fiji's total population and are expected to remain at the same level by 2035.[30] According to the HIES 2008/2009, 61 percent of children belonged to families living below the basic needs poverty line and almost 80 percent of children were in families that lacked sufficient income to invest in their development. Children in specific areas of the country were identified as being particularly disadvantaged, including those living in squatter settlements, low quality urban housing, rural areas and the Northern Division.[31]

Elderly

In response to the National Ageing Policy,[32] the SPS was introduced for elderly people with an annual household income of F$9,100 or less. While the FNPF provides cover in old age for those in the formal sector, SPS will cater to the estimated 70 percent of the elderly population who are not covered by FNPF. In 2015, the SPS eligibility age was reduced from 70 to 68 and the allowance was increased from F$30 to F$50 per month to assist more senior citizens. This is reflected in the upward trend in the cost of the SPS from F$3 million in 2014 to F$8 million in 2015. The eligibility age will be further reduced to 66 effective from July 2016.

People Living with Disabilities

According to the Pacific Disability Forum, 4,534 people with disabilities live in cyclone-affected areas. The Fiji Disabled Peoples Federation undertook an assessment of 986 people with disabilities and found that tools they used for their livelihoods and micro businesses had been destroyed, particularly in the red zones, and women's weaving produce was destroyed, including pandanus leaves.

2.2.3 Assessment of Disaster Impact

Employment and Livelihoods

TC Winston affected approximately 540,400 people and the livelihoods of about 108,083 households located across the country's four divisions. While 5,780 laid-off employees and/or workers with interrupted income-generating activities were reported as of April 2016, a decline in production of goods and services are estimated over a five-year period, likely to result

[30] 2007 National Population Census.

[31] Republic of Fiji Poverty Trends, Profiles and Small Area Estimation (Poverty Maps) in Republic of Fiji (2003-2009), World Bank 2011.

[32] Recent progress in the government's commitment to addressing ageing includes passing the National Council of Older Persons (NCOP) Decree 2012. This enabled the establishment of the NCOP for the purpose of inclusivity, instilling dignity, respect for human rights and meeting basic needs through the empowerment of older people and for related matters (NCOP Decree, 2012). The NCOP is directly aligned to the National Ageing Policy (2011-2015), which the Cabinet endorsed in 2011.

in a loss of 14,450,129 work days and F$351.45 million in personal income (Table 9).[33] The largest number of workdays and income loss occurred in the Northern Division followed by the Western, Central and Eastern Divisions, which follows the pattern of the extent of damage and loss in the productive sectors.

Table 9: Work Days and Personal Income Lost by Division

Division	Work Days Lost	Personal Income Lost (F$ million)
Central	2,660,634	63.9
Eastern	1,338,970	33.8
Northern	6,093,521	148.3
Western	4,357,004	105.4
Total	**14,450,129**	**351.4**

Source: ILO estimates based on Government of Fiji data.

Several data extrapolation methods have been used to construct the baseline and to derive an estimate of the cyclone impact on Employment, Livelihoods and Social Protection (ESLP), including primary and secondary sources.[34] As the ESLP assessment is based on cross-sectoral analysis, additional data were obtained from the agriculture sector (loss of agricultural output), tourism sector (estimated duration of business interruption), manufacturing and commerce sector (number of recorded layoffs) to conduct a quantitative analysis of the cyclone's effect on ELSP. Results were subsequently triangulated and complemented through qualitative observations in affected communities, and through interviews with representatives of the FNPF, Fiji Commerce & Employers Federation, Fiji Trades Union Congress, Fiji Sugar Cane Growers Council, Fiji Disabled Peoples Federation, Fiji National Youth Council, Women Entrepreneurs Business Council and Fiji Taxi Union, to name a few. An additional rapid survey was conducted by the Integrated Human Resources Development Program, a division of the Strategic Planning Office (SPO), to gather data on the effects of TC Winston on informal micro-enterprises. A key finding of the assessment noted a high risk of loss in business confidence, particularly by young micro entrepreneurs. The effects of the disaster on civil servants and public employees, such as teachers, has not been taken into account, as wages continue to be paid.[35]

Table 10 presents the number of work days lost and income loss by sector, with a large proportion of personal income loss in the agriculture sector (F$298.16 million), which has a significant proportion of workers or 44.2 percent of the economically active population.[36]

Table 10: Work Days and Personal Income Lost by Productive Sectors and Transport Sector

Division	Work Days Lost	Personal Income Lost (F$ million)
Agriculture	12,851,608	298.2
Commerce	498,149	17.1
Manufacturing	585,873	18.5
Tourism	495,021	17.0
Transport[a]	19,478	0.7
Total	**14,450,129**	**351.5**

Source: ILO estimates based on Government of Fiji data.

Social Protection Post-TC Winston

In response to TC Winston, the government has been using existing social welfare schemes to efficiently disburse cash to vulnerable groups and inject much needed cash into the economy. On March 18, 2016, a total of F$19.9 million (US$9.4 million) was disbursed under three social protection programmes. Under the PBS, 22,802 households were paid a lump sum of F$600, or the equivalent of F$200 for three months. 17,782 pensioners of the SPS over the age of 68 received an

[33] The PDNA Guidelines note that as GDP losses are usually expressed in terms of annual GDP, this estimate refers to the amount of work (e.g., workdays) or work income lost in the year of the disaster and following years, and does not distinguish between jobs completely lost, jobs temporarily suspended or jobs with reduced income. Part of this loss might be offset in case of a speedy recovery of the productive sectors.

[34] Secondary sources included the Population and Labour Force Survey 2014, the 2007 Census of Agriculture, the 2009 National Population and Housing Census, the 2009-2012 Decent Work Country Programme, and the 2013-14 HIES Preliminary Findings – Release 1.

[35] Civil servants and other public employees have been stretched to capacity in trying to fulfil the demands caused by TC Winston.

[36] ILO, ADB. Fiji Creating Quality Jobs: Employment Diagnostic Study.

additional F$300 (F$100 over three months). Finally, 3,313 families under the Care and Protection Scheme (CPS) received a total of F$300. The cash top-up payments were intended to help people meet immediate expenses following TC Winston and were provided to all existing beneficiaries, irrespective of whether they resided in affected areas.

On April 8, 2016, the government announced the approval of a FVP top-up of F$4.6 million to beneficiaries under the PBS, SPS and CPS who reside in the 12 priority regions only. The top-up will be provided for May and June 2016, assisting approximately 44,169 households. The programme will be implemented with the help of the World Food Programme. The government has also announced the roll-out of the Help for Homes initiative, a housing programme where the government will provide affected households with vouchers (electronic cards) for housing rehabilitation and reconstruction. The programme is targeted to households with an annual income under F$50,000 (US$24,000) who experienced housing damage.

The FNPF has allowed its members to make withdrawals post-TC Winston, resulting in a significant injection of cash into the economy. Active members were allowed to withdraw up to F$1,000, plus an additional F$5,000 when they could present proof (property title) of having a house in the TC-affected area. In total, the FNPF has processed and approved 170,000 withdrawal applications, including 35,000 in the second (F$5,000) category. These one-time withdrawals resulted in a massive injection of around F$250.2 million cash into the economy.

Overall, the government's disaster responsive social protection measures post-TC Winston have translated into a financial contribution of F$344.7 million as seen in Table 11. However, this money has been diverted from existing programmes, so there may be implications for regular development initiatives.

Table 11: Major Social Protection Interventions and Cash Flow Post-TC Winston

Programme	Number of Beneficiaries (Households)	Duration	Budget (F$ million)
Social Welfare Top-up Payments	43,897	3 months (March-May 2016	19.9
Food Voucher Program	44,169	2 months (May-June 2016)	4.6
Housing Programme		April 2016 - onwards	70
Fiji National Provident Fund (FNPF)	170,000	2 months (March-April 2016)	250.2
Total			**344.7**

Source: Assessment Team based on Government of Fiji data.

Disaster Impact on Employment, Livelihoods and Social Protection

TC Winston is expected to have a significant impact on the livelihoods and social conditions of the population of Fiji.[37] With an expected recovery period in the productive sector ranging from three months to ten years, much of the population engaged in economic activity may be forced to increase its share of subsistence work as part of its economic activity. Before TC Winston, about one-half of workers were reportedly only doing paid work, while about one-quarter had both paid and subsistence work and one quarter had subsistence work only.[38] Women may fare worse than men as their observed increase in the labour force in the 2010-2011 period was primarily in informal work and subsistence activities.[39] TC Winston may cause a crowding into the informal sector, thus squeezing women out as more men seek to increase their share of informal activity and subsistence work.

The issue of rising income inequality requires attention. The Employment Diagnostic Study, undertaken by the ILO and the ADB using FBOS data, suggested a strong increase in household income inequality between 2004/2005 and 2010/2011.[40] The study further notes that, among other things, the increase in income inequality may reflect the concentration of subsistence employment in agricultural and rural areas. Most civil servants and salaried people will not suffer income loss as a result of TC Winston; however some segments of the population will experience income loss and a further concentration in subsistence employment may occur. If inadequate scaling-up of social protection measures persist, the result may be increasing income inequality.

The possibility of people sinking into deepening poverty or more of the population becoming poor following TC Winston is likely. The 2013-2014 HIES reported a national incidence of poverty of 28.1 percent in 2013-2014, a decrease of 2.9 percent from the 2008-2009 period. This poverty rate suggests that total earnings of some 240,055 people were below

[37] Sector assessments provide detailed accounts of the extent of damage and change in economic flows which have occurred in each sector and the length of recovery period required to return to normalcy.

[38] ILO/ADB. Fiji Creating Quality Jobs: Employment Diagnostic Study. 2015. Pg.31

[39] Ibid. pg. 8.

[40] Ibid. pg. 39.

the poverty line (F$55.12 and F$49.50 per adult equivalent per week for urban and rural respectively). Data suggests that some 90 percent (485,030) of the affected population has suffered and may continue to suffer income loss, falling below the poverty line, into the emerging poor group. Currently, the government's Social Protection Programme supports a little over 200,000 beneficiaries. Despite measures, such as the housing grant, which was provided to some 35,000 people in the amount of F$5,000, and withdrawals granted to 135,000 people, both from the FNPF, the government may still be confronted with an additional 33 percent of the population seeking assistance, in addition to its normal beneficiaries.

Despite the injection to the economy of some F$250 million and assurances given that the FNPF is strong (with a reserve of some F$5 billion), the withdrawal of money may have a long-term impact on the Fund's viability and a reduction in the volume of pensions, which participants may receive in the future.

Micro, small and medium enterprises may be at risk of losing momentum and entrepreneurial confidence due to the extent of damage and change in economic flows suffered as a result of TC Winston. This will impact the ability of the local private sector to lead much-needed employment creation and local economic growth in the affected areas and informal sectors.

2.2.4 Recovery Strategy and Needs

In addition to the immediate measures undertaken since TC Winston, such as the implementation of a Community Based Emergency Employment programme,[41] which includes cash for work, farming tools, health and safety training, social security link to FNPF, child labour awareness, link to overseas seasonal work and other social programmes, more must be done. Recovery needs are estimated at F$31.5 million, as set out in Table 12. The following are a brief outline of policies, which seek to address the medium- and long-term impacts of TC Winston.

Employment and Livelihoods

A task force may be established to review, develop and implement a comprehensive and innovative response programme for the medium and long term to support disenfranchised informal and subsistence workers in rural areas. This should result in the development of an informal economy policy based on a robust database in order to inform targeted interventions to empower the informal economy and lead to increased formalization of micro and small enterprises. Such a process should be facilitated through simpler registration procedures, coupled with formalization incentives (e.g., eligibility for subsidies and credit).

The register of people seeking employment should facilitate a ready-to-work pool, available for deployment for employment intensive infrastructure programmes as significant volumes of employment can be created during the reconstruction of public and community infrastructure. Women and youth must be trained in non-traditional skills for ready absorption into the construction sector during this phase and people with disabilities should be included as well.

The development of agricultural insurance may be considered to reduce the risk of shocks experienced by disaster. In order to meet the major institutional and technical/operational challenges, such a package will require collaboration between the government, the Insurance Council of Fiji, farmer cooperatives, the microfinance and banking sectors, and development partners.

The development of an enterprise recovery programme with a robust public-private partnership should ensure that enterprises restart and consequently regenerate employment.

Social Protection

An analysis of the proportion of households in the PBS that was previously just above the poverty cut-off score, but as a result of TC Winston has drifted below, should be undertaken. The Department of Social Welfare has begun a process of consolidating and centralizing the PBS Registry, which will be useful for this purpose, and estimates a recovery budget of F$7 million for the recovery period for the expansion of current social protection programmes.

The impact of the top-up transfers delivered through the three core social assistance programmes in response to TC Winston should be assessed, which will help inform future post-disaster cash transfer initiatives.

The emergency employment programmes or skills development trainings designed for immediate livelihood and income generation should be targeted towards the pro-poor beneficiaries who are part of the PBS (10,931 households in the 12 severely affected areas), ensuring inclusiveness in terms of gender and people living with disabilities (PLWD).

A review of existing social protection measures and the development of policies for use in future disasters, as the basis for the development and approval of informed social protection legislation, should be undertaken.

[41] This pilot programme is implemented by the Ministry of Employment, Productivity and Industrial Relations and supported by the National Disaster Management Office (NDMO) and the MOA through the Food Security and Livelihoods Cluster

Table 12: Total Recovery and Reconstruction Needs for the ESLP Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Micro-enterprise support and preparedness	7			7
Enterprise Recovery Programme (to support enterprises in the formal sector)	10			10
Expansion of existing social benefit scheme	7			7
Capacity building of Government agencies and CSO's that support micro enterprises	3.5			3.5
Skills Development & Business Confidence Programme for construction sector using Employment Intensive Infrastructure Programmes (EIIP)	3			3
Child Labour monitoring, advocacy and withdrawal programme	0.5			0.5
Study on the Fiji National Provident Fund (FNPF) on the impact of withdrawals for disasters and social security support programmes for informal workers	0.5			0.5
Total	**31.5**			**31.5**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

2.3 Disaster Impact on Quality of Life

While the overall economic impact of disasters varies widely, it is always significantly negative on the quality of life of the affected population, particularly in the case of more vulnerable population groups.

Reliable quantitative procedures exist to estimate disaster impact at the macroeconomic level, but methodologies to quantitatively estimate disaster impact at the personal or household level have lagged behind, often concentrating only on qualitative means of assessment. The Human Development Index (HDI) was used as a proxy quality of life indicator; however, the HDI is relatively static and does not lend itself to measuring impact on quality of life caused by a sudden disaster, and is not available in all countries nor at sub-national levels.

To estimate the changes in quality of life following TC Winston, a composite measurement index was estimated based on relatively simple indicators, and data was collected during the relatively short duration of this PDNA.[42] This approach was successfully applied and tested during the recent PDNAs following the 2015 Nepal earthquake and Myanmar floods and landslides.[43]

The following sectoral indicators are used in estimating disaster impact on quality of life for the affected population:

- Housing deficit;
- Number of patients treated in hospitals because of physical or psychological injuries, or due to the occurrence of disease outbreaks arising from the disaster;
- Number of school days lost by students due to the interruption of classes;
- Decline in household connections to the electricity grid;
- Decline in household connections to the collective water supply and sanitation systems; and
- Decline in personal or household income.

In addition to the above, whenever agricultural production losses were high in comparison to normal productions volumes, which may occur as a result of slow-evolving disasters, an additional indicator measuring food insecurity may be added.

[42] Jovel, Roberto. Estimation of Disaster-Induced Losses to Define Post-Disaster Recovery Requirements, in Disaster Recovery: The Governance, Economics, and Social Impacts, Asian Disaster Management News, Volume 22, Asian Disaster Preparedness Center (ADPC), Bangkok, Thailand, 2015.

[43] See Myanmar Post-Disaster Needs Assessment on Floods and Landslides, July–September 2015, Government of the Union of Myanmar, November 2015.

Based on the values obtained for pre-disaster and post-disaster conditions for the above-listed sector indicators, and assigning equal weights to each, a composite indicator is developed that provides a measure of how the affected population's quality of life deteriorated because of the disaster. Moreover, the estimated quality of life composite indicator may be used in the future as a measure of the degree of recovery being achieved over time.

2.3.1 Quantification of Sectoral Quality of Life Indicators

During the 2016 Fiji PDNA, existing sectoral baseline information and the estimated value of the main disaster effects were used to define quality of life.

Housing

While information on pre-disaster housing deficits was not fully available, data was collected on the number of households existing in all disaster-affected provinces from the 2007 census and the most recent household survey.

In addition, the number of fully destroyed housing units, together with those that sustained high partial destruction caused by the cyclone, was obtained from local and national authorities (Table 13). Housing units that sustained only minor damage were not considered for the analysis.

Table 13: Pre- and Post-Disaster Housing Data in Disaster-Affected Provinces

Province	Pre-Disaster number of Housing Units	Post-Disaster number of Houses	
		Destroyed	Major Damage
Ba	47,533	3,494	4,241
Bua	2,794	524	605
Cakaudrove	7,858	1,513	2,199
Kadavu	2,161	0	0
Lau	5,897	328	63
Lomaiviti	2,517	1,191	296
Macuata	5,636	5	10
Nadroga	9,250	122	259
Naitasiri	25,240	542	365
Namosi	1,419	27	14
Ra	5,946	2,813	757
Rewa	16,426	66	78
Rotuma	639	0	0
Serua	2,596	19	19
Tailevu	10,378	395	287

Source: Estimations by Assessment Team.

The housing index was estimated for pre-disaster and post-disaster situations (Table 14).

Table 14: Pre- and Post-Disaster Housing Index by Province

Province	Pre-Disaster	Post-Disaster
Ba	1.0135	0.8485
Bua	0.9164	0.5461
Cakaudrove	0.8162	0.4307
Kadavu	0.9586	0.9586
Lau	0.4823	0.4504
Lomaiviti	0.9224	0.3780
Macuata	1.0785	1.0756

Province	Pre-Disaster	Post-Disaster
Nadroga	0.8595	0.8242
Naitasiri	0.8688	0.8375
Namosi	1.0423	1.0122
Ra	0.9228	0.3688
Rewa	0.7873	0.7804
Rotuma	0.6750	0.6750
Serua	0.6851	0.6751
Tailevu	0.9539	0.8913

Source: Estimations by Assessment Team.

Education

Baseline information on the number of schools that existed and of students enrolled before the disaster was obtained. Data on the number of disaster-affected schools – whether totally or significantly damaged – and the corresponding number of students that had to be relocated to other schools or other premises were also ascertained. Table 15 shows the baseline information and the estimated values of the pre- and post-disaster education index.

Table 15: Pre- and Post-Disaster Education Index by Province

Province	Pre-Disaster		Post-Disaster	
	Number of Students Enrolled	Education Index	Number of Students Affected	Education Index
Ba	57,056	1.0000	34,460	0.3960
Bua	4,018	1.0000	1,177	0.7071
Cakaudrove	15,597	1.0000	8,410	0.4608
Kadavu	3,004	1.0000	126	0.9581
Lau	2,682	1.0000	591	0.7796
Lomaiviti	5,565	1.0000	4,359	0.2167
Macuata	17,894	1.0000	1,400	0.9218
Nadroga	14,343	1.0000	3,332	0.7677
Naitasiri	31,429	1.0000	3,746	0.8808
Namosi	1,653	1.0000	1,143	0.3085
Ra	8,431	1.0000	7,975	0.0541
Rewa	35,137	1.0000	11,937	0.6603
Rotuma	521	1.0000		1.0000
Serua	5,211	1.0000	2,133	0.5907
Tailevu	16,831	1.0000	5,547	0.6704

Source: Estimations by Assessment Team.

Health

Data on pre-disaster morbidity levels in disaster-induced disease for the months of February and March of 2015 and 2016 were obtained and analyzed. Only the number of patients with digestive disease conditions increased following the disaster due to the consumption of unsafe drinking water. On that basis, the health index was estimated for pre- and post-disaster conditions (Table 16).

Table 16: Pre- and Post-Disaster Health Index by Province

Province	Population	Pre-Disaster		Post-Disaster	
		Number of Cases	Health Index	Number of Cases	Health Index
Ba	244,366	298	0.9988	623	0.9975
Bua	15,148	164	0.9892	234	0.9846
Cakaudrove	52,480	320	0.9939	700	0.9867
Kadavu	10,854	93	0.9914	94	0.9913
Lau	11,455		1.0000		1.0000
Lomaiviti	17,296	79	0.9954	18	0.9990
Macuata	76,648	875	0.9886	168	0.9978
Nadroga	61,799	236	0.9962	15	0.9998
Naitasiri	168,711	80	0.9995	114	0.9993
Namosi	7,300		1.0000		1.0000
Ra	31,329	75	0.9976		1.0000
Rewa	106,329	524	0.9951	538	0.9949
Rotuma	19,282		1.0000	238	0.9877
Serua	58,957		1.0000		1.0000
Tailevu	2,166	278	0.8716	44	0.9797

Source: Estimations by Assessment Team.

Water Supply

The most recent information on household access to safe water service was used to define the baseline for the analysis. Such data was combined with information on the number of affected households that due to the disaster caused by TC Winston no longer had direct access to a safe water supply. Table 17 shows the values of the safe water access index for pre-disaster and post-disaster conditions.

Table 17: Pre- and Post-Disaster Water Supply Access Index by Province

Province	Pre-Disaster			Post-Disaster		
	Number of Households	Number of Households with Access	Water Access Index	Number of Houses Disconnected	Number of Households with Access	Water Access Index
Ba	52,570	48,047	0.9140	7,735	40,312	0.7668
Bua	3,205	2,654	0.8281	1,129	1,525	0.4758
Cakaudrove	10,708	9,422	0.8799	3,712	5,710	0.5332
Kadavu	2,387	2,148	0.8999		2,148	0.8999
Lau	2,440	2,329	0.9545	391	1,939	0.7945
Lomaiviti	3,568	3,285	0.9207	1,487	1,799	0.5041
Macuata	16,411	13,155	0.8016	15	13,140	0.8007
Nadroga	12,871	8,360	0.6495	381	7,980	0.6200
Naitasiri	33,551	32,435	0.9667	907	31,529	0.9397
Namosi	1,423	1,411	0.9916	41	1,370	0.9628
Ra	6,821	5,353	0.7848	3,570	1,784	0.2615
Rewa	22,157	22,019	0.9938	144	21,876	0.9873
Rotuma	484	484	1.0000		484	1.0000
Serua	3,970	3,935	0.9912	38	3,897	0.9816
Tailevu	11,619	11,091	0.9546	682	10,410	0.8959

Source: Estimations by Assessment Team.

Sanitation

Similar information was collected regarding the number of households that had access to safe sanitation facilities before the disaster and those that lost such access to sanitation as a result of TC Winston.

Sanitation service coverage in the country is much lower than access to safe water supply, which explains the very low values of pre- and post-disaster sanitation access indexes (Table 18).

Table 18: Pre- and Post-Disaster Sanitation Access Index by Province

Province	Pre-Disaster			Post-Disaster		
	Number of Households	Number of Households with Access	Sanitation Index	Number of Houses Affected	Number of Households with Access	Sanitation Index
Ba	52,570	7,542	0.1435	7,735	0	0.0000
Bua	3,205	1,084	0.3382	1,129	45	0.0140
Cakaudrove	10,708	1,420	0.1326	3,712	2,292	0.2140
Kadavu	2,387	227	0.0951		227	0.0951
Lau	2,440	198	0.0811	391		0.0000
Lomaiviti	3,568	119	0.0334	1,487		0.0000
Macuata	16,411	4,306	0.2624	15	4,291	0.2615
Nadroga	12,871	3,568	0.2772	381	3,188	0.2476
Naitasiri	33,551	1,966	0.0586	907	1,060	0.0316
Namosi	1,423	145	0.1019	41	104	0.0731
Ra	6,821	2,097	0.3074	3,570	1,473	0.2159
Rewa	22,157	1,082	0.0488	144	939	0.0424
Rotuma	484	2	0.0041		2	0.0041
Serua	3,970	336	0.0846	38	298	0.0751
Tailevu	11,619	1,586	0.1365	682	905	0.0778

Source: Estimations by Assessment Team.

Electricity

For access to electricity, baseline information on the number of residential connections to the Fiji Electricity Authority (FEA) grid was obtained from the utility. An additional number of households obtain electricity from isolated systems but no information on their number was made available at the time of the PDNA. Thus, the analysis only covered data on electricity access from the FEA.

Table 19 shows the estimated electricity access index for each province. If data on connections to isolated electrical systems had been included, some of the values of the access index – in Bua, Kadavu, Lau and Rotuma Provinces – would not be 0.

Table 19: Pre- and Post-Disaster Access to Electricity Index by Province

Province	Pre-Disaster			Post-Disaster		
	Number of Households	Number of Households Connected to Grid	Electricity Index	Number of of Houses Disconnected	Number of Households Connected to Grid	Electricity Index
Ba	52,570	42,487	0.8082	7,735	34,752	0.6611
Bua	3,205		0.0000			0.0000
Cakaudrove	10,708	3,084	0.2880	3,712		0.0000
Kadavu	2,387		0.0000			0.0000
Lau	2,440		0.0000			0.0000
Lomaiviti	3,568	2,027	0.5681	1,487	541	0.1515
Macuata	16,411	13,328	0.8121	15	13,313	0.8112

Province	Pre-Disaster			Post-Disaster		
	Number of Households	Number of Households Connected to Grid	Electricity Index	Number of of Houses Disconnected	Number of Households Connected to Grid	Electricity Index
Nadroga	12,871	8,035	0.6243	381	7,655	0.5947
Naitasiri	33,551	32,525	0.9694	907	31,619	0.9424
Namosi	1,423	580	0.4076	41	539	0.3788
Ra	6,821	3,983	0.5839	3,570	414	0.0606
Rewa	22,157	28,091	1.2678	144	27,948	1.2613
Serua	3,970	3,961	0.9977			0.9977
Tailevu	11,619	15,847	1.3639	38	15,809	1.3606
Rotuma	484		0.0000			0.0000

Source: Estimations by Assessment Team.

Personal Income Decline

In 2008, the FBOS conducted a household survey of income and expenditure, which provided a baseline for income by division.[44] Such information was combined with data on population per province and nominal GDP, in order to obtain a measure of GDP per province. In addition, non-disaster and post-disaster GDP forecasts for 2016 were used in combination with the estimated value of production losses in each province in order to determine the decline in per capita GDP arising from the disaster's impact.

Per capita GDP by province data were used to estimate a personal income index under pre- and post-disaster conditions (Table 20). The estimated highest decline in personal income in 2016 will likely occur in Bua Province (just above 20 percent); the second highest decline will occur in Lomaiviti, Cakaudrove and Ra Provinces (around 9 percent); and residents of Tailevu and Lau Provinces are expected to sustain an estimated 4 percent decline in personal income. Personal income decline will likely go beyond the current year, and last at least two more years in view of the disaster's impact.

Table 20: Pre- and Post-Disaster Personal Income Index by Province

Province	Population	Personal Income Index		2016 GDP (F$ million)		2016 Per Capita GDP (F$)	
		Non-Disaster	Post-Disaster	Non-Disaster	Post-Disaster	Non-Disaster	Post-Disaster
Ba	244,366	0.9244	0.9046	2,679.3	2,621.8	10,964.3	10,729.1
Bua	15,148	1.0000	0.7882	179.7	141.6	11,860.4	9,348.8
Cakaudrove	52,480	0.9102	0.8247	566.6	513.3	10,795.7	9,781.5
Kadavu	10,854	0.9463	0.9463	121.8	121.8	11,223.3	11,223.3
Lau	11,455	0.8774	0.8377	119.2	113.8	10,406.4	9,935.2
Lomaiviti	17,296	0.9048	0.8151	185.6	167.2	10,731.9	9,667.6
Macuata	76,648	0.8145	0.8021	740.5	729.1	9,660.8	9,512.7
Nadroga	61,799	0.8924	0.8822	654.1	646.6	10,584.6	10,463.7
Naitasiri	168,711	0.9738	0.9679	1,948.6	1,936.8	11,549.8	11,479.7
Namosi	7,300	0.9776	0.9734	84.6	84.3	11,595.1	11,544.7
Ra	31,329	0.9220	0.8282	342.6	307.7	10,934.9	9,823.0
Rewa	106,329	0.9186	0.9178	1,158.5	1,157.5	10,895.4	10,885.8
Rotuma	2,166	0.7923	0.7923	20.4	20.4	9,396.7	9,396.7
Serua	19,282	0.9519	0.9500	217.7	217.3	11,289.7	11,267.5
Tailevu	58,957	0.9911	0.9524	693.0	666.0	11,754.3	11,295.6

Source: Estimations by Assessment Team.

[44] Fiji Bureau of Statistics, Report on the 2008-09 Household Income and Expenditure Survey for Fiji, Suva, Fiji, 2009.

2.3.2 Composite Index on Quality of Life

An equal-weight, composite quality of life index was developed when combining the different sectoral indexes described above, for both pre- and post-disaster conditions in all affected provinces of Fiji. Table 21 and Figure 15 show such estimated values. Based on the quality of life estimates, determining the areas where people live that were most affected by the disaster is possible.

Table 21: Pre- and Post-Disaster Composite Quality of Life Index by Province

Province	Quality of Life Index	
	Pre-Disaster	Post-Disaster
Ba	0.9805	0.7737
Bua	0.8453	0.5604
Cakaudrove	0.8518	0.5352
Kadavu	0.8242	0.8172
Lau	0.5863	0.4931
Lomaiviti	0.9067	0.5167
Macuata	0.9905	0.9778
Nadroga	0.9011	0.8395
Naitasiri	0.9772	0.9369
Namosi	0.7572	0.6214
Ra	0.7601	0.2226
Rewa	1.0155	0.9542
Rotuma	0.9461	0.9441
Serua	0.8588	0.7846
Tailevu	0.8194	0.7418

Source: Estimations by Assessment Team.

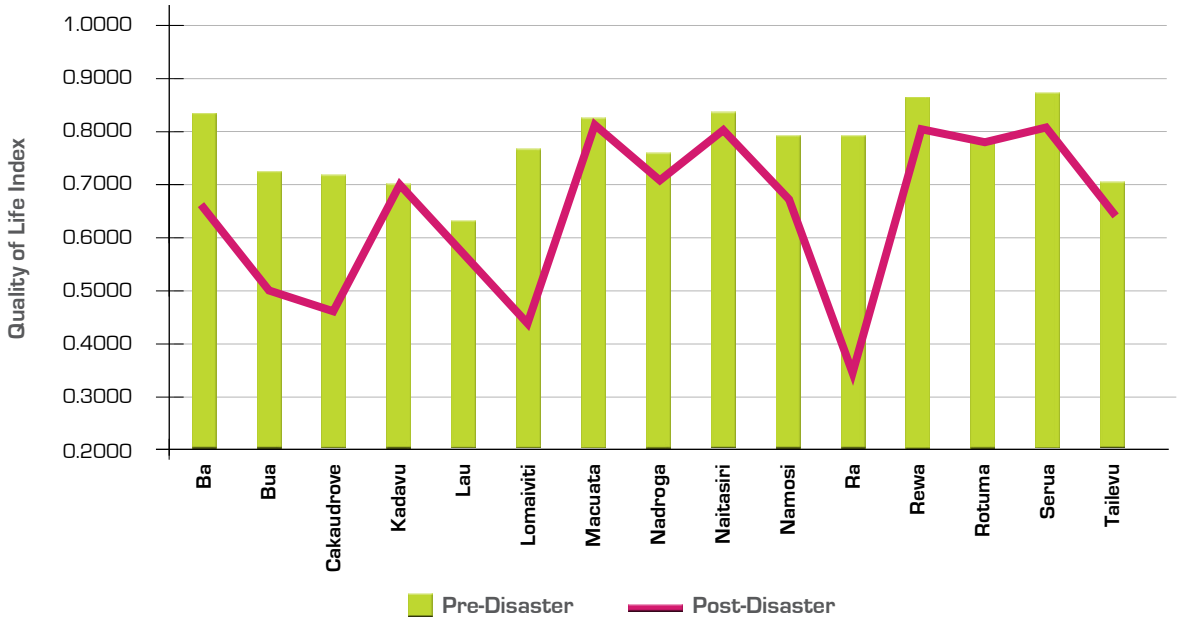


Figure 15: Pre- and Post-Disaster Quality of Life Index by Province

Source: Estimations by Assessment Team.

2.3.3 Most Affected Provinces

The analysis undertaken reveals the most affected population, in terms of declining quality of life, which is very relevant in order to define and quantify the geographical areas that will require post-disaster needs assistance to achieve recovery and reconstruction. The most affected provinces are shown in Figure 16 as well as in the map in Figure 17.

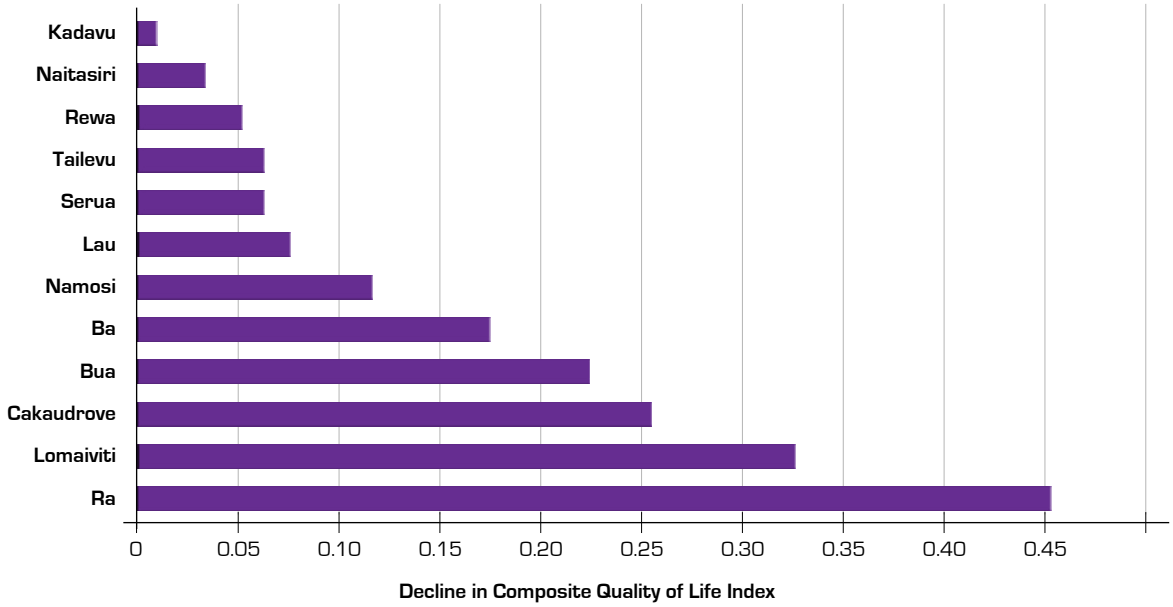


Figure 16: Most Affected Provinces in Terms of Decline in Quality of Life

Source: Estimations by Assessment Team.

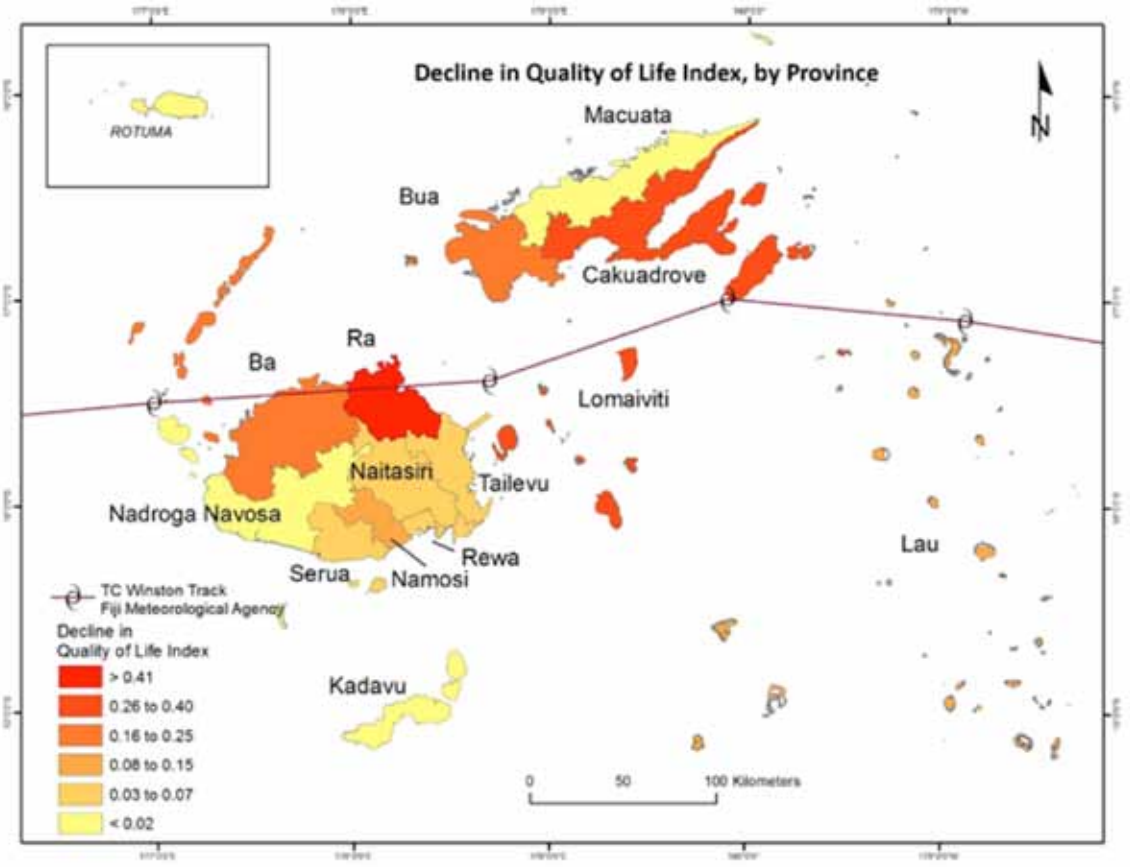


Figure 17: Decline in Quality of Life by Province

Source: Estimations by Assessment Team.

Ra Province was by far the most affected in terms of decline in quality of life. First, its housing index presently stands at the lowest in the country at 0.37, after declining from 0.92. Second, its decline in access to safe water supply now is the second lowest in the country, after declining from 0.78 to 0.26. The post-disaster index in access to sanitation facilities is 0.22, down from a pre-disaster level of 0.31. Access to the electricity grid after the disaster is less than 0.10, from a pre-disaster level of 0.58. The destruction of schools has been extensive, and the post-disaster education index is now less than 0.10. Because of the disaster, personal income is expected to decline by about 10 percent.

Lomaiviti Province is the second most affected. The housing index after the disaster is 0.38 – the second lowest in the country – after many houses were destroyed. The index on direct access to safe water supply declined from 0.92 to 0.50. Direct access to sanitation facilities that, prior to the disaster showed a very low index of less than 0.03, is presently near zero. In terms of direct connection to the FEA electricity system, the index declined from 0.56 to 0.15. Again, the destruction of schools was extensive, bringing the education index to only 0.22. Personal income decline is expected to be the highest in the country at nearly 33 percent.

Cakaudrove Province is the third most affected. The housing index stands at 0.43, the third lowest in the country. Safe water supply access declined from a pre-disaster level of 0.88 to 0.53. In terms of access to safe sanitation facilities, the index declined from 0.13 to nearly zero. The index of direct connection to the FEA electricity grid, which was 0.29 before the disaster, now stands at nearly nil. Again, due to the widespread destruction of school facilities, the education index presently stands as 0.46. Personal income decline is the second highest for the country, at about 26 percent.

Bua Province is the fourth most affected. The housing index decreased from 0.92 to 0.55. The access to safe water supply index declined from 0.83 to 0.48. The sanitation index had a very low value of 0.34 before the disaster and presently stands at nearly zero. No data on access to electricity in isolated systems is available and the province does not receive electricity from the FEA. A relatively large number of schools were destroyed and the post-disaster education index stands at 0.71. Personal income decline has been estimated at about 22 percent.

Lastly, Ba Province sustained a decline of nearly 15 percent in its housing index. The index on access to safe water services sustained a moderate decline, from a pre-disaster value of 0.91 to a post-disaster level of 0.77. In terms of access to sanitation facilities, the index declined from a low pre-disaster value of 0.14 to nearly zero. In terms of access to electricity, the respective index sustained a moderate decline, from a pre-disaster level of 0.81 to a post-disaster ratio of 0.66. Due to extensive destruction of school facilities, the education index dropped to 0.40. Personal income decline is estimated to be about 8 percent.

2.3.4 Use of the Quality of Life Index as a Measure of Recovery

In addition to identifying the most affected provinces and populations, the composite quality of life index may be used as a measure of recovery over time. Quantification of this index may be undertaken every six months or year to ascertain the progress of recovery and reconstruction plans.

Damage to roadway in Cakaudrove Province on Vanua Levu
Source: Ministry of Infrastructure

3.

Namuaimada village, Ra Province, Viti Levu
Source: Vlad Sokhin/World Bank

DAMAGE, LOSSES AND NEEDS BY SECTOR

3.1 Productive Sectors

3.1.1 Agriculture

Summary

For the purpose of this PDNA, the agriculture sector is defined to include the following five subsectors: crops, sugar cane,[45] livestock, fisheries and forests. In total, the five subsectors made up 9.4 percent of the 2014 GDP, including 5.4 percent for crops, 0.8 percent for sugar cane, 1.4 percent for livestock, 0.8 percent for forestry and 1.1 percent for fisheries. Crops and livestock constitute 72 percent of the sector's contribution to GDP, followed by fisheries (11.7 percent), sugar cane (8.3 percent) and forestry (8 percent).[46] The agriculture sector accounts for 45 percent of total employment in the country, with women comprising about 37 percent of those employed in the sector.[47] A large share of the population is also engaged in informal and subsistence agriculture, which remains a major source of livelihoods across the country.

Of the five subsectors, the crops subsector was the most affected by TC Winston (contributing to 40 percent of total damage and loss for the sector), followed by fisheries (38 percent), sugar cane (14 percent), forestry (5 percent) and livestock (3 percent). Permanent crops, such as kava and coconut, were the most impacted by the cyclone, but seasonal vegetables and annual crops, such as cassava and taro, also suffered significant losses. Livestock subsector damage and losses occurred mainly in the Western and Central Divisions, mostly affecting dairy, beef, poultry, pigs and apiculture. In the forestry subsectors, the timber industry was impacted by high winds resulting in damage to infrastructure and trees, mostly in the Western Division. The fisheries sector was also impacted, with the greatest effect on artisanal fisheries and commercial aquaculture. Severe damage to coral reefs is expected, as well as substantial and sustained loss in artisanal fisheries catches for the next decade.

The total value of damage and production losses in agriculture amounts to F$542 million. Recovery needs should focus on supplying emergency inputs that will enable farmers to get back on their feet and promote a more resilient agriculture sector to withstand future shocks. Reconstruction needs will focus on the medium- to long-term infrastructural works and building technical capacity to BBB.

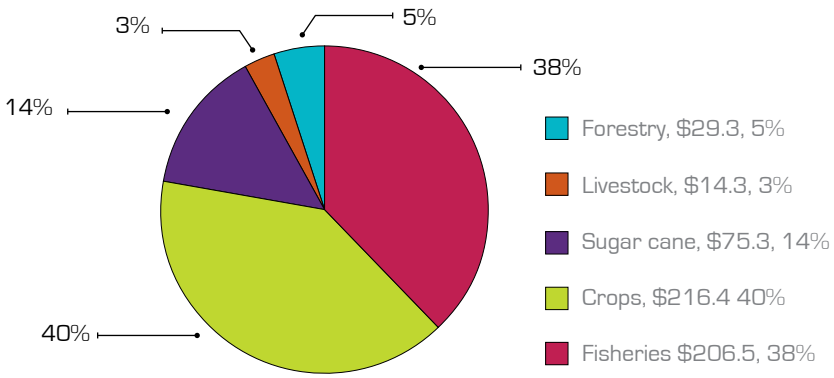


Figure 18: Damage and Losses to Agriculture by Subsector (F$ million)

Source: Estimations by Assessment Team.

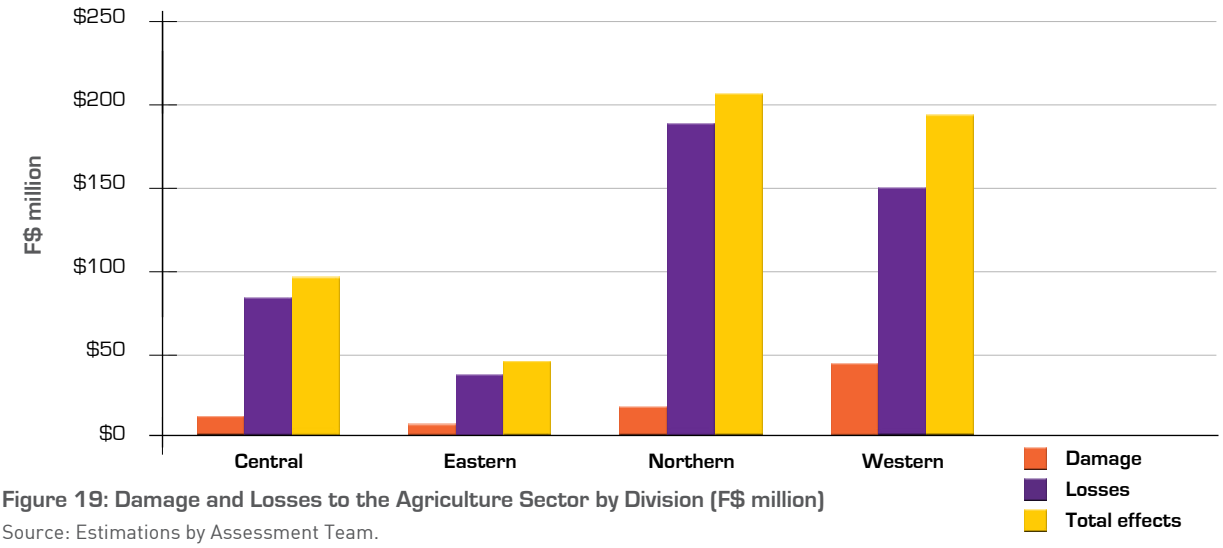


Figure 19: Damage and Losses to the Agriculture Sector by Division (F$ million)

Source: Estimations by Assessment Team.

[45] Sugar cane has a special status and a dedicated ministry in Fiji, which explains why it is considered as a separate subsector in this PDNA, independently from crops.

[46] Based on the latest national accounts data (Macro Division- SPO, 2016). The crops and livestock subsectors are divided into the following components: formal non-government agriculture, subsistence agriculture, informal agriculture and general government agriculture.

[47] EUS 2010-2011.

Agriculture Sector Background

The five subsectors included in the agriculture sector are divided across three ministries: crops and livestock under the Ministry of Agriculture (MoA); sugar cane under the Ministry of Sugar; and fisheries and forestry under the Ministry of Fisheries and Forests.

Crops: The crops subsector represented an average of 57.1 percent of total agricultural GDP (5.4 percent of total GDP). Dominant subsistence crops include taro, cassava, yam, banana, plantain and leafy vegetables. Copra, ginger, taro and Bilateral Quarantine Agreement commodities[48] are the major export crops and an important source of cash income for many rural households. A significant number of farming households derive income from taro, cassava, kava and copra. However, due to transportation and other logistical constraints associated with geographical conditions, remoteness and isolation, many rural households find it difficult to access markets for cash crops.

Sugar Cane: The sugar subsector contributes 8.3 percent of agriculture GDP (GDP 2014) (0.8 percent of total GDP) and provides employment to some 51,000 people. The subsector directly or indirectly supports more than 200,000 people, or nearly one-quarter of the Fijian population, mainly in the Western and Northern Divisions. The sugar industry has been in decline for the past decade and is now half its 2006 production value mainly due to high milling inefficiencies, low farm productivity and high production costs.[49] The industry is at risk of further decline following the expiry of Fiji's preferential access to the European Union's sugar markets in October 2017, further exacerbated by damage and losses caused by TC Winston. A sugar sector revival strategy is currently underway, which focuses on improving on-farm productivity, increasing cane quality, reducing logistics costs, tapping into opportunities for further value addition, and effectively utilizing sugar byproducts.

Flooded Sugar Cane crops in Lomolomo area
Source: Henri Loze/World Bank

Livestock: Livestock production represented an average of 15 percent of total agricultural GDP (1.4 percent of total GDP) between 2011 and 2014. Fiji is self-sufficient in poultry, pigs, poultry meat and eggs. The livestock subsector is dominated by large semi-commercial and commercial pig, dairy, layer and broiler farms. Most beef and sheep production is carried out under subsistence production. Cooperative smallholder milk production involves some 10,000 small dairy herds, operated under semi- or fully commercial conditions. Broiler and layer production are fully commercialized and meet Fiji's demand for poultry, meat and eggs. Subsistence livestock production remains widespread, constituting a small percentage of total livestock output, but providing significant income generation for large numbers of rural households. Although the subsector has been marked by a gradual transformation from subsistence to semi-commercial farming, many rural households continue to raise subsistence-level livestock for food security, extra cash income and meeting customary obligations.

Fisheries: Fisheries represented an average of 11.7 percent of total agricultural GDP (1.1 percent of total GDP). The fisheries subsector includes offshore fisheries, inshore fisheries and aquaculture. Offshore fisheries are a significant contributor to the economy through offshore tuna fishing. Inshore fisheries are dominated by subsistence fishing involving half of rural households.[50] The main aquaculture products include blacklip pearl, tilapia, freshwater prawns, shrimp and seaweed. Bêche-de-mer, giant clam and mud crab are additional products. In recent years, aquaculture has gained more prominence in the fishing sector resulting from the increasing recognition that coastal fisheries resources in Fiji are either fully exploited or significantly over-exploited and further development of coastal fisheries would be unsustainable. The establishment of marine protected areas within the qoliqoli (customary fishing areas) and other marine waters is being promoted to conserve and protect fish stocks to ensure sustainable levels in the future. Also being pursued is the regulation

[48] Fiji exports of fresh agricultural products are governed by the Bilateral Quarantine Agreements (BQA) that have been negotiated on a country to country basis. At present, Fiji has BQAs for fruit fly products such as papaya, mango, eggplant and breadfruit, as well as other fresh exports, such as okra and chiles. A range of frozen and cooked products also have access to export markets, mainly in New Zealand, Australia and the United States.

[49] These include: the low rate of replanting of new sugar cane field; abandonment of existing cane fields; urban migration of cane farmers; rapid labour exit from cane production and slow adoption of labour-saving technologies; nonrenewal of cane leases; and aging cane farmers.

[50] Fiji National Agricultural Census 2009, Department of Agriculture, Economic Planning and Statistics Division Report.

of commercial fishing licenses, replenishment of marine ecosystems, and the introduction of alternative fishing methods, such as the use of fish aggregating devices (FADs) and small-scale fish farming in ponds.

Forestry: Forestry represented an average of 8 percent of total agricultural GDP (0.8 percent of total GDP). Approximately 56 percent of Fiji's land area is forested. The country's forest resources can be grouped into two main classes: native forests of mainly indigenous species; and the man-made forests of exotic softwood and hardwood plantations. Currently, native forests constitute 87 percent of forests, softwood forests around 8 percent and hardwood forests approximately 6 percent.

Assessment of Disaster Effects on the Agriculture Sector (F$542 million)

Damage to assets and production losses were assessed and estimated for the five agricultural subsectors. The total effects of TC Winston on crops, livestock, sugar, fisheries and forestry is F$542 million, of which F$80.3 million is attributable to damage and F$460.7 million is attributable to loss.

Damage to Agriculture Sector (F$81 million)

Crops: The total value of damage in the crops subsector was estimated at F$8.5 million. Most of the damage included the total or partial destruction of nurseries, copra driers, farm roads, public buildings and machinery, and total damage (stock losses) to permanent cash crops, such as coconut, kava, cocoa and sugar cane. Estimates show that damage to the crops subsector represents 11 percent of total damage to the agriculture sector (Table 22). Most of the damage in the crops subsector occurred in the Northern, Eastern and Western Divisions, mainly in the provinces of Cakaudrove, Bua, Lomaiviti, Ba, Lau, specifically Vanua Balavu and surrounding islands.

Sugar Cane: Estimated value of damage to this subsector is F$21.8 million, representing 27 percent of total sector damage. For the sugar cane subsector, damage was mainly sustained to access roads, plants, farm sheds and stores, sea bunds and major drainage systems. Most of the damage occurred in the Western Division, which has the highest sugar cane production.

Livestock: The estimated value of damage to the livestock subsector was F$9.2 million, which represents around 23 percent of total damage to the sector. Fences, livestock and milking sheds, beehives and infrastructure were damaged and animals died. Most of the damage occurred in the Western Division (57 percent), followed by the Central Division (29 percent), Northern Division (8 percent) and Eastern Division (6 percent).

Fisheries: Damage to the fisheries subsector is valued at over F$40.7 million[51], representing 51 percent of total damage to the agriculture sector. The damage assessment covered main fisheries and aquaculture assets, including boats, engines, fishing gear, fish ponds, farm equipment, farm buildings (including sheds and tanks), planting materials, farm stock, hatcheries, fences and fish feed. Ice plants, nurseries, hatcheries, stations and quarters at 13 government stations also sustained damage. The most significantly affected areas were the coastal subsistence fisheries, with a value of F$27.7 million, accounting for about 68 percent of total damage in the subsector. Coastal commercial fisheries sustained damage amounting to F$5.3 million (13 percent), while damage to aquaculture was valued at F$3.7 million (9.5 percent). Out of the 23 existing government stations, 13 of them sustained damage at a cost of F$3.8 million (9.5 percent).

Forestry: The estimated value of damage to the forestry subsector totaled F$1.1 million.[52] The Western Division sustained the most damage, accounting for 59 percent of all damage to the subsector, followed by the Northern Division (27 percent), Central Division (12 percent) and Eastern Division (2 percent). Assets damaged include nurseries, sawmills (static and portable) and a solar kiln. Damage to trees included mature trees in plantations and native forests, with significant damage to pine, teak and mahogany in the Western Division. Significant damage to teak in Ra, mahogany in Ba and pine plantations in the Central, Eastern and Northern Divisions also occurred.

Losses to Agriculture Sector (F$461 million)

Crops: Estimated production losses in the crops subsector was F$207.9 million (Table 22). The cyclone caused significant losses to cash crops (kava, taro and cassava), tree crops (coconut, breadfruits, citrus and cocoa), food gardens and food security crops (kumala, cassava, taro and vegetables). Most of the production losses affected kava (55 percent), a crop that is vulnerable and very fragile to strong winds, followed by taro (13 percent) and coconut (7 percent). Losses in cassava, banana and assorted vegetables accounted for 17 percent of total losses. A major share of the losses occurred in areas badly affected by the cyclone, mainly islands and areas within the provinces of Cakaudrove, Lau, Ba, Ra and the Lomaiviti Group.

[51] Damage and losses to Fiji's lead pearl farm are not included here, but are considered separately in this PDNA under the commerce and industry sector. The farm has significant downstream manufacturing components. Pearl primary production farms, and pearl spat catching operations are considered under fisheries.

[52] This figure is probably underestimated as new reports from the private sector indicate further significant damage in the forestry subsector.

Sugar Cane: Production losses in the sugar cane subsector are approximately F$53.6 million, which represent 12 percent of total sector losses. Most of the losses were sustained in the form of uprooted crops (mainly in the Western Division), higher input costs and lower output prices. The production loss of crops is expected to result in lower sugar production, which will negatively affect revenue and foreign exchange earnings for the current calendar year.

Livestock: Estimated losses to the livestock subsector were F$5.1 million, which represents around 1 percent of total losses to the sector. These include production losses due to the death of animals and decline in meat, honey and milk production. Substantial quantities of fresh milk were lost due to power failures at milk chilling centres, and road blockages by wind-blown debris that prevented milk trucks from collecting milk from these centres. Most of the livestock losses were sustained in the Western Division (61 percent) followed by the Central Division (26 percent), Northern Division (7 percent) and Eastern Division (6 percent).

Fisheries: The fisheries subsector sustained a high value of production losses, at over F$165.9 million. This was the result of extensive damage to fisheries assets and the long-term losses of production capacity of coral reef ecosystems and other fish habitats, which will significantly and durably affect rural marine-based livelihoods. A substantial part of the losses is attributed to subsistence fishing valued at F$119.7 million (72.1 percent) followed by commercial artisanal fisheries valued at F$43.6 million (26.3 percent) and semi-commercial fisheries worth $2.6 million (1.6 percent). It will take an estimated 12 years for subsistence and commercial fisheries to get back to their pre-disaster production levels, provided that sound resource management is applied and no other major natural disaster occurs in the meantime. The aquaculture sector should only take a year or two to be rehabilitated, provided that the necessary resources are identified and deployed to the affected areas.

Forestry: Estimated production losses to the forestry subsector totaled F$28.2 million. Native forests accounted for a substantial portion of total losses (70 percent), while plantation forests (exotic species) accounted for the remaining 30 percent. The Western Division sustained the most losses (62 percent), followed by the Northern Division (28 percent), Central Division (7 percent) and Eastern Division (3 percent). Considerable production losses were recorded with Raintree in Ra, Dakua in Ba and Kaudamu in Bua.

Table 22: Damage and Losses to Agriculture by Subsector (F$ million)

Subsector	Damage	Losses	Total Effects	Private (%)	Public (%)
Crops	8.5	207.9	216.4	99	1
Sugar Cane	21.8	53.6	75.4	70	30
Livestock	9.2	5.1	14.3	98	2
Fisheries	40.7	165.9	206.6	98	2
Forestry	1.1	28.2	29.3	70	30
Sector Total	**81.3**	**460.7**	**542.0**	**93**	**7**

Source: Estimations by Assessment Team.

Table 23: Damage and Losses to Agriculture by Division (F$ million)

Division	Damage	Losses	Total Effects	Private (%)	Public (%)
Central	12.2	83.8	96.0	98	2
Eastern	7.9	37.2	45.1	91	9
Northern	17.4	189.2	206.6	96	4
Western	43.8	150.5	194.3	88	12
Sector Total	**81.3**	**460.7**	**542.0**	**93**	**7**

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses to the Crops, Livestock, Sugar Cane, Fisheries and Forestry Subsectors

The extensive destruction of food crops has seriously affected household income, food security and nutrition, with vegetables and root crop prices having increased significantly since the cyclone. An illustrative case is cassava, a staple food for Fijians, for which prices doubled from F$5 a heap before the cyclone to F$10 after the cyclone. The loss of vegetables and fruits, compounded by a considerable increase in vegetable prices, could place a stress on food budgets for most low-income earning households around Fiji, and make it worse off for those living in areas badly affected by the cyclone. There are also concerns that women, particularly pregnant and lactating women living in rural areas, may not get sufficient access to adequate nutritious food. Production losses are expected to last several years, the time required for fruit

trees to be replanted and begin producing again, and for fisheries catch to recover after fish return to coral reef areas. Thus, rural household income and livelihoods are expected to remain depressed over a long period of time. Households may need: support and food assistance for a longer period of time; to further diversify their activities; or retraining for other skills so other income-generating activities can be undertaken. In addition, retraining in non-traditional and non-farm economies would increase the resilience of women and girls against future disasters.

Subsistence agriculture is an important form of employment and income support for rural communities. The extensive damage sustained by, and projected reduced agricultural output across, the sector will not only impact the economic performance of the country but also has welfare implications on a large number of rural households. It will affect households' ability to provide food security, nutrition and meet familial basic needs, resulting in economic hardship and eroded resilience to future shocks.

From a gender perspective and in economic terms, men overall have sustained the largest damage and production losses through the combined impact on the agriculture sector. Women hold a 33 percent share of the sector,[53] representing approximately F$179 million of the total agricultural damage and losses. However, women's losses have far reaching implications at the household level as their subsistence activities and earnings contribute directly to nutritional security and household economic welfare and foster human welfare. Reduced yield in food crops, and the potential for resulting food insecurity, could put enormous pressure on women to provide food and nutrition. An analysis of the affected crops in the Western Division shows that vegetables were the most affected, making up 24 percent of total crop losses. Damage to vegetables will not only affect direct income to women (as they are largely responsible for cultivating vegetables), but will also affect their ability to provide nutritious food within familial contexts. The loss of livestock will have an additional detrimental impact on income, food security and nutrition. An analysis of livestock indicates that 71 percent of all dead livestock include poultry (excluding commercial poultry), pigs and beehives. As smaller animals are usually under the control of women, total livestock held by women is less than those held by men; nevertheless, smaller livestock are a key source of protein and extra income. These livestock tend to be sold off first as a coping mechanism in times of hardship, further eroding women's asset base and leaving them even more vulnerable to future shocks.

Moreover, efforts to provide food security at the household level, particularly in the context of extensive damage to crops and offshore fisheries, will increase the work burden for women in foraging for food and fishing in mangroves, leaving them little time for other income-generating activities. Due to their productive role, women are dependent on accessible natural resources for alternative income sources. Women particularly rely on non-timber forest products for mat and basket weaving, which have also been heavily affected by the cyclone. All economic activities around *voivoi* (pandanus) have reportedly come to a halt, and women dependent on this plant may be faced with dwindling livelihoods options at a time when they need income the most, thus impeding their recovery.

In fact, the combination of key factors, including lower income, livelihood dependence on subsistence farming, mobility constraints which limit availability and ability to look for other employment opportunities, and increased reproductive responsibilities[54] may increase women's economic hardship and economic dependence on their spouses.

Recovery and Reconstruction Needs for the Agriculture Sector (F$161 million)

The total value of recovery and reconstruction needs for the agriculture sector is estimated at F$161 million, of which F$65 million is required for recovery and F$96 million is required for reconstruction needs.

Implementation of this recovery strategy will maintain and strengthen inclusion, and incorporate clear identification and participation of vulnerable groups, with a focus on gender and age where necessary. It will also include nutrition and food security concerns through the medium and longer term.

Given the loss of income and major food access issues resulting from TC Winston, many small and subsistence farmers are now facing significant hardship. The aims of the recovery and reconstruction efforts in the agriculture sector are primarily to support the re-establishment of food security sources in affected communities, revive economic activity across the sector and strengthen farmers' capacity to be more resilient to similar future shocks in accordance with the principles of BBB. The proposed recovery programmes specifically focus on facilitating access to good quality agricultural inputs, such as seeds, tree seedlings and fingerlings, as well as supporting animal restocking. Reconstruction will be focused on rehabilitating damaged infrastructure, such as roads, drainage administration buildings, equipment and machinery, and other damaged farming assets.

The government instituted recovery programmes immediately after the cyclone in collaboration with the Food Security and Livelihood Cluster (which includes NGOs and UN agencies). Short-, medium- and long-term post-cyclone recovery and reconstruction needs have been identified, some of which are incorporated into the PDNA.

[53] ADB 2015: Fiji Country Gender Assessment.

[54] Women and girls in Fiji are responsible for more than 74 percent of household work compared to 26 percent for men.

Crops and Livestock: In the crops and livestock subsectors, short-term activities will address immediate food security needs by restoring crops and livestock production through land clearance, distribution of agro-inputs (seeds, seedlings, suckers, cuttings and fertilizers) and provision of feeds and fodder, veterinary drugs and day old chicks. Support is also needed with respect to land preparation, clearing existing drainage systems, pasture rehabilitation, providing farm machinery and equipment, and rehabilitating critical transport and infrastructure, such as pasture fencing and livestock. Immediate recovery and reconstruction activities should target the most affected population within government priority areas irrespective of gender or age.

In the medium to long term, further resources would be required for restoring the crop and livestock economy, biosecurity and plant protection monitoring. There is also a medium- to long-term need to improve disaster preparedness in terms of developing solid baseline data, as well as post-disaster assessment, communications, and monitoring and evaluation tools for crops and livestock. Increasing disaster resilience will also be essential through improving land resource management, establishing new drainage systems where required, distributing resilient crops, increasing awareness about traditional disaster management and introducing modern technology where possible, and promoting climate-smart and resilient farming techniques and systems.

Sugar Cane: Recovery and reconstruction for the sugar sector will need to address not only damage and losses to sugar cane growers, but also to the wider industry within which sugar cane production occurs. A number of basic components and infrastructure has been destroyed or compromised, putting at risk long-term safety and operability (for example, the drainage systems). A number of essential services to farmers have been directly constrained since the cyclone, including the near collapse of the entire improved seed cane production system and the redirection of the Sugar Cane Growers Fund resource towards quick emergency loans to farmers. For the sugar cane subsector, recovery and reconstruction will focus on cane production through the production of seedlings and planting of new canes, provision of farmer support services, and capacity building for the Ministry of Sugar and the broader sugar industry. These actions should help bring the industry back to its pre-TC Winston level. Immediate subsector actions should be linked to a longer-term set of actions that need to drive the industry forward, in alignment with the Sugar Action Plan,[55] with an emphasis on the principles of BBB.

Forestry: For the forestry subsector, the short-term focus will primarily be on clearing and salvaging fallen trees from plantation and licensed native forests, which will require acquiring and mobilizing new portable saw mills to support the salvaging process, including trainings. In the medium to long term, the main focus will be on reforestation of plantation and native forests. Starting in the short-term, strengthening nurseries will be required so that replanting programmes can operate smoothly from the medium term onwards.

Fisheries: In the fisheries subsector, the main thrust of short-term needs is to address the food security situation by restoring the flow of fresh fish products from fisheries and aquaculture as quickly as possible. This ranges from the distribution of fishing equipment kits to both licensed and non-licensed fisheries enterprises, to the provision of fish pellet feed to fish farmers so that fish remaining in small-scale ponds can soon be reared to a harvestable size. Resources are required to repair boats and engines, replace missing equipment, and restore damaged or breached ponds for fish restocking. Rapid deployment of FADs in the impact corridor will help provide an alternative livelihood to fishers, and relieve pressure on coral reef fisheries, which suffered ecosystem damage and will be subject to a long recovery time.

Medium-term needs highlight the cost of reconstruction, which is considerable for the private sector. Many boats, engines and fishing gears have been lost, particularly in the non-licensed fisheries sector. Government fishing and aquaculture infrastructure has been severely damaged, with two hatchery facilities (giant clam and tilapia) completely wiped out. Effort should be placed on strengthening the FAD programme in Fiji to maintain and increase FADs as an alternative means of fishing. Long-term surveys of impacted coral reefs will be needed to monitor their recovery, and provide a scientific basis for fisheries management and coastal development. Long-term strategies are needed to increase the visibility of non-licensed fishermen in the economy. Disaster resilience and preparedness of impacted fisheries and aquaculture must be assessed and further strengthened. Fiji's leading aquaculture industry of pearl farming has been particularly hard hit, and merits special attention during post-cyclone recovery efforts.

[55] The Sugar Action Plan is a new comprehensive ten-year action plan (from 2013 to 2022) for the Fijian sugar industry, and is a forward-looking, industry-led and action-oriented framework implemented through a flexible and adaptive approach. The Sugar Action Plan seeks to improve the quantity and quality of sugar cane grown in Fiji, enhance the efficiency of milling operations, diversify revenue streams and implement longer-term restructuring actions related to production unit size, commercialization and industry governance.

Table 24: Total Recovery and Reconstruction Needs for the Agriculture Sector (F$ million)

Subsector	Recovery	Reconstruction	Resilience	Total
Crops	30.3	9.4		39.7
Sugar	12.4	28.7		41.1
Livestock	1.2	9.6		10.8
Fisheries	18.0	47.2		65.2
Forestry	3.4	1.2		4.6
Total	**65.3**	**96.1**		**161.4**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

3.1.2 Commerce and Manufacturing

Summary

The commerce and manufacturing sector contributes close to 24.5 percent of Fiji's GDP. Damage from TC Winston to buildings and production capability has and will continue to affect the sector through increased costs and reduced activity.

Total damage is estimated at F$72.9 million and economic losses are estimated at F$69.9 million, with total effects of F$142.8 million. The majority of the damage and losses were incurred in the Western Division, largely attributed to sugar manufacturing and associated damage and losses. The private sector accounted for around 51 percent of total effects.

The cost of the recovery and reconstruction needs are estimated at F$61.3 million and considerable support to avoid a prolonged reduction in the country's production capacity is required. Reconstruction and recovery will need to rely on a combination of subsidised loans, commercial finance, insurance, grants, private savings and exemptions. The weight given to the respective instruments and their detailed design will be decided upon following further assessment. Development partner support will be necessary, and the financial and insurance sectors must play a proactive role by, for example, processing insurance claims and loan applications in a timely manner.

Table 25: Total Damage and Losses in the Commerce and Manufacturing Sector (F$ million)

	Damage	Losses	Total Effects
Commerce	2.5	8.0	10.5
Manufacturing	70.4	61.9	132.3
Total	**72.9**	**69.9**	**142.8**

Source: Estimations by Assessment Team.

Commerce and Manufacturing Sector Background

As mentioned, commerce and manufacturing accounted for 24.5 percent of GDP in 2014 (F$1,747.5 million). Contributions by subsector are reported in Table 26.

The manufacturing subsector is a major component of the economy, contributing around 13.2 percent of GDP in 2014.[57] The manufacturing subsector in Fiji includes components of food and beverage manufacturing and other manufacturing activities, ranging from cigarettes, apparel, footwear, paper products, plastic and rubber products, furniture, basic metals, coachworks, concrete products, and timber and wood products.

Total employment generated from manufacturing was around 25,000 people in 2012, with women making up 33 percent of the workers.[58] Around 56 percent of the female workers are employed in the textile, clothing and footwear industries.

The commerce subsector contributed 11.3 percent of GDP in 2014. Commerce includes vehicle trade, supermarkets, textile and clothes traders, hardware traders, book traders, fuel and oil traders, and product distributors. The subsector is primarily driven by the sale of motor vehicles and parts, fuel wholesale, hardware, and clothing and textiles. Investment in the commerce subsector stood at F$59.1 million in 2012,[59] during which the sector employed approximately 25,000 people of which 34 percent were female. Fifty-five percent of female workers were employed in the retail sector, in particular household equipment in specialised stores.

[56] Estimate does not include insurance claims, which were not processed at the time of assessment.

[57] 2014 FBOS provisional GDP statistical release (2011 Base). Figures used are nominal GDP estimates.

[58] FBOS Manufacturing sector survey, 2012.

[59] FBOS Wholesale and retail survey, 2012.

Traders return to Rakiraki Market after the cyclone
Source: UN Women/Ellie van Baaren

Table 26: Contribution to GDP by Subsector (F$ million)

	2012	2013	2014
Manufacturing	822.0	892.4	940.2
Commerce Wholesale and Retail Trade	701.0	754.9	807.3
Total in Sector	**1,523.0**	**1,647.3**	**1,747.5**
Total GDP	**7,119.6**	**7,727.7**	**8,552.9**

Source: Fiji National Accounts 2014.

Assessment of Disaster Effects on the Commerce and Manufacturing Sector (F$143 million)

TC Winston brought about the destruction or damage of assets in both the manufacturing and commerce subsectors, including destruction of premises, equipment, machinery, and stocks of raw materials and finished products. In addition, the disaster caused production and sales disruptions derived from activity stoppage caused by the damage to assets and temporary absence of labour and electricity. In addition, because of the disruption to the food production chain, industries and commercial establishments will face future decline in production and sales, arising from production losses in agriculture, livestock and fisheries, which will become evident during harvest time. These subsequent production losses will be sustained in the industrial and commercial enterprises that were damaged and in undamaged entities as well.

In the assessment of disaster effects, damage and losses were estimated through a combined process of field visits and telephone interviews with affected enterprises and analysis of sector specific issues.

Damage (F$73 million) and Losses (F$70 million) to the Commerce and Manufacturing Sector

Commerce: In the wholesale and retail commerce sector, 43 business establishments were partially affected, sustaining damage to buildings, equipment and stocks. A survey that covered enterprises accounting for 36 percent of the total trade sector output found that sales interruptions occurred over an average of four days due to electricity outages and limited road access immediately after the cyclone. Estimates were also made regarding future losses in sales of food products in

the commerce subsector arising from primary losses in the agriculture, livestock and fisheries subsectors. A good number of large retail outlets and the majority of wholesalers surveyed had insurance coverage. Most of the damage occurred in commercial establishments located in the Western and Northern Divisions.

The total value of disaster effects for the commerce sector is estimated as F$10.4 million, of which F$2.5 million refers to the value of destroyed assets, and F$7.9 million represents decline in sales, as shown in Table 27.

Manufacturing: For the manufacturing sector, information was obtained through a sample survey on: the estimated value of destroyed physical assets, including premises, equipment and machinery, stocks of raw materials for processing, and stocks of finished goods; and the value of stoppage or slowdown of production and sales and other operation-related problems (including the absence of electricity and employees). In some cases, businesses underwent higher production costs due to increased transport and electricity costs. Businesses which depended primarily on produce reported significant losses, in particular, in the pearl industry, where the only manufacturer highlighted a limited supply forecast resulting from massive damage to all pearl farms across Fiji. A total of 70 individual manufacturing companies from the Western, Northern and Central Divisions submitted their responses to the survey.

In addition to production losses, a total of 554 short-term job losses in the formal sector was reported in manufacturing companies during the two weeks after the cyclone. The jobs were reinitiated once the electricity supply was fully restored. No employment or livelihood losses were reported in the informal sector.

The sugar milling industry was also heavily affected. Milling facilities located in in the Western Division were significantly damaged, in particular the Penang Mill in Rakiraki, the Rarawai Mill in Ba and the Lautoka Mill. In addition, the rail network for carting cane was damaged. Impact on production due to temporary closure of the Penang Mill, the anticipated shortage of sugar cane, and higher energy and transport costs contributed to the losses. Total damage to sugar manufacturing stands at F$60.2 million and production losses were estimated at F$42.8 million.

In addition, a comprehensive survey conducted by the National Centre for Small and Micro Enterprises Development found that 272 enterprises were affected. In addition, the Ministry of Industry, Trade and Tourism (MITT) conducted a survey revealing that 1,857 clients incurred damage to fixed assets (furniture, fittings, equipment and stock) and production losses. The types of businesses affected included canteens, roadside stalls, market vendors, barbershops, catering, grass cutting and handicrafts. Based on field surveys, an estimated 84 out of the 443 registered communally owned cooperatives also recorded damage and losses.

The total value of disaster effects for the manufacturing subsector are estimated at F$132.4 million, of which F$70.4 million refer to the value of destroyed assets, and F$62.0 million represent the value of production decline, as shown in Table 27.

Table 27: Damage and Losses in Commerce and Manufacturing by Subsector (F$ million)

	Damage			Losses			Total Effects		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Commerce									
Wholesale and retail trade		2.5	2.5		7.9	7.9		10.4	10.4
Manufacturing									
Sugar milling	40.9	19.3	60.2	29.1	13.7	42.8	70.1	33.0	103.1
Processing of non-sugar food and non-food products		6.8	6.8		8.0	8.0		14.7	14.7
Informal sector SME manufacturing		3.4	3.4		11.2	11.2		14.6	14.6
Manufacturing subtotal	40.9	29.5	70.4	29.1	32.9	62.0	70.1	62.3	132.4
Total	**40.9**	**32.0**	**72.9**	**29.1**	**40.8**	**69.9**	**70.1**	**72.7**	**142.8**

Source: Estimations by Assessment Team.

Note: Small and medium enterprises are considered informal sector activities that contribute to the manufacturing sector, as treated in the classification of national accounts for Fiji. Small and medium enterprises and cooperative businesses are considered informal sector activities that contribute to the commerce sector, as treated in the classification of national accounts for Fiji. However, figures on these damage and losses were not readily available at the time of the assessment. They have subsequently been made available and were estimated to total F$2.07 million in damage and F$5.98 million in losses.

Social Impact of Damage and Losses

A significant number of manufacturing and retail operations located in the affected zone reported temporary closure for a few days following TC Winston as a result of intermittent electricity and water supply outages, and the limited accessibility of staff and customers to places of business. Wholesale operators were largely spared as they operate from outside the TC Winston-affected zone. Employees were temporarily laid off and livelihoods impacted as alternative sources of income were limited. Furthermore, most of these workers also suffered damage to their houses and subsistence crops and livestock, which compounded the impact. In particular, survey data collected found a total of 554 short-term jobs in the manufacturing sector were lost within two weeks following the cyclone. In general, for each person who lost a job, at least two to three other people presumably would be affected by this loss in their household. Alternative job opportunities were limited given the broader impact of TC Winston, which would have exacerbated the household-level impact.

Around 43 percent of micro and small enterprises, which contribute to both manufacturing and commerce activities, have suffered extensive damage and losses. Of this, 38 percent are female entrepreneurs who had engaged in some form of business activities. Both women and men have sustained damage to their businesses and will continue to incur losses, particularly losses in food processing enterprises arising from primary production losses sustained in the agriculture sector, and livestock and fisheries subsectors (refer to Section 3.1.1 for more information). As savings are diverted towards meeting basic household needs and home reconstruction, there may not be enough capital available to restore businesses. Similar challenges can be anticipated for cooperatives, which along with micro and small business enterprises, employ a high number of women due to the flexibility and low-entry capital requirements.

Cooperatives are also reportedly sustaining damage to assets and losses in revenue. Some cooperatives provided eco-tourism services and recovery will depend not only on reconstruction of assets but broader recovery in visitor arrivals and the tourism sector. (Refer to Section 3.1.3 of this report for more information on damage and losses to the tourism sector). Recovery for SMEs and cooperatives could be further impeded due to limitations on accessing the loans and micro-finance that may be needed to inject cash into their businesses to help post-disaster recovery. Limited access to loans may be a bigger challenge for women, as they often have difficulty in accessing financial services under ordinary circumstances. Targeted intervention to support cooperatives and SMEs is, therefore, important to ensure women are not left behind in the recovery process. Recovery efforts should focus on facilitating access to soft credit and low interest rates for SMEs. Medium- and long-term skills development and direct access to external markets are also needed for women entrepreneurs to reduce their reliance on local tourist markets and to enhance their resilience against future disasters.

Recovery and Reconstruction Needs for the Commerce and Manufacturing Sector (F$61 million)

Private businesses in the commerce and manufacturing sector have been affected by TC Winston, particularly in terms of sugar manufacturing. The total recovery and reconstruction costs are estimated at F$61.3 million[60] and considerable support to avoid a prolonged reduction in the country's production capacity is needed. Reconstruction and recovery will need to rely on a combination of subsidised loans, commercial finance, insurance, grants, private savings and exemptions. The weight to be given to the respective instruments and their detailed design will be decided upon further assessment. Development partner support will be necessary in most parts. In addtion, the financial and insurance sectors will need to play a proactive role, with, for example, lodging and processing insurance claims in a timely manner.

A number of specific recovery needs have been identified by the sugar stakeholders, in particular, repair of sugar processing equipment and vessels, and electrical and electronic control facilities. Further repairs of roofs, civil works and administrative offices will be carried out in 2017. The Penang Mill may be dismantled and options on a way forward for the mill is yet to be determined. Stoppage of the Penang Mill will have a direct consequence on transport costs to the Fiji Sugar Corporation with an additional F$25/tonne expected to cart cane from from the Penang to the Rarawai Mill in Ba. In addition, railway and road infrastructure for cane delivery requires upgrades.

The short-term support identified by the commerce and manufacturing sector should not deviate attention from pursuing the long-term policy priorities identified by the government for developing these sectors as identified by the National Development Plan, the 2016 National Budget Strategy and the 2015 Trade Policy Framework. Longer-term support directly linked to coping with risk from natural disasters needs to be aligned with the National Development Plan and associated government strategies.

[60] Damage and losses in the sector multiplied by a factor as per the Damage and Loss Assessment methodology and, based on stakeholder consultations, sugar sector specific recovery needs have been incorporated. The BBB principle has been incorporated where appropriate. Estimates do not include insurance claims, which were not processed at the time of the assessment.

Aerial view of damaged Volivoli Beach Resort, Rakiraki
Source: Ministry of Information

Table 28: Total Recovery and Reconstruction Needs for the Commerce and Manufacturing Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Commerce subsector	2.0	0.9		2.9
Manufacturing subsector, excluding sugar	2.0	7.4		9.4
Sugar industry (less insurance)	10.7	31.4		42.1
SMEs	2.6	3.0		5.6
Cooperatives	0.5	0.8		1.3
Total	**17.8**	**43.5**		**61.3**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

3.1.3 Tourism

Summary

While many hotels did suffer major impacts from TC Winston, the cyclone bypassed the tourist hotspots and hit the country during the low tourist season. International flights were reinstated after approximately only two days of disruption and a clear 'business as usual' message was emphasised to the primary tourism markets in the wake of the cyclone. The rapid reaction of tourism providers and the tourism industry in mitigating negative perceptions was key to minimising lost revenue through cancellations. Lessons learned from TC Evan and other disasters had been well implemented by both the tourism sector and responding authorities.

Of an estimated 400 national tourism businesses, at least 75 were significantly damaged. Accommodation providers bore the brunt of the impact, with tour operators reporting little to no damage.[61] Structural damage to hotels and resorts was minimised due to the generally good standards to which they were built, but nevertheless damage of approximately F$76 million was sustained across the four divisions. The majority of damage occurred at a small number of properties, the worst affected being six small, but very exclusive, island properties. These six properties constitute 76 percent of self-reported damage.

[61] A PDNA survey was distributed through the Fiji Hotel and Tourism Association and the Society of Fiji Travel Associates (SOFTA), but no reports were received from SOFTA members by PDNA reporting deadlines. Damage reports have been obtained from 74 accommodation businesses and one tour operator (approximately 50 percent of businesses surveyed). Additional data on tour operators in the affected area was supplied by the environment team.

Businesses are estimated to have lost F$44 million through cancellations and future bookings. Losses due to additional operating costs appear to have been minimal, within the range of F$4 million. TC Winston will reduce visitor numbers by an estimated 3,700, or 0.5 percent, of annual arrivals during 2016, with the majority of the impact in the second quarter of the year.

Given that TC Winston had a limited impact on the national tourism sector, recovery needs are relatively modest. The properties that constitute the majority of damage and losses are believed to be well insured. Based on initial insurance industry estimates and industry self-reporting, between F$12 million and F$29 million in damage and losses are uninsured. Accessing appropriate and affordable insurance products for smaller operators needs to be addressed. A smaller, but nevertheless important, need is to continue the positive messaging regarding Fiji being open for business in 2016.

Tourism Sector Background

Tourism has become a cornerstone of Fiji's socioeconomic development over the past two decades. The sector consists of over 400 hotels, resorts and backpacker accommodations, located mainly around the Western Division islands of Savusavu, Taveuni, Mamanucas and Yasawas.[62] Direct tourism earnings as a percent of nominal GDP was an average of 17.6 percent between 2011 (F$1.28 million) and 2015[63] (F$1.56 billion). Earnings fluctuate throughout the year depending on seasonality of tourist arrivals. The first quarter of the year is the trough season, while the third quarter of the year is the peak season (see Figure 20).

Visitor arrivals increased from 675,050 in 2011 to an estimated all-time high of 754,835 in 2015. Australia, New Zealand and the United States are the three major source markets comprising 48.7 percent, 18.4 percent and 9 percent of total visitor arrivals, respectively, as of 2015. Other markets consisting of mainly China, continental Europe and Canada make up the remaining 23.9 percent.

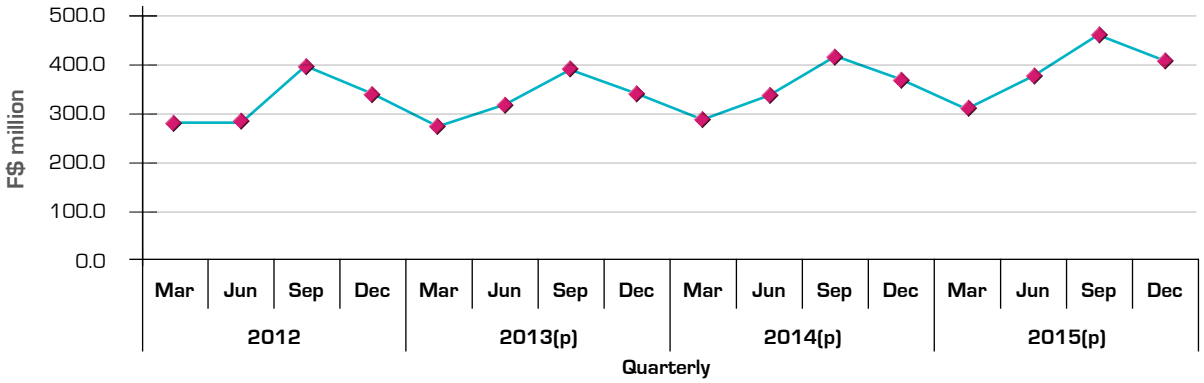


Figure 20: Quarterly Tourism Earnings 2012–2015

Source: Estimations by Assessment Team

Sector growth declined in 2012 and 2013 due to the effects of severe flooding in January 2012 and TC Evan in December 2012, resulting in declining visitor arrivals and relatively stagnant earnings. However, due to swift measures implemented by government and industry stakeholders, record growth was experienced in 2014 and 2015.

Figure 21: Tourism Visitor Arrivals and Earnings for 2011–2015

Source: Estimations by Assessment Team

[62] Hotel Licensing Board Database.

[63] FBOS – Tourism Statistics Year End Release.

The number of rooms available increased from 10,211 in 2011 to 10,422 in 2015. Over the same period, average room occupancy has been 56.1 percent during the third quarter of the year (peak period). Moreover, visitors spent an average of 9.5 days in Fiji as of 2015, spending an estimated F$184.96 per day.

As the sector experienced positive growth, direct tourism employment increased from 11,663 jobs in 2011 to 13,247 in 2015.[64] An estimated 77.7 percent of these jobs are full time employment while 22.3 percent are part time.

Table 29 provides a snapshot of Fiji's tourism sector at the end of 2015 by area. Nadi and the Coral Coast have the largest share in all parameters followed by the Mamanucas and Suva.

Table 29: Baseline Tourism Data for 2015

Division	Area	Rooms Available	Occupancy (%)	Visitor Nights (%)	Hotel Receipts (F$ million)
Central	Suva	1,591	56.1	9.1	$76.3
Western	Nadi	3,513	58.7	35.0	$315.8
	Lautoka	833	39.7	3.9	$46.3
	Coral Coast	1,937	57.4	28.7	$218.2
	Mamanucas	1,424	55.2	19.4	$220.0
Northern	Northern Division	739	28.6	2.7	$63.1
Eastern	Others	385	19.9	1.3	$17.0
Total		**10,422**	**52.5**	**100**	**$956.7**

Source: FBOS Quarterly Tables 1 to 11.

Assessment of Disaster Effects on the Tourism Sector (F$120 million)

TC Winston's track avoided Fiji's most popular and productive tourism regions, but did however cause extensive damage to the infrastructure, facilities and amenities of at least 75 tourism businesses. The majority of those affected are accommodation providers, with almost no impact reported by tour operators. Nadi, Suva and the Coral Coast, which received 72.8 percent of visitors in 2015 (see Table 29), were left relatively unscathed by TC Winston.

In the immediate aftermath of TC Winston, the Tourism Action Group (TAG)[65] implemented a successful strategy based on lessons learned from previous cyclones. Having quickly established the viability of key locations and properties, the priority was to minimise negative reporting on TC Winston's impact on Fiji's (economically critical) tourism sector. International and regional media in core markets were kept updated through all available communication channels. In addition, Tourism Fiji provided messaging to consumers directly through social media.

Flights were reinstated after only two days of cancelled services, and a clear 'business as normal' message was pushed out to core markets, reinforced by discounting some airfares and packages. Furthermore, the ability of the government and TAG to persuade the Australian Department of Trade and Foreign Affairs and the New Zealand Ministry of Foreign Affairs and Trade not to issue travel warnings greatly reduced cancellations both immediately after the event and with regards to future bookings.

Damage to the Tourism Sector (F$76 million)

Across the affected areas, businesses have reported damage to physical assets, equipment and furnishing, without reporting any significant damage to public tourism infrastructure. Most of the damage has been to exteriors, with interior damage resulting from the deterioration of buildings during the storm and consequent water damage that has resulted in the destruction of furnishings and equipment. Significant damage to foliage and landscaping, as well as to coral reefs in the Vatuira Passage, was also reported. The impact on coral reefs and diving sites used by the tourism industry are detailed and needs are addressed through the environment section of this PDNA.

[64] Provisional Hotel and Tourist Accommodation Statistics - Quarterly Release, June 2nd Quarter, FBOS.

[65] The Tourism Action Group is an initiative of partners in the tourism industry urgently activated in the aftermath of TC Winston to reassure and continue to encourage global travellers to come to Fiji. TAG has three key functional arms, including public relations, marketing and finance.

Table 30: Damage and Losses in the Tourism Sector by Division (F$ million)

Division	Damage	Losses	Total Effects
Central	0.8	0.5	1.3
Eastern	6.6	12.9	19.5
Northern	13.0	19.1	32.1
Western	55.8	11.3	67.1
Total	76.1	43.9	120.0

Source: Estimations by Assessment Team.

Losses to the Tourism Sector (F$44 million)

Approximately F$44 million[66] in losses has been estimated for the tourism sector, with F$40 million attributed to revenue loss from cancellations and non-fulfillment of future bookings, and F$4 million attributed to additional costs incurred. The vast majority of revenue losses (F$34 million) are carried by just three exclusive island properties.

The impact on visitor arrivals is estimated to be minimal with a reduction of just over 3,700 visitors during 2016 (around 0.5 percent of arrivals in 2015).

Social Impact of Damage and Losses

Due to the relatively small and localized impact of TC Winston, the impact on employment and incomes is likely to be minimal compared to some of the other sectors considered in this PDNA (i.e., agriculture). According to the MITT survey, the majority of affected businesses are partially damaged and intend to continue operating at reduced capacity or reopen within a couple of months. The handful of businesses that were severely damaged and will remain closed for an extended period have not shared data on staffing or the social impact for communities with which they have links.

While the men's share in Fiji's tourism industry is larger than that of women, the sector offers paid employment to a larger share of women than men; 12.8 percent of women work in the sector, compared to 7.4 percent of men.[67] The economic performance of the sector particularly in terms of recovery is, therefore, important to women's social and economic advancement. While complete data on women's and men's employment in the sector are not available, women are usually employed as housekeepers, receptionists and waitresses. Only one-quarter of managerial and professional positions are held by women.[68]

The employment and livelihoods analysis included in Chapter 2.2 of this PDNA indicates that as a result of TC Winston, women lost an estimated aggregate personal income of about F$7 million, while men lost almost F$10 million. But while men have incurred the larger drop in personal income overall, women were likely more affected by the cyclone, since they comprise a larger proportion of those within the tourism industry who are paid minimum wage. In addition, the reduced operating capacity and temporary closure of some of the hotels may have harmed women more than men, as women are likely be the first to lose their jobs when the sector experiences a downturn. During these times, the tourism sector tends to maintain managerial and technical jobs held by men, while laying off low-skilled women who can be easily replaced.

Tourism also provides an important market for woman-owned micro and small enterprises, such as those selling flowers for hotels, artisanal products, cosmetics for beauty spas and jewelry. According to the ADB,[69] women outnumber men in the crafts market (jewelry, wooden crafts and woven mats), which is highly reliant on the tourist market. Women handcraft groups in Ba in the Western Division have reported that in the aftermath of the cyclone, their daily income from tourists is F$50 to F$140 a day lower than it was before.[70] Although the reduction in tourist numbers is small, it has had, and will continue to have, a negative impact on women's livelihoods until the tourist numbers are restored to pre-cyclone levels.

Recovery and Reconstruction Needs for the Tourism Sector (F$34 million)

Total recovery and reconstruction needs are estimated at F$34 million for the tourism sector, which includes F$29 million for reconstruction and F$5 million for recovery. While a small number of properties suffered extensive damage and losses,

[66] Hotels reported a total loss of F$50 million due to cancellations and loss of future bookings. This has been revised to F$40 million due to the likelihood that a proportion of visitors will rebook at equivalent properties within Fiji.

[67] These figures are based on the analysis of the accommodation and food services subsector by the Fiji Bureau of Statistics; see "FBOS Release No. 94: Provisional Annual Paid Employment 2014," 2015.

[68] Asian Development Bank, "Fiji Country Gender Assessment," 2015.

[69] Ibid.

[70] Figures are based on interviews with 45 members of a women's handcraft group on April 13, 2016, in Visesei Village, Vuda, Ba. The interviews were conducted by the Ministry of Women, Children and Poverty Alleviation along with UN Women, the International Labour Organization and the United Nations Development Programme.

most are insured and the overall economic effects of TC Winston to the tourism sector will be muted. Prior to the cyclone, visitor numbers were predicted to increase in 2016 and the estimated reduction in visitor numbers by 3,700 represents only a 0.5 percent drop in arrivals, which will mainly be felt in the second quarter, after which the majority of affected businesses are expected to be fully operational again with visitor numbers beginning to surpass 2015 arrivals.

Of the 75 businesses reporting to MITT, 49 have either confirmed they hold insurance or have not verified their insurance status.[71] The value of insurance claims received by insurance companies is approximately F$85 million covering both damage and business interruption. These claims have yet to be assessed, but typically about 10 percent of claims are rejected and the settlement process can take 12 months or longer for all claims assuming no litigation. Furthermore, the insured must pay an 'excess,' which is roughly 20 percent of the value of the claims. An estimated F$61 million (assuming 90 percent of claims are settled) to F$68 million (assuming all F$85 million is settled) will be paid out and the insured would pay an excess of F$15 to F$17 million. In addition, 24 businesses have stated that they lack insurance, representing damage and losses of F$12 million.[72] This funding gap of up to F$29 million is the minimum to which additional funding must be added for BBB (see Table 31).

Given the large number of uninsured smaller tourism businesses, discussions will be needed with the tourism sector to establish ways to support the sector in accessing appropriate and affordable risk management products. Import duty waivers could also be considered to assist in reducing the rebuilding cost. Maintaining Fiji's reputation as a safe tourist destination, even during cyclone season, is also important.

Table 31: Damage and Estimated Rebuilding Cost for the Tourism Sector by Division (F$ million)

Division	Damage	Cost to rebuild, incorporating the principles of BBB
Central	0.8	0.9
Eastern	6.6	7.2
Northern	13.0	14.3
Western	55.8	61.4
Total	76.2	83.8

Source: Estimations by Assessment Team.

Table 32: Total Recovery and Reconstruction Needs for the Tourism Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Marketing – immediate info campaign	1.0			1.0
Marketing – destination confidence campaign	2.0			2.0
Reconstruction (F$83.9 million, less F$54.8 million insurance)		29.0		29.0
Import duty waivers for reconstruction materials	2.0			2.0
Short-term technical assistance for review of tourism sector insurance products				0.0
Total	5.0	29.0		34.0

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

3.1.4 Mining Sector

Summary

Although Fiji's mining and quarry industry produces gold, silver, quarrying and groundwater resources, the assessment and analysis undertaken here deal mainly with gold production, which is dominated by the Vatukoula Gold Mines (VGM). Mining is an integral part of Fiji's economy, with gold representing one of the country's largest exports. On average, the mining and quarry sector has accounted for about 1.2 percent of GDP annually since 2011, although the sector experienced a decline in performance in 2012 and 2013 due to underground flooding and low gold ore production. The VGM is one of the country's largest industries and accounts for 3.6 percent of total employment in the Western Division.

[71] This corresponds with 49 claims received by local insurance companies (at the time of reporting).

[72] It was not possible to establish insurance coverage of several hotels.

While other mining prospecting sites exist around the country, the VGM operates within three special mining leases that cover a total area of 1,255 ha. VGM also has the right to explore areas outside the current mining leases via a special lease that covers over 19,000 ha of the surrounding Tavua volcano. Total damage to the sector following TC Winston is estimated at F$11.5 million, and economic losses are estimated at F$20.0 million. Hence, the total effects of TC Winston on the mining and quarry sector are estimated at F$31.5 million. Total recovery needs for the sector total F$11 million, which includes F$5 million in reconstruction needs that can, however, be met by insurance coverage for VGM. About F$6 million is needed to recover lost revenues by VGM.

The industry must focus on an immediate response to urgent needs and must also take steps to achieve and maintain production at a sustainable level. The BBB approach will be incorporated into the medium- and long-term recovery and reconstruction activities to ensure robust industry growth.

Mining Sector Background

Eight mining leases are currently monitored in Fiji, and 78 exploratory licenses have been issued. Mining activities are expected to increase in the near future. Measured in terms of revenue generated through the export of gold and other minerals, VGM dominates the mining and quarry sector. Gold shipped for the month of February 2016 (2,114 oz) was 46 percent lower than for January 2016 (3,913 oz). With the price of gold at US$1,097.40 per ounce, this equals a production loss of F$3.7 million.

Assessment of Disaster Effects on the Mining Sector (F$32 million)

Damage and production losses in the mining sector were predominantly sustained by VGM, both at the underground and surface mining facilities.

Table 33 shows the total value of damage and production losses in the mining sector. Figures for total estimated damage were provided by the Inspectorate Unit and the Environmental Unit of the Mining Division within the Department of Mineral Resources based on their onsite assessment following TC Winston.

Table 33: Quantification of Damage and Losses in the Mining Sector (F$ million)

	Damage	Losses	Total	Private	Public
Mining Industry (Vatukoula Gold Mines, Ltd.)	11.5	20.0	31.5	100	0

Source: Estimation by Assessment Team.

Note: Total estimated loss was based on the assumption that the average gold shipped per week is 1,100 oz at the price of US$1,097.40.

Damage to the Mining Sector (F$12 million)

TC Winston caused significant damage to buildings, infrastructure and other assets at VGM. Most of the damage to the mining and quarry sector involved structural damage to buildings (factory, office and staff quarters), furniture (in offices and staff quarters), communication and technology infrastructure, and machinery. Underground mining areas also suffered extensive damage due to flooding. Overall, the surface facilities were more affected than the underground facilities. Table 34 shows the damage to key assets within the mining industry.

Table 34: Damage to Key Assets in the Mining Sector

	Damage (F$ million)		
	Underground Assets	Surface Assets	Total Damage
Buildings	0	4.8	4.8
Mining area	2.6	0	2.6
Infrastructure	0.3	0.5	0.8
Assets	2.4	1.0	3.4
Total	**5.3**	**6.3**	**11.6**

Source: Estimations by Assessment Team.

Losses to the Mining Sector (F$20 million)

Losses are primarily attributable to loss of earnings, higher operational costs, cleanup costs and lower productivity, which resulted from flooding at the underground mine and led to a decline in gold shipped. Total gold shipped in February 2016, the month of the cyclone, was 2,114 oz, which was 1,799 oz less than the January shipment. Table 35 shows the mining industry's total loss (including gold shipped and earnings) due to low production.

Table 35: Losses in the Mining Sector

	February–March	April–June	Total Effects
Loss in Gold Shipped (oz)	1,522	6,874	8,396
Loss in Earnings (F$ million)	3.7	16.3	20.0

Source: Estimations by Assessment Team.

Note: Some of the costs (losses) to the sector could not be determined at this early stage of assessment. The average gold shipped per week is 1,100 oz. Calculations assume that by July 2016, VGM will be back at full capacity and that the average gold shipped per week is 1,100 oz at the price of US$1,097.40.

Social Impact of Damage and Losses

Despite normal operations at VGM after the cyclone, sector operations were affected by the poor attendance of workers, the majority of whom were affected by the devastating cyclone in some way (such as damage to their homes).

Much of the damage done to buildings posed a risk to the environment. For example, live electrical wires were exposed to rain and sun, and the chemical storage facility was damaged, potentially exposing staff to hazardous chemicals. However, the staff acted quickly to address and mitigate the risks. Structural engineers working within the sector were deployed to the site to undertake the assessment, and the findings formed the basis for the rehabilitation and maintenance works to be undertaken.

Recovery and Reconstruction Needs for the Mining Sector (F$11 million)

Total recovery and reconstruction needs for the mining sector (that is, for VGM) are estimated at F$11 million. Approximately F$6 million is needed to cover costs of operating the mine from February to July 2016, when the industry is expected to be back at full capacity, and includes costs for repairing minor damage, paying wages, etc., without full revenue while there are no gold sales. The remaining F$5 million is required for VGM's first insurance deductible of F$5 million. The assumption is that the insurance company will agree to pay 100 percent of the claim for F$11.5 million (total damage on physical assets).

Table 36 provides the breakdown of recovery needs that must be met to return the industry to full capacity.

Table 36: Total Recovery and Reconstruction Needs for the Mining Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Recovery of lost revenue by increasing gold production (VGM)	6.0			6.0
Maintenance/repair of buildings and infrastructure (Insurance excess)		5.0		5.0
Total	**6.0**	**5.0**		**11.0**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

VGM is expected to fund the majority of reconstruction requirements. However, more funding may be required for additional risk management mechanisms and insurance arrangements, which will take into account cyclone risks and support the industry in BBB. Maintaining well-skilled employees for construction activities is also important.

Children inside a damaged home in Malake Landing, Ra, Viti Levu
Source: Vlad Sokhin/World Bank

3.2 Social Sectors

3.2.1 Education

Summary

TC Winston severely damaged education facilities across Fiji, with damage and losses to the education sector totaling F$77 million.

495 schools were affected with damage to classrooms, staff housing, furniture, educational resources and equipment. The worst affected area was the Western Division, which sustained over 50 percent of total damage and where 61 schools were severely damaged. Private schools and higher education institutions reported no cyclone damage as they are all located in urban areas that were not seriously impacted by TC Winston.

The majority of schools reopened after five to 10 days once debris was cleared and minor repairs were made. Tents were provided as temporary classrooms for schools with significant damage. Only three schools remain closed at the time of this PDNA assessment and they are expected to be rebuilt by the beginning of the 2017 school year. The 859 students and the teachers from these three schools have been relocated to neighbouring schools.

Many school staff and students lost their homes and belongings and entire school communities have been traumatized by the cyclone experience. In spite of this, communities and staff worked together to clear debris and repair classrooms so that school could recommence as quickly as possible.

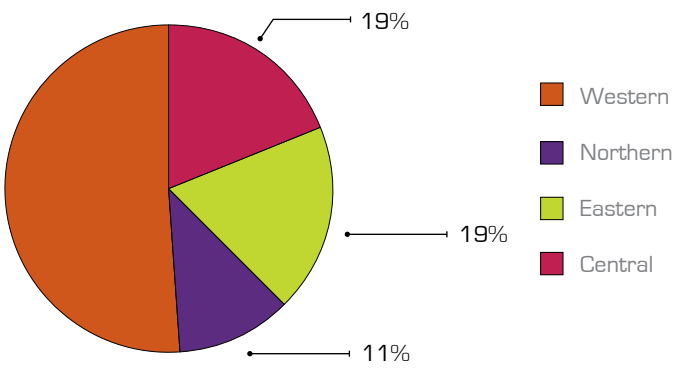


Figure 22: Share of Damage and Losses in the Education Sector by Division

Source: Estimations by Assessment Team.

Qalivakabau District School, Eastern Division
Source: Ministry of Education

Education Sector Background

The education system in Fiji is administered by the Ministry of Education under the Education Act 1978. There are over 1,700 schools in Fiji: 715 early childhood education facilities (42 percent), 731 primary schools (43 percent), 177 secondary schools (10 percent), 75 Technical and Vocational Education Training (TVET) institutions (4 percent) and 17 special education schools (0.9 percent). 97 percent of the schools are faith based and/or community owned and are supported through government grants. The government owns and manages 12 schools, including twelve large secondary schools. The Ministry of Education provides teachers and curriculum for all faith-based, community and government schools. Private schools make up less than 2 percent of the total schools in Fiji.

Table 37: Number of Schools by Division (as of 2014)

Education Level	Central	Western	Northern	Eastern	Total	Percent of Total School Facilities (%)
Early Childhood Education (attached and standalone)	252	267	134	62	715	42
Primary	204	249	163	115	731	43
Secondary	68	58	38	13	177	10
Special Education	7	7	2	1	17	1
Technical Vocation and Training	24	29	14	8	75	4
Total	**555**	**610**	**351**	**199**	**1715**	**100**

Source: MOE.

The government's commitment towards ensuring that all Fijians have access to basic education at all levels remains a priority. In 2014, Fiji achieved universal access to primary education (a Millennium Development Goal target) through various government-implemented policies and initiatives. The Ministry of Education employs 10,411 teachers.

In 2015, the Ministry of Education was allocated a budget of F$398 million to provide quality education to all Fijians. Funding was included for grant assistance for free tuition, bus services and textbooks. Upgrading existing schools and building new facilities are also government priorities.

Assessment of Disaster Effects on the Education Sector (F$77 million)

A total of 495 schools was affected by TC Winston with damage to classrooms, science laboratories, libraries, staff rooms, ablution blocks, teacher housing and the gardens attached to boarding schools.

Damage to the Education Sector (F$70 million)

The education sector suffered damage valued at F$69.2 million, which included damage to buildings, furniture and equipment, and education resources.

172 schools suffered severe structural damage, the majority of which were primary schools, which sustained damage valued between F$0.08 to F$0.79 million per school. Five secondary schools sustained severe damage valued at over F$1 million per school with the Queen Victoria School in Tailevu Province requiring complete reconstruction.

Losses to the Education Sector (F$7 million)

The education sector suffered losses valued at F$7.4 million, including the costs of temporary learning spaces, classroom cleaning, debris removal, transporting students to alternative schools, and counselors to provide psychosocial support to staff and students.

Boarding schools also sustained losses to their school gardens, which produce staple crops and vegetables to feed students. In the worst instances, cassava gardens were completely destroyed and, after replanting, will not be ready for harvesting for another eight to 12 months.

Total damage and losses in the education sector in each of the four divisions are described in Table 38.

Table 38: Damage and Losses in the Education Sector by Division (F$ million)

Division	Damage	Losses	Total Effects	Public (%)	Private (%)
Central	13.0	1.4	14.4	100	0
Eastern	13.6	0.7	14.4	100	0
Northern	7.7	1.0	8.7	100	0
Western	34.8	4.3	39.1	100	0
Total	**69.2**	**7.4**	**76.6**	**100**	**0**

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses

Although most children have returned to school, the impact of TC Winston on the affected population will be significant. Forty-three percent of Fiji's students are enrolled in schools that sustained cyclone damage. Following TC Winston, the Ministry of Education, local communities and development partners, such as the UN Children's Fund (UNICEF), and the Governments of Australia and New Zealand worked together to ensure the distribution of temporary learning facilities to damaged schools. Textbooks and other learning resources were also provided for affected students.

Increased work burdens due to the disaster could have negative consequences for school enrolment and child labour. In particular, concern was expressed that older boys are likely to be absent from school as they assist their families with rebuilding homes and re-establishing livelihoods. Before TC Winston, 9 percent of children were not in school because they were performing household work[73] in families unable to afford school, and data indicate that, in the past, nearly one-third of children who do not attend school (31.9 percent) stayed home because they could not afford it.[74] These numbers could potentially increase as more hands are needed to support domestic work, agricultural work and other livelihood activities. The schooling of girls, in particular, could be affected, given that household activities tend to be performed by females, beginning as young as six years old.[75]

According to reports from the Child Protection Sub-Cluster (part of the Education Cluster), teachers have seen signs of psychological distress in children following the cyclone, and there is a risk that caregivers will resort to negative coping behaviours, which will increase cases of child abuse and neglect. Communities, teachers and students have been traumatized by the experience and many have lost all personal belongings and their homes. Counseling has been provided to 2,341 students and 279 teachers from 91 schools across the country at a cost of F$70,000, but the quality of teaching

[73] FBOS, "The 2010–11 Employment and Unemployment Survey: Preliminary Findings," 2012.

[74] Ibid.

[75] FBOS, "Fiji Women and Men at Work and Leisure: Final Report," 2013.

and learning may be negatively impacted throughout the recovery period. Given what the population experienced during TC Winston and recent floods, and given how common tropical depressions are in the region, children's mental health should be monitored. School programmes should, therefore, continue to provide psychosocial support to children and caregivers in order to reduce the psychological distress brought about by TC Winston and other more localized disaster events.

The school year is 205 days and damaged public schools were closed for between five and 10 days to repair and clean classrooms. The Ministry of Education has reduced each of the term vacations by one week to make up for lost teaching and learning time. In some schools, teachers are offering extra classes before and after school to allow students to catch up. The greatest impact to learning may be felt by secondary students who have lost access to science and computer laboratories. These facilities are costly to rebuild and teachers will struggle to provide adequate lessons while in temporary classrooms.

Recovery and Reconstruction Needs for the Education Sector (F$386 million)

Recovery and reconstruction costs are valued at F$385.9 million, which includes: rebuilding completely damaged schools; repairing and upgrading partially damaged schools; and replacing damaged furniture, equipment, and teaching and learning resources.

Table 39 provides a breakdown of the recovery needs for the following five years.

Table 39: Total Recovery and Reconstruction Needs for the Education Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Travel costs associated with counselling	0.007			0.007
Replacement of education materials		8.3		8.3
Design construction and project management		348.9		348.9
Furniture and equipment		28.7		28.7
Total		**385.9**		**385.9**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

Of the 495 schools impacted by the cyclone, 323 (65 percent) require repairs assessed at less than F$0.8 million to ensure they are at a safe standard for use. The Ministry of Education has instructed these schools to use their school building grants to undertake the repairs, which will cost, in total, F$9.5 million. Priorities will be set for rebuilding the remaining 172 schools that have significant structural damage, with some needing to be completely rebuilt.

The Fiji Institute of Engineers (FIE) has undertaken assessments of the structurally damaged schools and prepared cost estimates for their reconstruction. The extent of damage to school and staff housing highlights issues with building standards and maintenance. The FIE report identifies factors contributing to damage as: (i) lack of periodic maintenance and structural upgrades; (ii) age of buildings; and (iii) poor construction and workmanship. The most common failures with education facilities related to roof cladding and framing. The concrete block structures generally performed better than the timber ones, which often failed from the ground up. The worst affected schools were those in vulnerable locations, such those as close to the coast or in other very exposed positions.

Reconstruction activities will adhere to the BBB principles. The FIE assessment provides intermediate costing to rebuild schools to a "safe school" standard and long-term costing to rebuild to a BBB standard. Adhering to BBB principles will: (i) ensure buildings are designed to resist future disaster damage, including from cyclones, earthquakes, tsunamis, floods and landslides; (ii) meet the needs of a first class education curriculum; (iii) ensure accessibility to people with disabilities; and (iv) include adequate WASH (water, sanitation and hygiene) facilities. Before major reconstruction begins, the Ministry of Education will consider relocating the most vulnerable schools and rationalizing school facilities. Further consultations will be undertaken with government-line ministries on the relocation of schools affected by climate change.

A summary of the intermediate and long-term recovery costs for the 495 schools in the four divisions are in Table 40.

Table 40: Intermediate and Long-Term Reconstruction Costs for the Education Sector (F$ million)

Division	Intermediate Reconstruction Costs	Long-Term Reconstruction Costs	Total
Central	18.9	50.0	68.9
Eastern	20.1	63.7	83.8
Northern	10.6	16.0	26.6
Western	51.3	155.3	206.6
Total	101.0	285.0	385.9

Source: Estimations by Assessment Team.

Adopt a School

As part of the recovery strategy, the government launched the Adopt a School initiative, which will support the reconstruction of around 300 schools. The associated website (www.adoptaschool.gov.fj) provides details of damage and costs for each facility, and allows donors to contribute to the rebuilding and repair of a particular school. The Australian Government, through the Achieving Quality Education Program, has committed to fund the recovery of 26 primary schools located in rural areas across Fiji. Likewise, the Government of New Zealand has adopted schools on the Island of Vanua Balavu, while the Indonesian Government opted to assist the reconstruction works for the Queen Victoria School in Tailevu Province. The Reach for the Future Foundation has also announced it will support six schools across the country.

3.2.2 Health

Summary

Total damage and losses to the health sector as a result of TC Winston are estimated at F$13.9 million. The sector sustained significant damage and losses to facilities in the Central Division (24.3 percent of total damage), Western Division (23.4 percent of total damage) and Eastern Division (22.7 percent of total damage), with minor incidence of damage experienced in the Northern Division (5 percent of total damage). Total damage caused by TC Winston to the health sector is estimated to be approximately F$7.7 million (see Figure 23), with notable damage to infrastructure facilities, which is inclusive of damage associated with water, power and telecommunications. Health sector losses are approximately F$6.2 million inclusive of funds re-diverted for response operations, additional drugs and supplies, additional service delivery costs and psychosocial support. An estimated F$30.9 million will be required for recovery and reconstruction needs and approximately F$59.3 million to improve the health sector's resilience to climate change and natural disasters in the longer term.

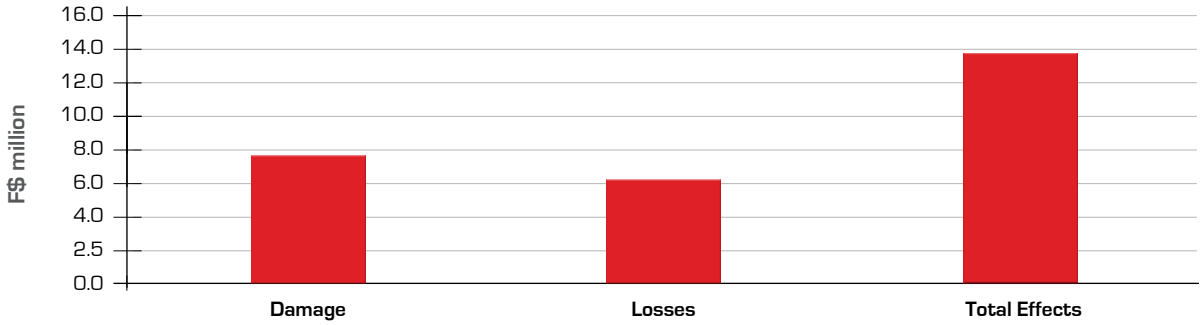


Figure 23: Total Damage and Losses in the Health Sector

Source: Estimations by Assessment Team.

Health Sector Background

The Ministry of Health and Medical Services (MoHMS) is responsible for providing clinical and preventative healthcare services. Clinical services are mainly provided at the hospitals and some health centres, while preventative healthcare services are through preventive care programmes, hospitals, health centres and nursing stations. Healthcare services are implemented through a decentralized health system that caters to integrated health care at the primary, secondary and tertiary care levels. Administration and management of human resources, finance, and drugs and medical supplies are centralized.

The MoHMS provides health services to the entire population of Fiji through hospitals, health centres and nursing stations. Medical Superintendents are responsible for the clinical services in the divisional and specialized hospitals and report to the Deputy Secretary of Hospital Services. Sub-divisional hospitals, health centres and nursing stations are managed by Divisional Medical Officers, who report directly to the Deputy Secretary of Public Health.

Eighteen sub-divisional hospitals also provide primary and secondary level clinical and preventive health services within a designated medical area, which also has health centres and nursing stations within each health facility providing primary healthcare services.

Three hospitals provide specialized health services, namely St. Giles for psychiatry, P.J. Twomey Hospital for tuberculosis and leprosy, and the Tamavua Rehabilitation Centre for restoring good health through therapy. The private sector provision of healthcare services consists mainly of outpatient services through general practitioners, inpatient services primarily through two private hospitals, and the sale of medicine by retail pharmacies. The health sector assessment in this chapter does not include private sector data.

There are approximately 214 health facilities in Fiji (see Table 41) comprising two specialized hospitals/national referral centres, three divisional hospitals, 19 sub-divisional hospitals (Level 1-2[76]), 80 health centres (Level A-C[77]), 107 nursing stations and three private hospitals distributed across all four divisions. Sixty-three health facilities are in the Western Division (the highest of all divisions), followed by 56 in the Eastern Division, 51 in the Central Division and 44 in the Northern Division. About 5,862 staff work in the MoHMS at all levels, including administrative and service delivery.

Table 41: Health Facilities in Fiji

Health Facility	Central	Eastern	Western	Northern	Total
National Referral Centre	2	0	0	0	2
Divisional Hospital	1	0	1	1	3
Sub-Divisional Hospital (Level 1)	0	0	3	1	4
Sub-Divisional Hospital (Level 2)	5	5	3	2	15
Health Centre (Level A)	7	0	4	1	12
Health Centre (Level B)	2	1	6	3	12
Health Centre (Level C)	11	14	17	14	56
Nursing Stations	22	36	28	21	107
Old People's Home	1	0	1	1	3
Total	**51**	**56**	**63**	**44**	**214**

Source: MoHMS.

Assessment of Disaster Effects on the Health Sector (F$14 million)

To measure the impacts of TC Winston, assessments to health facilities were categorized into the following areas to determine:

- damage incurred to infrastructure/buildings, non-medical equipment, drugs and supplies, and medical equipment; and
- losses from additional drugs and supplies, psychosocial support, additional service delivery costs, and operational costs.

Damage to the Health Sector (F$8 million)

Total damage to the health sector was estimated at approximately F$7.7 million (see Table 42). Eighty-eight health facilities sustained some level of damage due to TC Winston, with 40 of them prioritized by the government for immediate repair works. Infrastructure damage costs include damage related to water, power and telecommunications. Damage estimates per facility level were conducted by healthcare workers at each of the respective health facilities, with the exception of three sites (Koro, Nabasovi and Nacamaki), which were assessed by the Ministry of Infrastructure and Transport, and eight sites, which were assessed by the FIE.[78] Total infrastructure damage totaled F$6.9 million,[79] with the Kese, Nasau, Nabasovi, Waimaro, Nanukuloa and Lomaloma health centres badly affected.

[76] Level 1 sub-divisional hospitals cater to →35,000 people, are staffed by general medical practitioners, midwives, nurses and allied health staff, and operate 24/7. Level 2 cater to 15,000-35,000 population, but share resources with some Level C or B health centres.

[77] Level A health centres are located mainly in urban areas with populations of →35,000, staff medical doctors or nurses, and opening hours from 8:00 am to 4:30 pm. Level B heath centres cater to populations of 10,000-20,000, with two nurses, including a nurse practitioner, and may have a doctor. Level C health centres cater to populations of 4,000-9,900, have nurses and may have a doctor, and share resources with Level 2 sub-divisional hospitals.

[78] The FIE conducted assessments of government priority health facilities; however, only eight reports were made available to the sector team to verify and finalize damage and loss data (Namarai, Nanukuloa, Ba Health Centre, Balevu, Dawasamu, Nadrau, RKS and Londoni).

[79] Due to the extensive damage, all the drugs and equipment at these facilities are assumed to have been destroyed.

Losses to the Health Sector (F$6 million)

Total losses for the health sector were estimated to be approximately F$6.2 million (see Table 42). Losses incurred post-TC Winston include psychosocial support and psychological first aid provided by development partners, NGOs and MoHMS to affected population. Retired nurses were reengaged to assist medical teams that provided immediate medical care to affected communities in the aftermath of TC Winston. Losses include: costs associated with additional outreach activities conducted following Winston; and increased operational costs associated with such activities that were calculated as increased expenditure by the health sector during the disaster emergency period.[80]

Approximately F$3.6 million was used by MoHMS to purchase additional drugs and supplies and F$0.3 million for additional service delivery costs. Approximately F$0.7 million was used by the Ministry from its own budget for operational expenses related to TC Winston.

Table 42: Damage and Losses to the Health Sector by Division (F$ million)

	Damage	Losses	Total Effects
Central	2.6	0.8	3.4
Western	2.1	1.2	3.3
Northern	0.4	0.3	0.7
Eastern	2.6	0.5	3.1
Headquarters – MoHMS	0.0	0.1	0.1
National level	0.0	3.4	3.4
Total	**7.7**	**6.3**	**14.0**

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses

The disaster has affected economic and physical access to food. The extensive destruction of agricultural produce could have serious repercussions for food security and nutrition in both the short and long term. Because some of the nutritional impacts may not become evident until the harvest season begins, the government and development partners may be prompted to end food rations prematurely. The assessment of fisheries indicates that fisheries resources may take more than 10 years to recover. This could have serious consequences for nutrition, which is already suffering from the population's increased preference for cheaper but less nutritious foods, such as instant or tinned foods.

Malnutrition usually comes a few months after a disaster has occurred and sometimes even a year later. As families struggle to meet competing basic needs on reduced incomes, some of their coping mechanisms may include reducing the amount and nutritional quality of the food they eat. A focus on restoring homes and livelihoods without a focus on maintaining proper nutritional levels could, therefore, come at the cost of the health of children and pregnant or lactating women. While some households are actually reporting temporary increases in food intake because of food rations being distributed by the government, NGOs and donor partners, households in remote areas (such as Yasawasa and Burewaki villages in the Western and Eastern Divisions, respectively) are already facing food challenges. In Burewaki, women reported that they are only eating twice a day because they lack sufficient food. Furthermore, MoHMS is already recording an increase in malnutrition among children, including on Koro Island.[81] Sustained surveillance of nutrition status among children, pregnant women and lactating mothers is essential. Food supplements (through programmes, such as the Expanded Food Voucher Programme for pregnant women in rural areas) should be provided to pregnant and lactating women in the most affected districts to reduce malnutrition and anaemia, while targeted nutrition programmes for children in areas already reporting malnutrition cases should be increased and scaled up.

Teenage pregnancy is a growing sexual and reproductive health issue in Fiji.[82] Evidence from the 2012 floods suggests that women and girls who lacked access to food were offering sex in exchange for food as a coping mechanism. Anecdotal reports suggest that exchanges of this type are already happening in some parts of Fiji.[83] Reproductive health services and outreach by the government and NGOs should, therefore, be strengthened to provide critical services, including maternal health/family planning, assistance in responding to sexual violence, and adolescent sexual reproductive health services and information.

[80] The reported figures only represent services delivered through the public sector. No data are available for the impact of TC Winston on health services through the private sector, as no requirements exist for private services to report to MoHMS.

[81] Screening has identified 80 cases of moderate acute malnutrition: 33 in Koro, 17 in Taveuni and the rest in other affected areas. It has also identified 28 cases of severe acute malnutrition: 7 in Koro and 9 from Taveuni. Thus, most of the cases detected so far were from Koro and Taveuni.

[82] ADB, "Fiji Country Gender Assessment," 2015.

[83] The inference is based on the Gender Based Violence Subcluster Advocacy Note, "Gender-Based Violence in the Aftermath of the Fiji Tropical Cyclone Winston."

Surveillance of the mental health of affected communities that lack access social workers is also needed. Government and civil society collaboration with and support to churches, which often serve as a spiritual and psychosocial support to community members, may be required. Efforts should also be made to provide confidential counseling for men, who may not seek psychosocial support due to stereotypical ideals of masculinity.

Recovery and Reconstruction Needs for the Health Sector (F$31 million)

In the aftermath of TC Winston, total recovery needs of the health sector are estimated at F$30.9 million in order to ensure that health services are fully operational and able to meet the health care requirements of Fijians.

Total recovery needs are estimated at F$12.1 million. In terms of reconstruction, infrastructure and equipment are the major needs, and will cost approximately F$18.8 million (see Table 43). Forty health facilities have been prioritized as requiring immediate repairs to damaged structures by the MoHMS. Of these, 24 are scheduled for repairs and maintenance works during the next few months, while repair works for the remaining 16 facilities will be carried out in 2017. Ten health facilities affected by TC Winston require immediate relocation because of disaster and climate change threats. Procurement of non-medical equipment (generators) is needed for affected facilities earmarked for relocation, and repairs will also be needed for affected non-medical equipment (solar panels, generators, water pumps, etc.) to replace damaged items.

Table 43: Recovery and Reconstruction Needs for the Health Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Repairs and maintenance		0.9		0.9
Rehabilitation of facilities		0.9		0.9
Reconstruction of facilities		3.6		3.6
Relocation of medical facilities		11.3		11.3
Procurement of non-medical equipment		1.0		1.0
Procurement and repairs of non-medical equipment		0.4		0.4
Replacement for damaged drugs and supplies		0.1		0.1
Medical equipment		0.3		0.3
Cold Chain equipment		0.3		0.3
Drugs and supplies	5.0			5.0
Psychosocial support	1.4			1.4
Additional service delivery costs	4.8			4.8
Operational costs	0.9			0.9
Total	**12.1**	**18.8**		**30.9**

Source: Estimations by Assessment Team.

To address the shortage of medical officers, short-term contracts (one to three month contracts) will continue to be offered to retired nurses immediately following natural disasters to provide support and medical care for those affected. Moreover, to strengthen PDNAs, the MoHMS will have to ensure reliable estimates of damage are conducted/collated using one of two options: (i) a panel of engineers via the Construction Implementation Unit (CIU) within the Ministry of Finance to assess all damage; and (ii) training of staff on using a standard assessment methodology (damage and loss), including basic engineering assessment tools.

Over the longer term, further to the needs listed in Table 43, an estimated F$45.9 million will be required to increase the health sector's resilience to climate change and natural disasters. This includes: retrofitting 133 health facilities, BBB and ensuring they are cyclone proof (cost F$20 million); and immediately relocating 23 health facilities because of disaster and climate change threats (cost F$25.9 million). Partnerships with the private sector, NGOs, and bilateral/multilateral and development partners will facilitate future investment in disaster risk reduction (DRR) measures for the health sector.

Completely destroyed home, Kings Road near Ba town, Viti Levu
Source: Vlad Sokhin/World Bank

3.2.3 Housing

Summary

Prior to the havoc wreaked by TC Winston, Fiji was a relatively well-housed nation in terms of number, size and quality of its housing stock albeit housing conditions lack uniformity across all areas. Around 57 percent of houses consist of reasonably well constructed timber frames with either wood or tin iron cladding, while a further 40 percent are made of concrete/masonry construction. Over the years, the use of traditional bure housing has given way to concrete and fixed timber frame construction, which lends itself to easier fitting of plumbing and electricity supplies. The median floor area of Fiji's houses are large, on the order of 80m^2 (concrete) and 60m^2 (timber frame), reflecting a mature housing stock that has been incrementally consolidated by homeowners over a number of years.

TC Winston destroyed 7.5 percent of the total housing stock and caused major damage to a further 6.3 percent of houses. Total damage to houses, 99.9 percent of which are privately owned, included damage to toilets and showers (wet blocks) and household goods and totaled F$751 million.

The recovery and reconstruction needs are estimated at F$857 million. Total housing reconstruction needs are long term and households, which are largely uninsured, are expected to incrementally rebuild destroyed and damaged houses over the next decade. Under a supported, owner-led reconstruction approach, the government has announced an initial injection of materials grants of up to F$70 million (the Help for Homes initiative). This is for households to construct at least one cyclone-resilient room (starter home) or undertake preliminary roofing repairs along with coordinated and proactive building and social advisory support and training to ensure that houses are repaired and reconstructed to an appropriate, durable standard.

Housing Sector Background

No single public agency in Fiji is responsible for housing, and housing-related legislation is spread over at least 14 separate Acts including, for example, the Town Planning Act, Subdivision of Land Act, Public Health Act, Local Government Act and Fijian Affairs Act, all administered by different ministries. In an attempt to address the risks inherent in this fragmentation, in 2011 the government adopted, for the first time, a National Housing Policy, which aims to provide 'Affordable and Decent Housing for All.' It encompasses an ambitious and broad range of measures to address Fiji's housing challenges, including housing assistance for rural villagers, security of tenure in squatter/informal settlements, coordinated provision of trunk infrastructure to open up new land for housing, rationalizing rents charged by Native Land Owning Units, provision of housing finance and regulatory reforms. Importantly, the policy recognizes housing as a private good and as meeting basic needs, and is a key indicator of social wellbeing. It also strongly endorses the government's move away from direct delivery of housing to involvement in activities that create an enabling environment and to working in partnership with the private sector, NGOs, civil society organizations and communities to address the country's housing needs. The policy not only provides a sound framework for development of the housing sector, but it also contains principles and approaches that would be equally relevant for housing reconstruction following a disaster.

Making use of data available from FBOS[84] and data derived from adjusted modelling undertaken by the 2010 Pacific Catastrophic Risk Assessment and Financing Initiative (PCRAFI), the population of 182,015 households was calculated to be living in a total housing stock of some 146,292 units in 2015, indicating a country-wide occupancy rate of around 1.3 households per building although this was not uniform throughout the country. In a number of provinces in the Northern and Eastern Divisions which are experiencing population out-migration, occupancy rates were below 1, whereas in the faster growing Central and Western Divisions, and particularly in the Suva-Nausori and Nadi-Ba urban corridors, occupancy rates were higher at 1.45 per housing unit, indicating that the supply of affordable housing has not kept up with population growth.[85] In response to unmet demand and opportunities for supplementing household incomes, according to the 2008/2009 HIES, around one in three families in urban areas rented out at least one room in their house and, deriving supplementary income from this activity.

The country's land on which housing is built is codified into three main tenure forms, namely iTaukei (native) land (87 percent), state land (6 percent) and freehold (7 percent). According to the 2011 National Housing Policy, around 63 percent of households lived on freehold or leasehold land and a further 29 percent lived in village settlements where they are afforded secure tenure through their community status (Ministry of Local Government, Urban Development, Housing and Environment, 2011). The high overall security of tenure is reflected in both the quality of the housing stock and median house size. Table 44 shows the wall materials of the pre-Winston housing stock by division.

Table 44: Housing Stock by Type of Wall Material and Distribution by Division

Division	Concrete	Timber frame/ Wood	Timber frame/ Tin iron	*Bure*	Makeshift/ Other	Total No. Units
Central	25,092	12,102	17,676	672	518	56,060
Eastern	2,901	4,691	3,333	207	83	11,215
Northern	2,564	7,122	5,683	539	379	16,287
Western	27,271	9,600	23,660	1,409	790	62,730
Total	**57,828**	**33,515**	**50,352**	**2,827**	**1,770**	**146,292**

Source: MLGHE

The above table indicates that approximately 57 percent of houses consist of reasonably well constructed timber frame with either wood or tin iron cladding, and a further 40 percent of houses are made of concrete/masonry construction. Over the years, the use of traditional bure housing has given way to concrete and fixed timber frame construction, which lends itself to easier fitting of plumbing and electricity supplies. The Fijian vernacular bure house type currently constitutes only 3 percent of the overall housing stock, although accounting for 10 percent of houses in the Northern Division and 7 percent in the Eastern Division. Drawing on the digitized building footprints collated under PCRAFI, the median floor area of Fiji's houses are large, around 80m^2 (concrete) and 60m^2 (timber frame), reflecting a mature housing stock that has been incrementally consolidated by home owners over a number of years. According to a number of construction industry experts consulted during the course of the PDNA, 'like-for-like' house replacement costs would be in the order of F$750/m^2 for concrete houses and F$650/m^2 for timber frame housing, equivalent to a median house value of F$60,000 (concrete) to F$40,000 (timber frame).

However, the housing characteristics for the estimated 15 percent of the population living in some 240 informal settlements (primarily located in and around the Lami-Suva-Nausori and Nadi-Lautoka-Ba urban corridors and in Labasa town) point to less permanent structures. The settlements are far from homogenous, but based on a 2015 survey of 31 informal settlements,[86] only 10 percent of houses were concrete and the remaining 90 percent were timber frame and tin iron of varying construction quality and, in many cases, built using recycled materials. The lower quality overall in comparison to the wider housing stock is likely to reflect variables, such as a higher incidence of poverty found within many informal settlements and uncertainty regarding tenure security, in particular in those settlements located on privately-owned land.[87]

Within the constraints of available statistics, determining the proportion of women headed households who are home or land owners is not possible. While women's participation in most types of economic activities is not restricted in Fiji, iTaukei women have limited rights to inherit customary land or to own immovable property and, similarly, patriarchal inheritance preferences tend to dominate the freehold and leasehold markets. However, under Section 35 of the Bill of Rights in the

[84] FBOS, 2011; FBOS, 2007.

[85] The concentration of the housing deficit in urban rather than rural areas is also reflected in the fact that although urban areas account for 51 percent of the population, they account for only 46.3 percent of the housing stock and, by corollary, the 49 percent of the population which is rural occupies 53.7 percent of the housing stock.

[86] Informal settlement survey carried out by the People's Community Network, November 2015.

[87] Informal settlements have grown on all categories of land in Fiji. The settlements on state land (including settlements established 40 or more years ago) tend to be located within town boundaries; settlements on iTaukei land are found within urban areas and also in less regulated peri-urban areas; and a smaller number of settlements are on freehold land.

2013 Constitution, the State must now "take reasonable measures within its available resources to achieve the progressive realization of the right of every person to accessible and adequate housing and sanitation."

In an effort to assist lower income groups, the Government of Fiji provides subsidized serviced housing lots and mortgage loans[88] for home ownership (Housing Authority of Fiji) or Public Rental Board apartments. A number of privately established and funded social (subsidized) housing schemes exist for the extremely poor and destitute, supported by charitable groups (for example, the Model Towns Charitable Trust), church groups (for example, the Housing Assistance & Relief Trust (HART) and the People's Community Network borne out of the Ecumenical Centre for Research, Education and Advocacy), and NGOs (for example, Habitat for Humanity Fiji). The houses under all these schemes are well constructed from concrete or timber frame/tin iron materials. However, while assisting the housing needs of at least some extremely poor households, as in most countries, the supply of public and social housing has been unable to keep up with demand. The Housing Authority market demand survey in 2013 estimated that demand for units was 18,948, most of which (16,816) were in the Central Division. The Public Rental Board has a waiting list of around 4,600 units. Overall, Fiji's housing stock is largely (90 percent) in private ownership.

Assessment of Disaster Effects on the Housing Sector (F$777 million)

Damage to the Housing Sector (F$751 million)

Following the cyclone, the divisional administrations under the ministries of Agriculture, Local Government, Housing, Environment, Infrastructure and Transport undertook field-based assessments to record the damage to housing in all provinces. The National Disaster Management Office (NDMO) collated the damage information, which was aggregated and reported at the Tikina (local government) level, and reported figures for destroyed and damaged buildings. Using the methodologies described in Annex 5: Supplementary Material for Housing Sector, the pre-event baseline residential building stock (by housing typology) was estimated and the NDMO damage observations were further disaggregated into major damage (loss of roof or more than 40 percent of damage) and minor damage. The damage disaggregation was based on a predictive correlation drawn between the materials used in house construction and wind speed data during the cyclone event (making use of a 'fragility curve') and cross-checked through interpretation of satellite imagery and aerial photographs taken shortly after the cyclone.

Estimated damage to the residential building stock is summarized in Table 45.

Table 45: Damage to the Housing Sector (F$ million)

Total Damage to Housing	Total Damage to Household Goods[89]	Total Damage to Wet Blocks (Toilet/shower)[90]	Total Effects	Private	Public
660.90	53.8	36.2	751.0	750.3	0.7

Source: Estimations by Assessment Team.

Table 46: Value and Number of Houses[91] Destroyed or Damaged by Division

Division	Number of Houses Destroyed or damaged	Disaster Effects (F$ million)						Total
		Destroyed	Major damage	Minor damage	Sub-total	Household goods	Wet block	
Central	2,573	37.6	12.0	6.3	55.8	5.1	3.8	64.7
Eastern	2,235	63.0	6.2	2.7	71.9	7.4	4.6	83.9
Northern	7,670	78.7	44.7	22.3	145.6	10.0	7.5	163.1
Western	17,891	252.8	89.7	45.1	387.6	31.3	20.4	439.3
Total	**30,369**	**432.1**	**152.6**	**76.4**	**660.9**	**53.8**	**36.2**	**751.0**

Source: Estimations by Assessment Team.

[88] Housing finance, in particular mortgage finance, is provided through commercial banks, the Housing Authority, the Home Finance Company and the Fiji National Provident Fund. An estimated 10 percent of the housing stock has been constructed or extended using mortgage finance.

[89] Damage to household goods was estimated for destroyed buildings only.

[90] Damage to wet blocks (toilet/shower units) was conservatively estimated to be equal to destroyed houses.

[91] This includes house that are destroyed, houses that need major repairs and those that need minor repairs in the four divisions.

The housing sector in the Western Division was the most affected with total damage estimated at F$439 million, followed by the Northern and Eastern Divisions, respectively. Damaged houses in the Western Division also include those that were planned and constructed by statutory bodies like the Housing Authority of Fiji, the Public Rental Board and HART. This would account for the F$0.7 million (public) stated in Table 45.

Losses to the Housing Sector (F$26 million)

Both the public and private sectors incurred losses in the housing sector of a combined amount of F$26.4 million. The breakdown of estimated losses are shown in Table 47.

Table 47: Losses in the Housing Sector by Type (F$ million)

Type of Loss	Losses
Total loss of rental income (for single rooms, over 24 month reconstruction period of partial house, at an average monthly rent of F$200[92])	13.9
Cost of demolition and rubble removal to lot boundary	0.6
Cost of temporary housing (evacuation centres, including power, food, land, and water and sanitation)	11.9
Cost of temporary housing (transitional shelters under the State of Emergency period) – met by donors	0.5
Total Estimated Cost of Losses	**26.4**

Source: Estimations by Assessment Team.

In the immediate aftermath of TC Winston, the government opened a total of 758 designated evacuation centres in all four divisions, which, at their peak (February 26, 2016), hosted 62,000 men, women and children. Simultaneously, the government coordinated with a number of relief agencies to distribute tarpaulins, tool kits, food rations and short-term transitional shelters (tents) to all affected villages as temporary shelter relief for people returning to their own homes. The strategy was effective in that within 10 days (by April 6, 2016), the majority of internally displaced people had returned to the sites of their homes and only 14 evacuation centres (in the Western Division) remained open to cater to 223 people.[93] Total costs to the government of this early relief have been met by a budget allocation to the NDMO of F$11.89 million with donor support of in-kind grants.

On returning to their homesteads, families were faced with the enormous task of salvaging materials for repairing and rebuilding their homes, and stockpiling the remaining debris for subsequent collection and safe disposal by the authorities. This stockpiling effort, still underway, is estimated to have cost private households at least F$0.6 million in imputed labour costs to remove construction demolition waste of the 11,030 houses that were completely destroyed, and possibly more if the 18,380 houses that were damaged but reparable are taken into account, assuming not all construction demolition waste can be salvaged for repairs.

The largest loss in the sector is that sustained by private households, who, prior to the cyclone, may have rented out one or more rooms to supplement their household income. Applying figures from the 2008/2009 HIES to the 2014 estimate of housing stock, such rentals were being derived from a total of 38,407 houses. As 7.5 percent of the housing stock was completely destroyed, rental income from at least 2,896 houses where one or more rooms may have been rented out would be lost. At typical informal market rentals of F$200 per month per room, and assuming households take up to 24 months to rebuild (including an additional room for rental purposes), a loss of household income of F$13.9 million is expected.

Social Impact of Damage and Losses

The social and psychological impacts on the affected population, in particular in those villages where all homes were completely destroyed (for example, Koro Island), although difficult to quantify, cannot be overemphasized. One in five households across the entire country (other than the Rotuma and Kadavu Provinces) have experienced total destruction of their houses and most personal belongings, or at least some damage to their houses. As most cannot afford to carry personal or home insurance, households now face the burden of rebuilding themselves, making use of limited personal savings. With continuing inclement weather, especially in the Western Division, news reports have carried stories of people sheltering in caves on higher ground. Safety concerns of women and children have been raised and in some villages, women and children are being provided shelter in churches and with relatives, while housing reconstruction gets underway.

[92] Based on a common practice of a household renting out a single room to a second family/individual. According to the HIES 2008-09, 33% of iTaukei households and 19% of Indo-Fijian households practiced this informal rental.

[93] Shortly thereafter, a number of evacuation centres had to reopen to receive people fleeing the flooding caused by a new cyclone, TC Zena.

Different social groups have been affected in distinct ways by TC Winston. Housing serves different functions for different household members. For example, due to their role in reproductive work and lack of access to jobs in the formal economy, women often derive income in their homes. Men, on the other hand, use homes for resting and recuperating, and their economic activities tend to not be home based. For example in Ra and Tailevu (Western and Central Divisions respectively), most women were engaged in mat and basket weaving at home[94] before the cyclone; however, since the cyclone, their economic activities have come to a halt due to the destruction of houses, kitchens, raw materials and equipment. Destruction of homes could, therefore, have more far-reaching consequences for women than men. Homes are places for nurturing and security for children, and loss of housing is likely to compound the traumatic experience of having endured a Category 5 cyclone (as noted in Chapter 3.2.2 of this PDNA, which considers the effects of TC Winston on the health sector). Housing also offers shelter and security for women and young girls from potential violence. While most families have returned home and are no longer in emergency shelters, many are still seeking shelter with relatives and friends while waiting to rebuild their homes. Therefore, the lack of access to privacy, and cramped living arrangements with extended family and friends, can lead to increased vulnerability for exploitation and put women and girls at a heightened risk of sexual and physical violence.

Such risks are also high for households headed by women who are still living in transitional shelters. Female-headed households make up about 12 percent of all Fijian households. Assuming that approximately 12 percent (or 3,529) of total houses destroyed belong to female-headed households, such households would incur total damage and losses in excess of F$93 million. While female-headed households are usually economically better off than male-headed households,[95] statistics show that female-headed households, where the head is divorced or has never married, have a 71 percent higher poverty rate, making them susceptible to severe disaster impacts, livelihoods stress and poverty.[96] Homes headed by single women are, therefore, more likely to be poorly constructed and maintained and, accordingly, to have sustained extensive damage from TC Winston. Furthermore, households belonging to widows, the elderly, PLWD and single women may also struggle to rebuild their homes due to a lack of physical strength and/or resources to rebuild quickly.

Home reconstruction programmes should prioritize the most vulnerable households to ensure they have access to resources to build their homes. The Help for Homes initiative should ensure that the targeting and verification of beneficiaries reaches the most vulnerable households. The appropriate share of the allocated F$70 million should reach all households that earn less than F$50,000 a year, including single women, divorced women and widows, PLWD and the elderly, as these groups are often among the poorest. The data used by the PBS managed by the Ministry of Women, Children and Poverty Alleviation could be a starting point in identifying the poorest households. Both women and men must also participate and benefit from home reconstruction programmes. As such, training women in masonry skills to support home construction could also assist women, who are underrepresented in the labour force, augment their livelihoods.

Recovery and Reconstruction Needs for the Housing Sector (F$857 million)

Early recovery of Fiji's housing sector began through the efforts of private households assisted by government agencies, the private sector, NGOs and other donors within a week after the cyclone. This included clearing debris in the villages and salvaging materials for housing and other building repairs.

The government established a dedicated CIU in the Ministry of Finance's SPO to coordinate the preparation of a recovery strategy in the housing and other sectors. The CIU has received a wealth of voluntary support from Fiji's private sector, notably from members of the FIE and from NGOs through the Shelter Cluster, providing detailed technical costing and recommendations for the future.

On April 9, 2016, H.E. Prime Minister Frank Bainimarama announced the Help for Homes initiative, which is at the core of the housing reconstruction strategy; an initial amount of F$70 million from the government's 2016 budget was announced at the strategy's launch. The Help for Homes reconstruction strategy recognizes that households are responsible for rebuilding and repairing their own homes. However, in order to 'jump start' private households' resources, the government will provide a construction materials grant to every affected household earning less than F$50,000[97] according to the level of damage. Three grant amounts will be offered as shown in Table 48.

[94] Based on interviews conducted by the Department of Social Protection, ILO, UN Women and UNDP on 13 April 2016.

[95] This is largely due to the fact that most female-headed households are supported by migrant spouses who sent remittances.

[96] Fiji Bureau of Statistic 2011: Republic of Fiji Poverty Trends, Profiles and Small Area Estimation (poverty maps) in Republic of Fiji (2003-2009).

[97] According to the limited available income information (HIES 2008/2009), the average annual income was F$23,000 for urban households and F$11,068 for rural households. Therefore, almost all affected households are expected to be eligible to receive a materials grant.

Table 48: Materials Grant for Different Levels of Damage in the Housing Sector

Level of Damage	Materials Grant Amount (F$)	Purpose
Minor damage to the roof	1,500	Sufficient to jump start partial repairs
Major damage to the roof	3,000	Sufficient to jump start partial repairs
House destroyed	7,000	Sufficient to construct one room (15m^2 floor area) and withstand Category 3 wind speeds

Source: Estimations by Assessment Team.

Following vetting by the Department of Social Welfare, eligible households will be issued e-cards (provided for free by Vodafone Fiji Ltd.) to hold the small grant funds. The e-cards may be used to purchase materials from eligible, pre-qualified (by the Ministry of Finance) materials suppliers. The e-card system is expected to be effective by May 2016 and the first round of grants (up to F$70 million) will close in June 2016.

Owner-led housing reconstruction approaches, similar to the Help for Homes initiative, have been successfully implemented in a number of countries and aim to ensure that limited public funds are spread widely to assist as many affected families as possible. However, in order to be successful, and to ensure that no household is left behind during the reconstruction, house repairs are carried out to an acceptable construction standard and suitable building materials (even where salvaged) are used, the household repairs process must be supported. Ideally and in keeping with a strong rural housing tradition in Fiji, households will initially be encouraged to form 'buddy' groups of five to 10 households to work together to purchase necessary construction materials in bulk and to repair or reconstruct the houses in their group. Furthermore, provincially-based, mobile support units consisting of building advisors and community caseworkers will be fielded (contracted in from the private sector to supplement government staff) to closely monitor progress being made by all households/groups and to provide on the spot design and construct advice and social counseling as needed. There is a need for: the provision of pre-approved model house plans[98] that can be incrementally extended; training of local builders in cyclone-resilient construction; a well-coordinated and ongoing public information and education campaign urging households to make use of sound construction techniques and properly specified building materials; and information regarding where to obtain building and counseling advice throughout the reconstruction. Furthermore, particularly in informal settlements where tenure security is not yet unambiguously recorded, a simple addressing system with occupancy rights may need to be introduced, where appropriate, to underwrite householders' own willingness to invest personal resources into the houses. Overall, approximately 38 percent of building materials will need to be imported; for example, required quantities of suitable treated framing timber is already in short supply.[99]

The government aims to complete the initial phase of Help for Homes recovery within 24 months. These 'softer' support activities should be established as soon as possible and should be fully funded for an initial three years. They should then be funded at a lower level of intensity for an additional two to three years, recognizing that once households have undertaken initial repairs/construction of one room with the Help for Homes materials grants, incremental improvements and additions will continue to be made to the homes over many years by households using only their own resources. Full recovery of the housing sector to pre-Winston levels (particularly in regards to the size of houses) and incrementally strengthening the housing stock for future extreme weather events is likely to take at least a decade to achieve.

The value of the total recovery and reconstruction needs for the housing sector are F$857.3 million. Table 49 provides the breakdown of total recovery needs for the housing sector. More information on how the recovery will make use of the supported owner-group reconstruction approach (Help for Homes) is set out in Annex 5: Supplementary Material for Housing Sector.

Table 49: Total Recovery and Reconstruction Needs for the Housing Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Preparatory work and strengthening the regulatory and technical environment	0.3	19.5		19.8
Design, construction and reconstruction of homes, and replacement of household items		834.1		834.1
Transportation costs		3.4		3.4
Total	**0.3**	**857.0**		**857.3**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

[98] The house plans also should incorporate design features to counter domestic violence risks, for example, two external doors on the main room.

[99] According to one expert opinion, over and above the normal framing timber requirements, the short-term housing reconstruction needs show an immediate shortfall of 10,000 m^3 treated framing timber.

Damaged road on Taveuni Island
Source: Vlad Sokhin/World Bank

3.3 Infrastructure Sectors

3.3.1 Transport

Summary

Total damage and losses to the transport sector, including land, maritime and aviation, are estimated at F$129.5 million, with estimated damage of F$127.1 million and losses of F$2.4 million. The majority of damage is concentrated on land transport assets, where TC Winston caused widespread coastal erosion and bridge and crossing washouts. The islands of Koro and Ovalau (both in the Eastern Division), and Taveuni (in the Northern Division), are among the most heavily affected. The majority of economic losses is a result of longer travel times and higher vehicle operating costs. Total recovery and reconstruction needs have been estimated at F$177.9 million, and are expected to be met through revised government budgets, insurance claims and reorientation of the ongoing ADB/World Bank-financed Transport Infrastructure Investment Project.

Transport Sector Background

Transport infrastructure and services underpin Fiji's economic growth and social development. Rural industries, such as sugar cane farming, forestry and tourism, rely on road access (e.g., from plantations to processing plants). Remote rural and island communities in Fiji depend on rural access roads, rural jetties, and safe and reliable maritime and aviation routes in order to access economic opportunities and social services. Tourism is Fiji's primary foreign exchange earner and relies on safe and efficient mobility, internal freight distribution and, increasingly, port facilities, safe and well-charted shipping lanes, and access to island destinations.

Fiji's topography has restricted the road network to spine or circumferential main roads along the coast with feeder roads, with few alternate routes. In the main urban areas, many lower-level municipal roads have suffered from neglect and are in poor condition. Inter-island freight and passenger transport relies on serviceable coastal and island jetties, adequate navigation aids, domestic airfields, and reliable and safe domestic shipping and aviation services.

The Ministry of Infrastructure and Transport is responsible for the management of policy, administration and regulatory activities of all transport modes. The Fiji Roads Authority (FRA) manages the country's road assets and bridges, as well as the country's wharves and domestic jetties, excluding international ports. Assets managed by the FRA are shown in Table 50. The FRA's funding requirements are currently met by government capital and operating grants, and loan financing. Airports Fiji Limited (AFL) manages international and domestic airfields.

Land Transport: The FRA is currently implementing a project jointly financed by ADB and World Bank loans and has recently implemented several other externally financed projects through the China Export-Import Bank and the Malaysia Export-Import Bank. It has a contract with an international firm to provide engineering services associated with the 10,000

kilometer plus road network, bridges and jetties. Several international contractors as well as an active domestic contractor industry provide construction services.

Maritime Transport: The Maritime Safety Administration of Fiji (MSAF) manages regulation of maritime safety, marine environmental protection, port security, and search and rescue and hydrographical services. MSAF is also responsible for providing navigation aids, including 80 lighthouses and 100 beacons.

Table 50: Fiji Road Authority Assets by Division

Division	Roads (kilometers)			Bridges	Jetties
	Sealed	Unsealed	Total		
Central/Eastern	675	1,681	2,356	427	30
Northern	677	2,406	3,083	440	4
Western	357	1,730	2, 087	384	13
Total	**1, 709**	**5, 817**	**7, 526**	**1,251**	**47**

Source: FRA.

Domestic inter-island shipping services are provided through three main mechanisms: (i) the Government Shipping Services; (ii) the Shipping Franchise Scheme; and (iii) commercial routes. The Government Shipping Services operates a small fleet of vessels, primarily for use by other government departments in servicing development and ongoing work on the outer islands. The Shipping Franchise Scheme provides inter-island shipping services on non-commercial routes, by engaging private operators to service each route for an agreed subsidy that is competitively tendered on a minimum basis for a fixed time period.

Fiji Ports Corporation Limited (FPCL) manages five of the six declared ports of entry in Fiji, and facilitates the provision of port services, including pilotage, tugs and other marine services, at a privately owned port. FPCL is responsible for ensuring the maintenance of safety and environmental standards within each port, and was privatized by the government in 2015.

Aviation: AFL, a state-owned enterprise managed by the Ministry of Public Enterprises, operates airports in Nadi and Nausori, both of which service international and domestic flights, and manages 13 domestic airports on the outer islands. Other private airstrips are owned by hotels and resorts.

Assessment of Disaster Effects on the Transport Sector (F$129 million)

Total damage and production losses sustained by the transport sector are estimated at F$129.5 million. The largest effects were sustained by land transport infrastructure, including roads and associated structures and buildings (F$108.4 million), followed by maritime transport assets (F$17.6 million)[100] and aviation infrastructure (F$3.4 million).

Damage to the Transport Sector (F$127 million)

Total damage sustained by the transport sector is estimated at F$127.1 million. Figure 24 illustrates the distribution of damage sustained by each subsector, while Figure 25 illustrates the breakdown of damage sustained in each division.

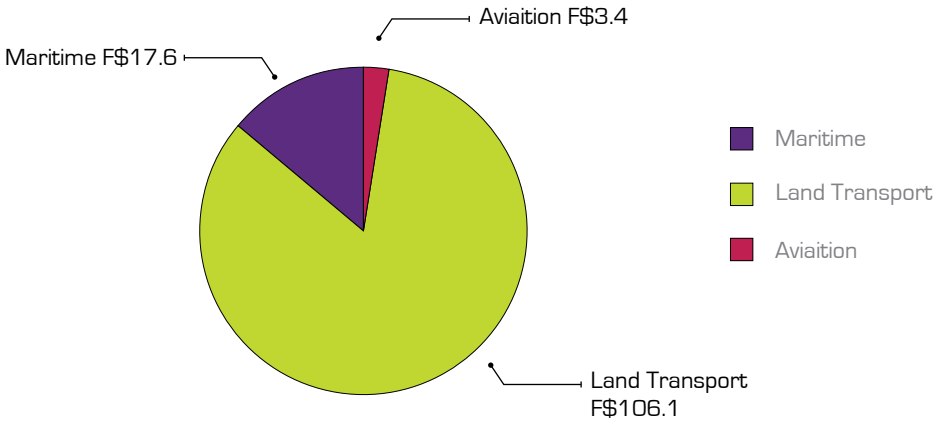


Figure 24: Damage to the Transport Sector by Subsector (F$ million)

Source: Estimations by Assessment Team.

[100] The figure does not include damages to private sector vessels, as damage estimates were obtained too late in the PDNA process to be included

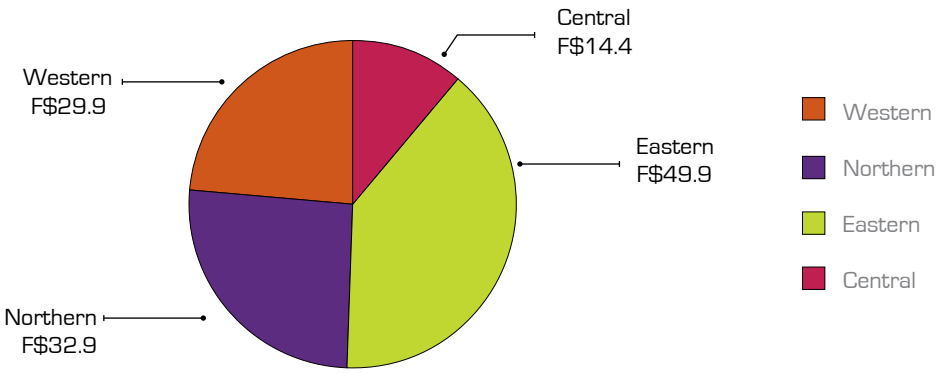


Figure 25: Damage to the Transport Sector by Division (F$ million)
Source: Estimations by Assessment Team

Land Transport: Damaged land transport assets include: roads; bridge approaches, which undermine the structural integrity of bridges; bridges and crossings; seawalls; and associated structures, such as bus shelters, signs, traffic signals and streetlights. A large proportion of this damage is due to seawall erosion caused by the cyclone in affected areas in the Eastern and Northern Divisions, particularly on Koro, Ovalau and Taveuni Islands. In addition, accumulation of debris caused widespread damage and washouts to bridges, crossing structures and their approaches, with the majority of these waterway damage sustained on Viti Levu in both the Central and Western Divisions, and in Taveuni in the Northern Division. The overall extent of the damage to roads may not be fully evident for some time, as water may have penetrated the surface and affected the base and sub-base courses, which could eventually cause some roadway sections to subside.

Maritime Transport: Maritime transport assets damaged by TC Winston include rural jetties, navigation aids, channel markers, lighthouses and international ports, including the associated port terminal buildings. Rural jetties accounted for the largest proportion of damage in the subsector, particularly the Lomaloma jetty at Vanua Balavu in the Eastern Division, which became inaccessible due to severe causeway damage near the jetty head and will require significant rehabilitation. Damage to rural jetties was a result of king tides and heavy swells that mostly eroded the causeway structures.

Aviation: Damaged aviation subsector assets include runways, terminal buildings and security fences at the Nadi, Taveuni and Savusavu airports. Debris on the runways was cleared following the cyclone.

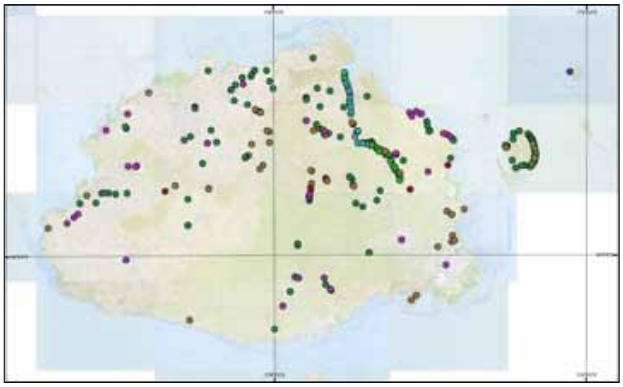


Figure 26: Damage Sites in the Central, Western and Eastern Divisions
Source: Assessment Team.

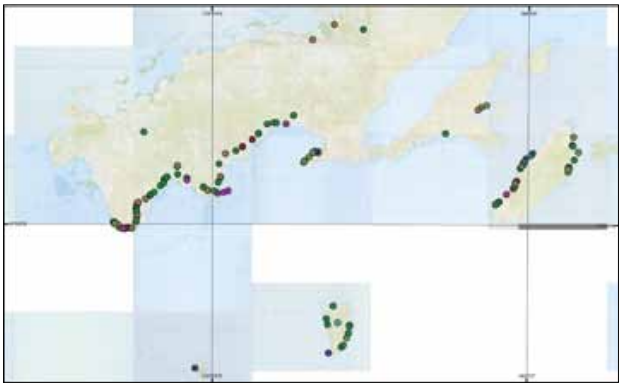


Figure 27: Damage Sites in the Northern and Eastern Divisions
Source: Assessment Team.

Losses to the Transport Sector (F$2 million)

Total losses sustained by the transport sector are estimated at F$2.4 million, with the majority of recorded losses incurred in the land and maritime subsectors.

Land Transport: Total losses sustained to land transport are estimated at F$2.4 million. Losses relate mainly to higher vehicle operating costs and passenger travel times along key national corridors, which were disconnected due to the presence of debris on roads, or bridge washouts and approach scouring. In particular, trip durations increased significantly between Suva-Nadi, Nadi-Lautoka, Lautoka-Rakiraki, Rakiraki-Suva and Labasa-Savusavu, and even doubled along selected sections of roads. The Nadi-Suva and Labasa-Savusavu corridors required up to a week from the disaster to restore normal connectivity, while the remaining sections took up to three weeks.

Maritime Transport: FPCL incurred economic losses resulting from lost rentals from the terminal buildings at the ports in Suva, Lautoka and Levuka, which were all damaged by the disaster. FPCL's revenues also declined following the disaster by providing wharfage concessions for humanitarian relief vessels, with a fixed ceiling on the concession in place.

Aviation: TC Winston resulted in minor losses to the aviation sector due to the cancellation of international flights to and from Fiji.[101] While these economic impacts were not recorded, AFL likely lost revenue from landing fees, but not from cancelled flights in the other 13 outer island domestic airfields, as they do not generate revenue. Losses were also incurred as a result of overtime paid to AFL workers, although these figures were also not recorded as they became available too late in the PDNA process.

Table 51: Damage and Losses in the Transport Sector (F$ million)

	Damage	Loss	Total	Public (%)	Private (%)
Land	106.1	2.4	108.5	98	2
Maritime	17.6	0.04	17.6	95	5
Aviation	3.4	0[a]	3.4	100	0
Total	**127.1**	**2.4**	**129.5**	**98**	**2**

Source: Estimations by Assessment Team.

[a] Losses for aviation were not recorded, although AFL likely lost revenue from landing fees.

Table 52: Damage and Losses in the Transport Sector by Division (F$ million)

Division	Damage	Loss	Total	Public (%)	Private (%)
Central	14.4	1.3	15.7	8	92
Eastern	49.9	0.0	49.9	1	99
Northern	32.9	0.2	33.1	1	99
Western	29.9	0.9	30.8	3	97
Sector Total	**127.1**	**2.4**	**129.5**	**2**	**98**

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses

The social impact of the disaster on the transport sector is significant. People in the affected areas would have experienced difficulty in undertaking travel to fulfill their livelihoods in the wake of the disaster. In addition, damage to vessels operating commercial routes disconnected people from economic opportunities and key social services. For example, the main access corridor linking Lautoka to Rakiraki was affected for up to three weeks, impacting the livelihoods of sugar cane farmers and exporters.

Recovery and Reconstruction Needs in the Transport Sector (F$178 million)

Total recovery needs for the transport sector are estimated at F$3.2 million and total reconstruction needs at F$174.7 million.

Recovery needs include restoration of road connectivity along the main transport corridors between Suva-Nadi, Nadi-Lautoka, Lautoka-Rakiraki, Rakiraki-Suva and Labasa-Savusavu. The road networks were mostly blocked by debris that needed to be cleared by FRA's maintenance contractors. Also, the washed out bridge approach to Yaqara Bridge, a key link between Rakiraki and Suva, requires refilling and connectivity to be restored. The value of this work being undertaken by FRA is estimated at F$2.8 million.

Similarly for AFL, immediate work included clearing debris from the airport runways and repairing security fences in the affected areas of Savusavu, Taveuni and Koro. Expenses have included travel allowances for AFL staff undertaking the repairs.

Reconstruction needs across all three subsectors are estimated at F$174.7 million, with the majority of these needs required for FRA assets. Reconstruction needs were estimated taking BBB into consideration. In particular, higher and longer spans for selected bridges and crossings would allow the flow of debris to prevent washouts in future extreme events. Bridge and crossing approaches should also be repaired with appropriate retaining structures to withstand future floods. Moreover, seawalls need to be rebuilt with stronger foundations to mitigate against further erosion that would affect

[101] On Saturday, February 20, only three Fiji Airways flights departed, and all were cancelled for Sunday. All Virgin and Jet Star flights were cancelled on Saturday and Sunday. Limited flights resumed on Monday and full service was restored on Tuesday.

coastal roads, bridges and rural jetties. Repairing associated facilities, such as bus shelters, signage and streetlights, is also required. To meet these needs, the government is expected to adjust its budget and reorient the ADB/WB-financed Transport Infrastructure Investment Project, which is currently being implemented.

Port and airport building reconstruction is expected to be completed in 2016. The repair of navigation aids by MSAF is expected to be met through its operational budget. MSAF will also continue to implement its maintenance budget to ensure that all navigation aids meet international standards as required by the International Association of Lighthouse Authorities.

Table 53: Total Recovery and Reconstruction Needs for the Transport Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Road	2.8	131.2	0.0	134.0
Maritime	0.3	37.0	0.0	37.3
Aviation	0.1	6.5	0.0	6.6
Total	**3.2**	**174.7**	**0.0**	**177.9**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

3.3.2 Water and Sanitation

This sector includes consideration of water, sanitation and solid waste. Total damage and loss incurred as a result of TC Winston in the water and sanitation sector is estimated to be F$24.8 million, consisting of F$16.9 million in damage and F$7.9 million in losses. Total recovery and reconstruction needs are estimated to be F$24.3 million. Geographical distributions are shown in Figure 28, with the breakdown by division in Figure 29.

Topics proposed for the recovery strategy are BBB for water and sanitation infrastructure and strengthening monitoring mechanisms, including the role of the Ministry of Infrastructure for monitoring rural water schemes and enhancing water quality testing capacities of drinking water treatment plants.

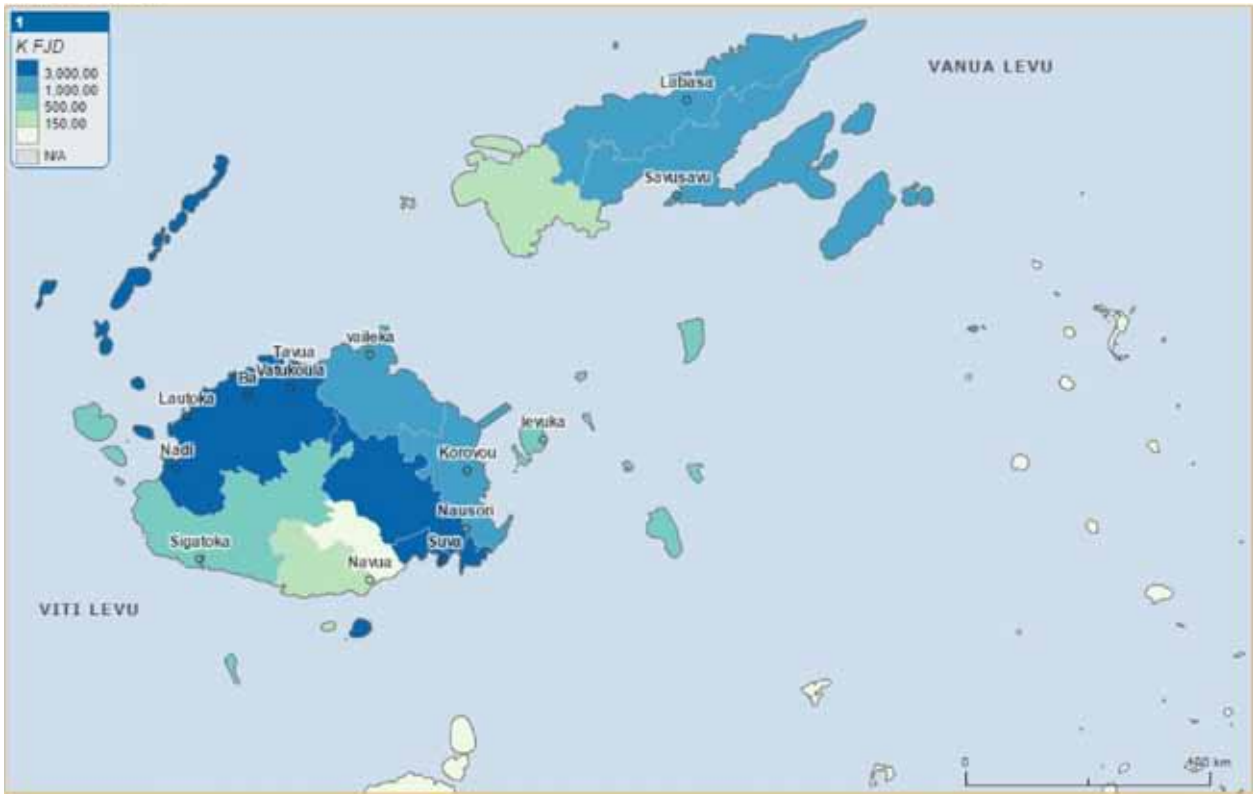


Figure 28: Geographical Distribution of Recovery and Reconstruction (F$ million)

Source: Estimations by Assessment Team.

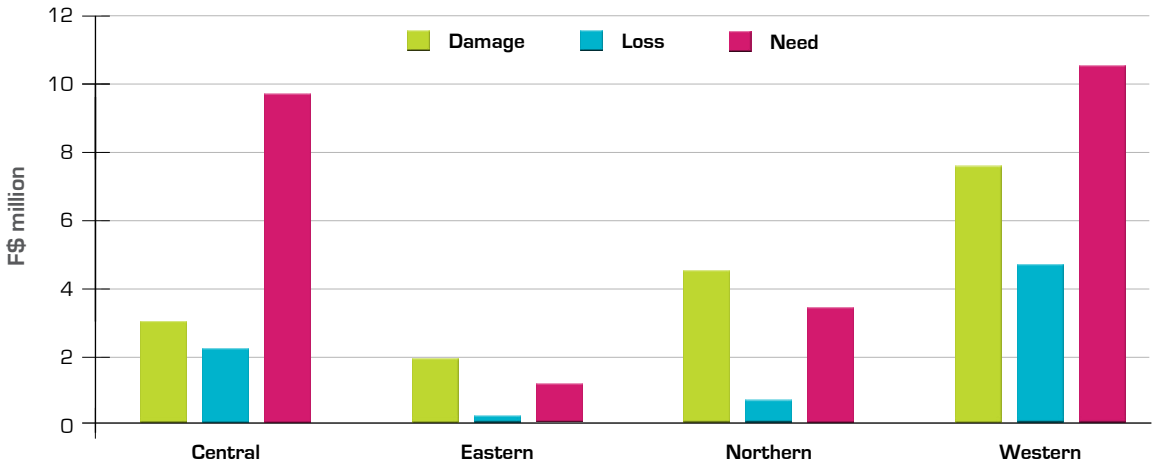


Figure 29: Damage, Losses and Needs by Division

Source: Estimations by Assessment Team.

Water, Sanitation and Solid Waste Sector Background

The 2013 Fiji Constitution guarantees the right of all people to adequate clean and safe water and sanitation, with legislative or procedural frameworks covering water and sanitation already in place.[102]

Water: Urban water supply and sanitation is managed by the Water Authority of Fiji (WAF) and regulated by the Department of Water and Sewerage, within the Ministry of Infrastructure and Transport. Water quality is monitored by the MoHMS. Rural water schemes are administered by WAF with regulation and technical oversight by the Ministry of Infrastructure and Transport, while operation and management is carried out by local communities. Over 2,500 rural water schemes exist.[103] WAF is a commercial statutory authority and provides water supply services to approximately 151,000 accounts. The non-revenue water (i.e., due to system leakage, etc.) accounted for 35-45 percent of total production as of December 2015. Approximately F$110 million is spent annually to upgrade water and sewerage infrastructure in urban systems. Enhanced asset management, including inspection and maintenance, is needed.

Sanitation: Eleven urban sewerage systems exist and are managed by WAF. However, the majority of urban and rural customers are not connected to formal sewerage systems and rely on onsite wastewater management facilities, such as septic tanks, which they construct and manage themselves. A number of private sector companies provide septic tank bailing services on a user pay basis; however, their services do not extend to the rural villages. Insufficient infrastructure and maintenance for rural onsite wastewater systems poses both health and environmental risks.

Solid Waste: Urban solid waste collection in Fiji is managed by respective city councils with regulation by the Ministry of Infrastructure and Transport. The annual weight of urban waste generated was approximately 315,000 tons as of 2015 and annual disposal costs were estimated at F$7.9 million. No formal system exists for rural solid waste collection and disposal. The annual weight of rural waste generated was estimated at 78,300 tons leading to indirect disposal costs of F$6.5 million. Table 54 provides an overview of existing infrastructure for the water and sanitation sector.

Table 54: Water- and Sanitation-Related Infrastructure (number of facilities)

Existing Infrastructure	Division				Total
	Central	Eastern	Northern	Western	
Intakes	12	13	22	17	64
Treatment Plants	8	6	19	11	44
Reservoirs	32	24	31	34	121
Distribution Network	7	7	4	7	25
Drinking Water Pumping Stations	17		14	17	48
Drinking Water Pumps	72		23	39	134
Rural Water Schemes	435	393	1,109	621	2,558

[102] The Public Health Act (1936), Environmental Management Act (2005), Green Growth Framework (2014), Water Supply Act (1955, ed. 1985), River and Streams Act (1882, ed. 1985), Town Planning Act (1946, ed. 1978), Water Authority of Fiji Promulgation (2007), Rural Water and Sanitation Policy (2012), Water and Sewerage Act (currently being developed), Fiji National Drinking Water Quality Standards, rural water schemes?

[103] Other water uses are managed respectively by the MOA for irrigation, Fiji Energy Authority for hydroelectricity, operation and management by municipalities, Public Works Department for construction, operation and management of urban drainage, MOA (limited areas) and Fiji Roads Authority (limited areas) for flood control.

Existing Infrastructure	Division				Total
	Central	Eastern	Northern	Western	
Ecological Purification Systems	12	2	14	14	42
Wastewater Treatment Plants	6		1	4	11
Wastewater Pumping Stations	98		16	58	172
Wastewater Pumps	218		32	122	372
Urban Waste Management Schemes	4	3	2	4	13

Source: WAF.

Assessment of Disaster Effects on the Water and Sanitation Sector (F$25 million)

Damage to the Water and Sanitation Sector (F$17 million)

The total damage to the water and sanitation sector was estimated to be F$16.9 million.

Water: WAF services were severely affected by debris, strong winds, rainfall and surface flooding, storm surges and system failures due to power outages. 532 rural water schemes were also affected with damaged pipes and restricted access to clean water sources. Damage to WAF assets included:

- Blocked surface water intake facilities due to debris from flooding;
- Physical damage to structures, including roofs and water tanks; and
- Physical damage to networks, including submerged piping washed away by flooding.

Sanitation: Damage to wastewater management and sanitary facilities, such as toilet and household septic tanks, affected approximately 20,500 households. Damage to WAF sanitation assets included tearing of liners of wastewater treatment lagoons, and damage to pumping station equipment and property.

Solid Waste: According to the Ministry of Local Government, Housing, Environment, Infrastructure and Transport, no damage to solid waste-related infrastructure occurred.

Losses to the Water and Sanitation Sector (F$8 million)

Water and Sanitation: Losses to the sector are derived from higher operating costs and lower operational revenues. WAF mobilized power generators to operate pumping stations where possible, and, in other cases, provided water carting services and bailing until water supply systems were operational. As a result, WAF incurred significant unanticipated costs amounting to an estimated F$4.4 million for emergency purchasing of generators, hiring water trucks, hiring wastewater bailing trucks and paying staff overtime. In addition, the estimated revenue loss due to water supplies reaching fewer customers was F$0.06 million.

Solid Waste: According to data obtained from the Ministry of Infrastructure and Transport, an estimated 31,300 tons of waste was disposed in urban waste management systems, including 102 tons of food, which was condemned by municipal sanitary health inspectors as unfit for consumption following power interruption. Organic waste (e.g., coconut fronds, tree branches, etc.) was carted to disposal sites or, in the case of the Suva City Council, composted in parks for reuse. Local governments provided free service to pick up solid waste from individual properties and public areas, with assistance from the Fiji Military Force, Fiji Corrections Service and the National Fire Authority. The cost for disposing waste in landfills was estimated at F$0.8 million, and extra operation costs for hiring waste collection vehicles amounted to F$1.4 million. The rural waste that was generated was estimated to be 15,700 tons, and indirect management costs were estimated at F$1.3 million.

The cost of waste collection and disposal was partly covered by municipal contingency funds, which are F$0.1 million each. This funding is allocated each year and redistributed at the end of the year when there are no contingencies.

Table 55: Damage and Losses in the Water and Sanitation Sector by Subsector (F$ million)

Subsector	Damage	Losses	Total Effects
Water	16.5	3.9	20.4
Sanitation	0.4	0.5	0.9
Solid waste	0.0	3.5	3.5
Total	**16.9**	**7.9**	**24.8**

Source: Estimations by Assessment Team.

Table 56: Damage and Losses in the Water and Sanitation Sector by Division (F$ million)

Division	Damage	Losses	Total Effects
Central	2.9	2.3	5.2
Eastern	1.9	0.2	2.1
Northern	4.5	0.7	5.2
Western	7.6	4.7	12.3
Total	**16.9**	**7.9**	**24.8**

Source: Estimations by Assessment Team.

Table 57: Damage and Losses in the Water and Sanitation Sector by Ownership (F$ million)

	Private	Public	Total
Damage	0.0	16.9	16.9
Loss	0.1	7.8	7.9
Total	**0.1**	**24.7**	**24.8**

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses

Anecdotal information relates to water transportation over longer distances.[104] The humanitarian response WASH Cluster distributed supplies (e.g., purification tablets and hygiene kits) to 24,000 people. The WAF network experienced power outages, which affected the water supply and wastewater systems. Increased risks and vulnerabilities from the disaster included public health concerns due to the existence of solid waste in public and private areas. The municipalities addressed this by increasing operational costs and, accordingly, all the excess waste was collected by March 31.

Restoring access to the water supply and sanitation services is critical to reducing public health and safety risks, particularly for women and girls, who are largely responsible for household water security and sanitation. Thus, water supply disruptions caused by TC Winston disproportionately impacted on women and girls who had to spend more time fetching clean water, especially in the days immediately following the cyclone. For example:

- In Burewai village in Tailevu Province (Central Division), women reported spending three hours a day fetching enough water to meet their daily requirements.
- Some women and girls are commuting to neighbouring villages to obtain water from those who still have running water.
- The Ministry of Women, Children and Poverty Alleviation reported that in Rakiraki in the Western Division, women identified water storage and access to clean water as a priority that must still be addressed.

Limited access to water combined with disruptions to the electricity supply in some affected areas also means that the time required to do laundry has increased from about 30 minutes to three hours. In areas where the water supply remains disrupted, the ability of women and girls to engage in other productive and income-generating activities has been curtailed.

Even in places where water is being supplied, the amount provided is less than the normal household daily intake before the cyclone. This decreased supply could compromise the ability of households to manage their waste needs and could lead to a deterioration in sanitary conditions, especially in light of continued rains.

Lack of proper sanitation and access to clean water poses a health threat to women and girls, in particular, given their role in providing water and ensuring water security. In general, reduced water quantity and quality in response to reduced water supply could create health problems for women and children under five.

The Damage to WASH facilities, lack of privacy and segregated facilities, and poor light resulting from TC Winston could increase the risk of sexual and gender-based violence (SGBV) to women and girls. As most of the rural water supply is through rural water schemes, enabling communities to restore their water supply should be prioritized in order to reduce the burden that women and girls are currently facing in securing household water and maintaining good sanitary conditions.

[104] An attempt at estimating rural loss is as follows, but is not included in the overall figures of this report: extra water bought or transported longer distances for communities not covered by urban or rural water schemes – F$0.9 million; and increased costs due to insufficient disposal of liquid and solid waste – F$0.8 million.

Recovery and Reconstruction Needs for the Water and Sanitation Sector (F$24 million)

Total recovery costs are estimated at F$3.6 million, and total reconstruction costs in 2016 and 2017 are estimated at F$20.7 million with details shown in Table 58. Specific needs raised by city councils include paving access roads to landfill sites and construction of transfer stations.

The recovery strategy needs to be aligned with existing development frameworks, such as the Fiji Green Growth Framework. It also must adhere to the principles of BBB and advocate and strengthen resilience in water and sanitation systems to ensure communities have access to reliable and safe water supply and sanitation services at all times. Strengthening the engagement of rural village committees and leaders in WASH systems is also an area requiring further support through relevant government authorities and partners. The amount and restrictions around the municipal contingency funding scheme should be reviewed on a medium-term basis.

Table 58: Total Recovery and Reconstruction Needs for the Water and Sanitation Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Repair and reconstruction of WAF assets		16.43		16.43
Repair or buy new water storage tanks, fees for carting, water monitoring and testing, rural water schemes	1.11	3.50		4.61
Urban waste disposal costs, upgrade waste water treatment plants (add mechanical screens)	2.20	0.11		2.31
Purchase generator sets	0.25			0.25
Strengthen institutional capacity in sector, including provision of experienced advisor with technical expertise of water treatment in the strategic planning department in WAF, review of tariff, preparation of water and waste management plans	0.04	0.01		0.05
Pave access road to landfills		0.23		0.23
Build transfer stations for solid waste		0.40		0.40
Total	**3.6**	**20.7**		**24.3**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

3.3.3 Electricity

Summary

Following TC Winston, the power supply was disrupted to all FEA customers. Full reconnection is anticipated by June or July 2016. An estimated 1,500 residential customers whose homes were destroyed are expected to be reconnected progressively over the next 12 months as reconstruction proceeds. TC Winston caused significant damage to the distribution grid and somewhat lower levels of damage to power generation and transmission infrastructures.

Damage to the Department of Energy's (DoE) rural power generation assets was significant, with approximately 54 diesel mini-grids and 609 solar home systems affected.

Total damage and loss in the electricity sector is estimated at F$41.1 million, consisting of F$33 million for the replacement of damaged power sector infrastructure and F$8.1 million in losses to FEA, mainly from loss of revenue.

Electricity Sector Background

FEA is a government-owned statutory agency that is responsible for the generation, transmission, distribution and retail sale of electricity in Fiji. It operates four separate power grids on Viti Levu, Vanua Levu (Labasa and Savusavu) and Ovalau, and produces electricity from a mix of diesel, hydropower and wind. During the 12-month period from January 2015 to December 2015, FEA generated 892,045MWh (megawatt hours) of energy with system losses (both technical and nontechnical)[105] of 9.65 percent. Over the same period, FEA had total electricity sales revenue of F$312 million. A summary of baseline power assets is presented in Table 59.

[105] Technical losses are physical losses (e.g., thermal losses), while nontechnical losses are those that FEA incurs through meter fraud, illicit connections, etc.

Damaged power lines on Kings Road near Rakiraki, Ra Province, Viti Levu
Source: Vlad Sokhin/World Bank

DoE provides power to a number of rural areas either through diesel-based mini-grids or solar home systems.

- *Diesel-based mini-grids* are installed by DoE and progressively transferred to community ownership. Since 1976, DoE has installed approximately 419 diesel-based mini-grids in rural areas, most of which have been transferred to local communities for operation and maintenance.
- *Solar home systems for rural households* are owned by DoE and are rented to the households for a fee. DoE supplies approximately 4,534 solar home systems to rural households.

Table 59: Baseline Assets in the Power Sector, January 2016

Site	Generation
Hydropower Generation (FEA)	
Monasavu Hydropower – Viti Levu	72MW
Nadarivatu Hydropower – Viti Levu	40MW
Wainikasou Hydropower – Viti Levu	6MW
Nagado Hydropower – Viti Levu	1MW
Wainiqeu Hydropower - Vanua Levu	0.8MW
Diesel Generation (FEA)	
Kinoya Power Station – Viti Levu	40MW
New Kinoya Power Station – Viti Levu	30MW
Rokobili Power Station – Viti Levu	12.8MW
Deuba Power Station – Viti Levu	3.3MW
Sigatoka Power Station – Viti Levu	9MW
Qeleloa Power Station – Viti Levu	6.2MW
Nadi Power Station – Viti Levu	7.6MW
Vuda Power Station – Viti Levu	20MW
Rakiraki Power Station – Viti Levu	1.6MW
Korovou Power Station – Viti Levu	0.4MW
Levuka Power Station – Ovalau	2.3MW

Site	Generation
Labasa Power Station – Vanua Levu	10.7MW
Savusavu Power Station – Vanua Levu	3.7MW
Renewable Energy (FEA)	
Butoni Wind Farm	9.90MW
Total installed capacity	277.25MW
Transmission (FEA)	
132kV line	147.2km
33kV line	453.4km
Distribution (FEA)	
11kV and 415/220V line	9,129km
Rural Electrification (DoE)	
Solar household systems	4,534 systems
Diesel mini-grids	419 systems

Source: Fiji Electrical Authority.
MW = megawatt; kV = kilovolt.

Assessment of Disaster Effects on the Electricity Sector (F$41 million)

Damage to the Electricity Sector (F$33 million)

Total damage to the electricity sector is estimated to be F$33 million, and includes damage to FEA generation, transmission, distribution, communication, retail assets and buildings, as well as to DoE rural power systems.

Major damage to FEA power sector assets occurred in the Western and Eastern Divisions. DoE rural power sector assets were mostly affected in the Eastern, Western and Northern Divisions. A summary of damage to assets by division is presented in Table 60.

Table 60: Damage to the Power Sector by Division (percent of assets damaged)

	Central	Eastern	Western	Northern
FEA generation, transmission and communication	0	15	15	0
FEA distribution lines (11kV and 415/240V)	30	80	75	30
Rural solar home systems (DoE managed)	n/a	17	53	20
Rural diesel grids (DoE/Community managed)	n/a	22	2	8

Source: Fiji Electricity Authority; Department of Energy.
kV = kilovolt; n/a = not applicable (no assets in this region).

FEA Generation Assets: As a result of TC Winston, buildings at six of FEA's 15 power generation plants suffered minor structural damage, and generators at three power plants suffered water damage. Emergency repairs were completed and full generation capacity was restored within one week of the cyclone, except at the Nadarivatu Power Station, which was switched on after four weeks. Although the Nadarivatu Power Station did not sustain any damage, one of the towers on the main transmission line fell and temporary repairs were required before power could be restored. Medium-term repairs will be required on the power plant structures following the emergency phase.

FEA Transmission Assets: Damage was sustained to both the 132kV (kilovolt) transmission line network and the 33kV subtransmission line network, predominantly in the Western Division. All transmission assets were operational by March 20, 2016, although some works were temporary and will require medium- to long-term investments for full rehabilitation.

FEA Distribution Assets: The major impact to FEA's infrastructure was to distribution assets. An estimated 4,000km (41 percent of FEA's total distribution assets) were damaged by TC Winston. FEA line crews, international line crews and Fiji contractors have been working to repair and restore connections to priority areas. Within four weeks of the disaster, 82 percent of damaged distribution assets were restored in the Central Division, 40 percent were restored in the Western Division, 9 percent were restored in the Eastern Division and 100 percent were restored in the Northern Division. For customers whose houses were not destroyed, full restoration and connection is anticipated by June or July 2016. For the estimated 1,500 residential customers whose houses were destroyed, reconnection will take place progressively over

the next 12 months as reconstruction proceeds. In addition, the FEA communications network also sustained significant damage to assets, including to fibre-optic cables, repeater sites and roof-mounted antennas in substations.

DoE Rural Power Systems: Approximately 54 rural diesel mini-grids were damaged and 609 solar home systems were destroyed. Reconstruction of diesel mini-grids and solar assets had not yet commenced when this PDNA was prepared.

Cost estimates for damage are detailed in Table 61.

Table 61: Estimated Cost of Damage in the Power Sector by Asset (F$)

Asset (type of damage)	Cost estimate
FEA Generation Assets	
Wailoa Power Station (water damage)	60,000
Vuda Power Station (building structure and generators)	40,000
Levuka Power Station (building structure and generators)	130,000
Nadarivatu Camp Site (building structures)	1,300,000
Nagado Power Station (building structure and generators)	25,000
Rakiraki Power Station (building structure and generators)	65,000
FEA Transmission Assets (33kV, 132kV)	
132kV transmission networks	4,800,000
33kV transmission	300,000
Zone substations and switching stations (building structures, fences and switchyard structures)	985,000
FEA Distribution Assets (11kV/6.6kV/415V)	
Central Division	2,000,000
Eastern Division	600,000
Western Division	14,000,000
Northern Division	600,000
FEA Retail Assets	
Customer electricity meters	200,000
FEA Communications and Network	
Fibre-optic communications network and repeater stations	2,000,000
FEA Buildings and Fleet	
Property	70,000
DoE Power Systems	
Diesel mini-grids (54 systems)	4,202,000
Solar installations (609 systems)	1,589,000
Total (F$ million)	**33.0**

Source: Fiji Electricity Authority; Department of Energy.

Losses to the Electricity Sector (F$8 million)

TC Winston disrupted all of FEA's power systems on Saturday, February 20, 2016. Electricity supply restoration commenced on Sunday, February 21. Power was restored to an estimated 1.55 percent of FEA's customers within 24 hours, and within four weeks, an estimated 90.1 percent of the pre-cyclone demand was being supplied to the grid. Full reconnection to customers is anticipated by June or July 2016. Losses to FEA and DoE from TC Winston include:

- Reduced revenue from the disconnection of customers between February 20, 2016 and June or July 2016 (when full reconnection is anticipated) due to damage to the electricity distribution network.
- Higher operational costs from temporary reliance in the Western Division on diesel generation between February 20, 2016, and March 30, 2016.

Total FEA and DoE losses are estimated at F$8.1 million. A breakdown of the losses is presented in Table 62.

Table 62: Estimated Losses in the Electricity Sector (F$)

	Cost Estimate
FEA loss of revenue from disconnected customers	3,530,479
Medium-term loss of revenue from an estimated 1,500 customers whose houses have been destroyed	40,000
Higher operational costs from temporary reliance on diesel backup	4,500,000
DoE loss of revenue from solar home systems	50,000
Total	8,120,479

Source: Fiji Electricity Authority; Department of Energy.

Social Impact of Damage and Losses

In light of the increasing use of firewood, especially in rural areas (where firewood is used by 77 percent of the population),[106] the abundance of firewood left by the cyclone (from downed trees) probably represents a gain for households. For women, who typically are responsible for gathering firewood, the cyclone reduced the time needed for that chore. (Women who were interviewed confirmed this benefit.) However, the impact of the cyclone on electricity supply has substantially increased the amount of time women spend doing laundry, both in rural and urban settings. In some areas, women will continue to face these challenges until mid-year, when FEA anticipates full reconnection at the household level. Baseline data on washing machine use at the household level suggest a washing machine penetration rate of 70 percent.[107] Because washing must now be done manually, time allocated for laundry has increased from about 30 minutes a week to around three hours a week. Lack of electricity combined with disruptions in water supply has increased the domestic work burden and left women with very limited time for income-generating activities.

In addition to affecting women's household burden, lack of electricity also affects women's opportunities for social and economic advancement. Electricity provides the mechanical power that women use for agricultural food processing, cooking, lighting, refrigeration, communications and commercial enterprises, while minimising the time expended on domestic work. Electricity supply disruptions have, therefore, undermined women's ability to derive livelihoods that depend on electricity (for example, rural economic activities, such as virgin coconut oil production).

Less visible perhaps is the impact of electricity on women's and girls' safety and sense of security. Following TC Winston, women and girls reported feeling insecure about going to sleep at night.[108] Lighting is a good deterrent to violence and its absence could put women at heightened risk.

Speedy restoration of electricity is essential for the return of power-dependent livelihoods and safety. In terms of helping communities prepare for future cyclones, training men and women in securing their solar panels and equipment ahead of impending cyclones would be beneficial.

Recovery and Reconstruction Needs for the Electricity Sector (F$34 million)

Total recovery and reconstruction costs for the electricity sector have been estimated at F$33.8 million (Table 63). Recovery needs include:

- The cost of short-term works to re-establish the electricity supply to the entire country;
- Non-urgent, medium-term reconstruction works; and
- Medium-term disaster resilience design of key infrastructure assets.

Table 63: Total Recovery and Reconstruction Needs for the Electricity Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Generation		1.8		1.8
Transmission		6.7		6.7
Distribution and Retail		17.4		17.4
Communications	2.0			2.0

[106] Fiji Bureau of Statistics, Household Income and Employment Survey, 2008/2009.

[107] Between 2002 and 2008, household-level washing machine usage increased from 15 percent to 31 percent. Assuming the same rate of increase, household-level washing machine usage is now at 70 percent.

[108] "Fiji Gender Based Violence Sub-Cluster Key Advocacy Note," April 9, 2016.

	Recovery	Reconstruction	Resilience	Total
Property	0.1			0.1
Rural Mini Grids and Stand-Alone Solar Systems			5.8	5.8
Total	**2.1**	**25.9**	**5.8**	**33.8**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

Disaster Resilience in the Power Sector

In order to improve system resilience, FEA and DoE will increase the cyclone design specification rating for key assets during medium-term reconstruction, which will include increased ratings for 132kV lattice towers, distribution lines, power plant housing structures and solar systems.

Undergrounding key sub-transmission and distribution lines is one approach to improving resilience to cyclone events. FEA and DoE have already implemented this practice where deemed feasible. Currently, FEA has the following underground reticulation:

- Sub-transmission lines (33kV): 17.7 percent (80.10km of the total 453.41km).
- Distribution lines (11kV and 415/240V): 8.7 percent (794.493km of the total 9,128.938km).

Reconstruction following TC Winston will not include any additional immediate undergrounding of sub-transmission and distribution assets. However, FEA and DoE will continue to include undergrounding in future development plans to maximise system resilience.

Examples of other opportunities to strengthen the resilience of diesel systems could include consideration of the following:

- Damage to certain components of rural diesel schemes could be avoided by moving powerhouses to higher ground, which could prevent damage to the powerhouses themselves and guard against the inundation of diesel generators. However, this approach will require longer mains cables from the powerhouses and, hence, will incur a greater initial cost. Burying cables from generation sources (diesel or solar) will also increase costs.
- Rehabilitation of damaged diesel schemes presents the opportunity to transition to diesel/renewable hybrid systems. The design of renewable plant components would need to be engineered for Category 5 winds as these systems are more exposed than traditional diesel schemes. Solar components mounted on structures would need to be easily dismountable for safe storage (like the FEA wind turbines in Butoni, Sigatoka, which are lowered and secured in the event of a cyclone warning).

3.3.4 Communications

Summary

Total damage and loss to the communication sector following TC Winston totaled around F$53.2 million, with the worst impacts occurring in the Western, Eastern and Northern Divisions. While overall impact in the Central Division was minimal, damage were sustained to key infrastructure connecting central Viti Levu with Vanua Levu and the Eastern Division, which resulted in significant service disruption and network downtime throughout these areas. There was minimal damage to postal services, while communications networks experienced the worst damage across the sector. Transmission towers in Koro, Vanua Balavu, Taveuni and parts of western Viti Levu were partly or totally destroyed, and transmission equipment in all four divisions was affected, resulting in a temporary loss of cellular, fixed-line, radio and TV services. Damage sustained in the worst-affected areas is expected to result in fixed-line, cellular and broadcast service disruptions until June or July 2016.

Total losses throughout all four divisions are estimated at F$22 million, are the result of main network disruptions due to power outages and include additional operating costs (fuel for generators, logistics, personnel, etc.) for temporary system repair and restoration. An estimated F$48.8 million is needed for the full recovery and reconstruction of the sector. While the majority of this amount will be privately funded, the government is also willing to assist the private sector in BBB, particularly for critical infrastructure that connects urban areas with rural and remote areas.

Communications Sector Background

The contribution of the communications sector toward GDP averaged 6.4 percent from 2007 to 2014. Deregulation in 2008 paved the way for increased competition, reduced prices and significant growth in the sector. Currently, wired and

Damage to South Ridge communications tower on Viti Levu
Source: Chris Wensley/ADB

wireless networks cover approximately 95 percent of the population. Due to improved network coverage and competitive pricing, mobile phone subscriptions have increased by 7.9 percent annually from 2007 to 2015, with the total number of subscribers reaching 965,950 by the end of the period. Landline usage has fallen in recent years as mobile phone usage has grown, and fixed telephone subscriptions per 100 people fell from 14.6 in 2007 to 8.4 in 2014. Household penetration of Internet broadband increased from 7.1 percent in 2007 to 30.7 percent in 2014, while the percent of individuals with Internet access rose from 10.9 percent to 41.8 percent over the same period, with 36.7 percent of households owning computers. Household expenditures on communications have risen steadily over the last decade. The proportion of household nonfood expenditure on communications rose from 4.3 percent in 2002/2003 to 5.4 percent in 2008/2009, reflecting the rapid rise in the number of mobile subscribers and the increasing importance of communications in the lives of all Fijians.[109]

Fiji's communications sector comprises a mix of public and private corporations, including: Telecom Fiji Limited (TFL), which is the sole provider of local and long-distance fixed-line telephone services; Fiji International Telecommunications; two mobile service operators, Vodafone and Digicel (which also offer mobile Internet services); two broadband service providers (Connect and Unwired); and a number of information and communication technology (ICT) support services. Private broadcasters include Communications Fiji Ltd., MaiTV and Fiji TV, with Fiji Broadcasting Corporation Ltd., the sole state-owned broadcaster. Government direct investment in the sector includes the establishment of 26 Government Community Telecentres that enable remote communities to access educational resources, information, public services, and business products and services on the Internet. Post Fiji Ltd., a state-owned enterprise, provides national letter and parcel services, and several national and international companies provide courier services.

The domestic ICT infrastructure includes extensive copper and fibre-optic cable networks that cover most urban and rural areas in Viti Levu and Vanua Levu, although some places remain without telecommunications coverage. Both TFL and FEA have invested substantially in underground fibre-optic cable networks. Mobile network operators rely largely on radio communications between cell towers and base stations, and approximately 1,399 base stations are located throughout Fiji. Table 64 shows the pre-disaster asset valuation for the sector.

[109] Data are from the Fiji Bureau of Statistics.

Table 64: Pre-Disaster Asset Valuation of the Communications Sector (F$ million)

Items	Postal services	Land-based systems	Cellular systems	Other systems	Total
Land	0.0	9.0	1.4	5.2	15.6
Nonresidential building	6.1	6.4	0.0	0.0	12.5
Residential building	0.0	0.2	1.7	4.8	6.7
Plant and machinery	0.4	96.2	146.5	36.6	279.7
Furniture, fixtures and office equipment	0.2	1.2	8.6	1.0	11.0
Other office equipment	0.3	0.0	0.0	0.1	0.4
ICT equipment	0.0	4.3	84.4	5.0	93.7
Transport vehicles and related equipment	0.3	0.1	1.4	0.5	2.3
Research and development	0.0	0.0	0.0	0.0	0.0
Valuables (antiques, original art, precious metals, etc.)	0.0	0.0	0.0	0.0	0.0
Other (subscriber, trunk exchange, exchange plant, intangibles, access, etc.)	0.0	3.1	0.0	0.0	3.1
Total	7.3	120.5	244.0	53.2	425.0

Source: Fiji Bureau of Statistics (adjusted to 2015 values).

Assessment of Disaster Effects on the Communications Sector (F$53 million)

Damage to the Communications Sector (F$31 million)

Postal, land-based, cellular and broadcast services were all disrupted by the cyclone, because both infrastructure was damaged and electricity was knocked out (damage and losses to the energy sector are discussed in Chapter 3.3.3 of this PDNA). Total damage to postal services was minimal, consisting mostly of damage to premises, equipment, parcels and supplies in the Suva, Nabouwalu, Koro and Lomaloma post offices. Damage to land-based systems affected approximately 8,000 customers, mainly in the Western and Eastern Divisions. Major damage to the sector was estimated at F$31.2 million, and comprised of costs for restoring services, infrastructure and equipment.

In the Central Division, considerable damage was done to the South Ridge broadcast tower, which is owned by TFL and leased to broadcast and mobile operators. The tower provides a vital link to Vanua Levu, which accounts for about 30 percent of Fiji's economic activity. TFL sustained massive infrastructure damage, mostly in the north of Viti Levu (particularly the towers and radios linking Suva to Rakiraki and Lautoka via the South Ridge), and in the Northern and Eastern Divisions. As TFL lacks a complete fibre network around Viti Levu, damage to its towers and antennas disrupted the entire network from Viti Levu to Vanua Levu.

Damage to cellular/mobile networks occurred in the Eastern, Central and Western Divisions. In Koro, Taveuni and Vanua Balavu in the east, and the Yasawa Islands in the west, critical link towers collapsed and ancillary equipment was damaged. Many of the damaged towers remain standing, but a significant number of dishes and other radio equipment were lost. Voice linkages have been restored, but data coverage remains limited.

Losses to the Communications Sector (F$22 million)

The telecommunications sector sustained around F$22 million in losses throughout all four divisions. These losses were the result of: main network disruptions due to electricity outages; additional operating costs relating to extra fuel for generators and to the transportation (helicopters, boats and personnel) involved in restoring and maintaining systems prior to reconstruction; and temporary facilities such as temporary towers and masts. For land-based systems, losses of approximately F$4 million are estimated for this year. Although cellular-based systems suffered initial loss of service and customer revenue for one to two weeks following the cyclone, the customer base has largely been restored.

Table 65: Damage and Losses to the Communications Sector (F$ million)

Items	Postal Services	Land-based Systems	Cellular Systems	Other Systems	Totals
Damage					
Buildings, furnishings, plant and equipment	0.29	3.10	7.38	0.44	11.21
ICT equipment, lines, antennas, towers and ancillary equipment	0.04	2.80	10.79	1.43	15.06
Transport vehicles and related equipment	0.00	-	-	-	0.00

Items	Postal Services	Land-based Systems	Cellular Systems	Other Systems	Totals
Others	0.00	0.00	4.94	0.02	4.96
Total damage	0.3	5.9	23.1	1.9	31.2
Losses					
Lower revenues	0.87	4.00	4.13	9.64	18.64
Higher operating costs	0.06	1.00	2.23	0.04	3.33
Total losses	**0.93**	**5.00**	**6.36**	**9.68**	**21.97**
Total Effects	**1.3**	**10.9**	**29.5**	**11.8**	**53.2**

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses

In the immediate aftermath of the cyclone, land-based systems were disrupted throughout all four divisions, with the worst impacts felt in the Northern, Eastern and Western Divisions, including parts of Ba and Rakiraki. Repairs in these areas were ongoing at the time of this PDNA. Services in the Central Division, in particular the Suva-Nausori corridor, suffered minimal disruption, and urgent repairs and maintenance to access networks in the Suva, Nausori, Nadi and Lautoka central business districts resulted in prompt restoration of service to these areas. In places where fallen telephone poles and wires are still being repaired, TFL is offering wireless devices free of charge to customers who wish to use fixed-line services. Customer uptake has been minimal, however, with interest in the offer mainly coming from business customers.

Cellular network coverage for the country was partially restored within a few days of the disaster, but about 30 to 50 percent of sites are still operating on generators due to limited electricity supply. Full cellular network restoration is expected sometime between April and July 2016. Broadcasters suffered extensive infrastructure damage in Ba, Tavua and Rakiraki and, as a result, most TV and radio services will likely remain disrupted until April or May 2016.

Recovery and Reconstruction Needs for the Communications Sector (F$50 million)

A BBB approach is critical for sustainability of the communications sector. The extent of the damage and losses incurred, and the expected socioeconomic impact of prolonged service disruption in rural and remote areas, underscore the need for building more resilient infrastructure that can withstand future disasters.

In order for the communications sector to recover in the short term, an estimated F$24,000 is needed to establish temporary wireless communications for businesses in the worst-affected areas, particularly in parts of Ba, Rakiraki and the Eastern Division, where TFL fixed-line access networks were still under repair at the time of this PDNA.

Total recovery needs of F$48.8 million are required. Medium- to long-term reconstruction activities for TV and radio broadcast systems will include investing in Category 4 cyclone-resistant bunkers to house transmission equipment. For land-based systems, this will involve completing the fibre ring around Viti Levu (approximately 100km remain from Korovou to Rakiraki) and building a second redundant link from Viti Levu to Vanua Levu through Lomaiviti, which will provide resiliency to Vanua Levu, Taveuni, Levuka and Lakeba and backhaul to other islands. For cellular systems, damaged transmission towers and equipment will need to be rebuilt to Category 3 and 4 specifications, particularly in rural and remote sites. However, given their low return on investment, towers and masts in rural areas are generally constructed using low-cost, poor-quality, locally fabricated materials.

In this regard, the government is committed to assisting the private sector in building back more disaster-resilient infrastructure through public-private partnerships and infrastructure-sharing arrangements. The medium- to long-term reconstruction activities identified through this PDNA for the communications sector are consistent with the long-term strategic direction of the government's five- and 20-year national development plans, which aim to boost the rural economy through better rural infrastructure, connectivity and service delivery.

Table 66: Total Recovery and Reconstruction Needs for the Communications Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Replacement, repairs and maintenance of damaged stock, infrastructure and equipment	1.9	29.4	0.0	31.3
Urgent rehabilitation of communication towers and equipment	4.5	0.0	0.0	4.5
Strengthening resilience of communications system	0.0	0.0	13.0	13.0
Total	**6.4**	**29.4**	**13.0**	**48.8**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

Damage to Namena Island
Source: Sangeeta Mangubhai/Wildlife Conservation Society

3.4 Cross-Cutting Issues

3.4.1 Environment

Summary

Fiji's environment sustained substantial damage in the aftermath of TC Winston, directly affecting people's daily lives, livelihoods, subsistence and economic activities. Damage were largely due to strong devastating winds and the occurrence of storm surges in coastal areas. The major environmental assets that were affected include native forests, mangroves and coral reefs. In total, 47 percent of native forests, 67 percent of mangroves and 79 percent of coral reefs in Fiji are within a 50km radius of the cyclone's path.

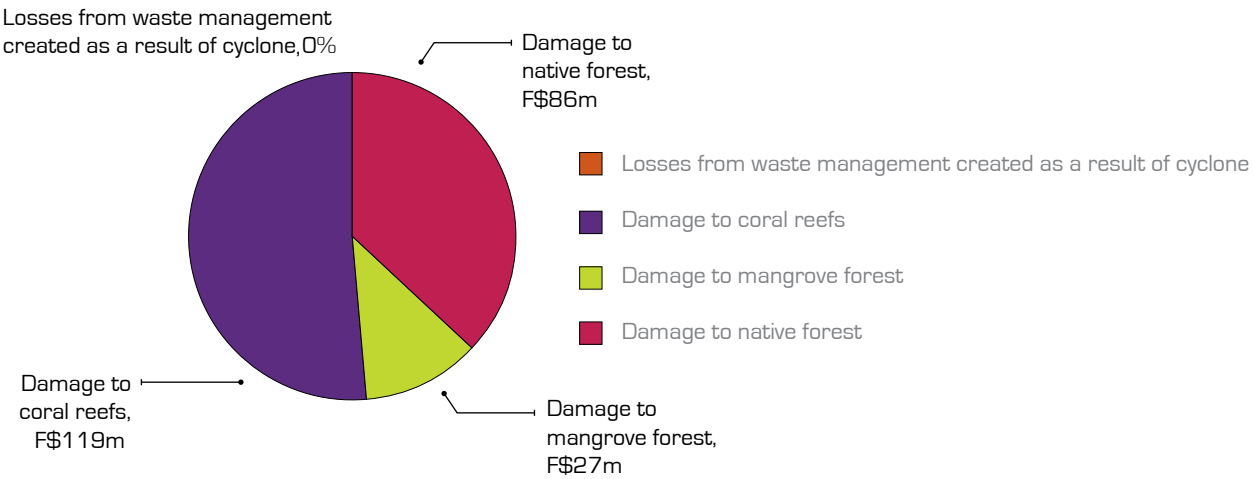


Figure 30: Damage to Major Environmental Assets (F$ million)
Source: Estimations by Assessment Team.

Available literature was used to calculate the economic valuation of ecosystem services in the cyclone-affected area and, thus, estimate the damage and losses caused by TC Winston. The total value of damage to environmental assets is approximately F$233 million of which 51 percent is damage to coral reefs, 37 percent to native forests and 12 percent to mangroves. The total value of losses for these three environmental assets is approximately F$630 million.[110] Total recovery needs are around F$61 million, while reconstruction needs are approximately F$13 million.

Environment Sector Background

Fiji has a range of ecosystems, including seagrass beds, coral reefs, mangroves, wetlands, tropical forests and grasslands. Native forests, mangroves and coral reefs cover 1,423,280 hectares (ha) of land and coastal area.

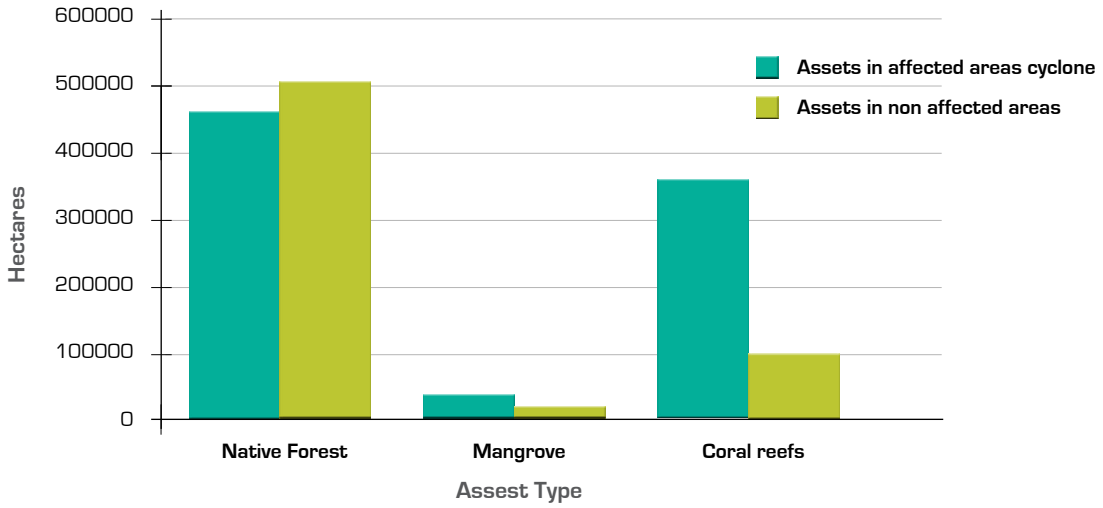


Figure 31: Hectares of Assets in Affected Areas

Source: Estimations by Assessment Team.

Native Forests cover about 969,050 ha of land, of which 47 percent is in cyclone-affected provinces. Only a small percentage (approximately 2.7 percent or 43,000 ha) is currently in protected areas with another 57,000 ha proposed for conservation/protection (National Environment Council-IP Report; Olson et al., 2010; Fiji Biodiversity Strategy and Action Plan, 2007). Dry forests are among the most critically endangered forest types. Multiple pressures have degraded the condition of forests, including illegal logging, unsustainable harvesting of timber by traditional landholders, clearance for agriculture, collection of firewood, and invasive vine and tree species, particularly African tulip.

Mangroves cover 54,190 ha of coastal areas, of which 67 percent are in cyclone-affected provinces. The major pressures on mangrove forests are illegal logging and fuelwood collection, which led to around a 25 percent loss of total mangrove area from 2003 to 2013 (MACBIO, 2016).

Coral Reefs cover approximately 454,000 ha of nearshore and marine areas in Fiji. Of these, almost 80 percent is within a 50km radius from the cyclone's path. Almost 17 percent of coral reefs are under conservation and local protection, an increase from 12 percent in 2010. This resulted from the decision by local communities to establish the Fiji Locally Managed Marine Area.

Assessment of Disaster Effects on the Environment (F$862 million)

The combined damage and losses for the environment sector amount to F$862 million, of which F$233 million is attributable to damage, F$595 million are losses from ecosystem assets and F$34 million is attributable to losses generated by waste management requirements following TC Winston.

Damage to the Environment (F$232 million)

For native forests and mangroves, damage included fallen trees and extensive loss of foliage stripped by the cyclone. For coral reefs, damage included uprooting of hard corals, and extensive death of fish and other marine life (see Box 1). Total damage is F$232 million, with the majority of this attributable to coral reef damage.

[110] This figure includes a recovery timeframe that is aligned with the recovery periods considered for other sectors within this PDNA. However, the recovery period for the environment sector could stretch to 10 years for coral reefs and 15 years for native forests and mangroves; therefore, total losses may be higher than those reflected in this report.

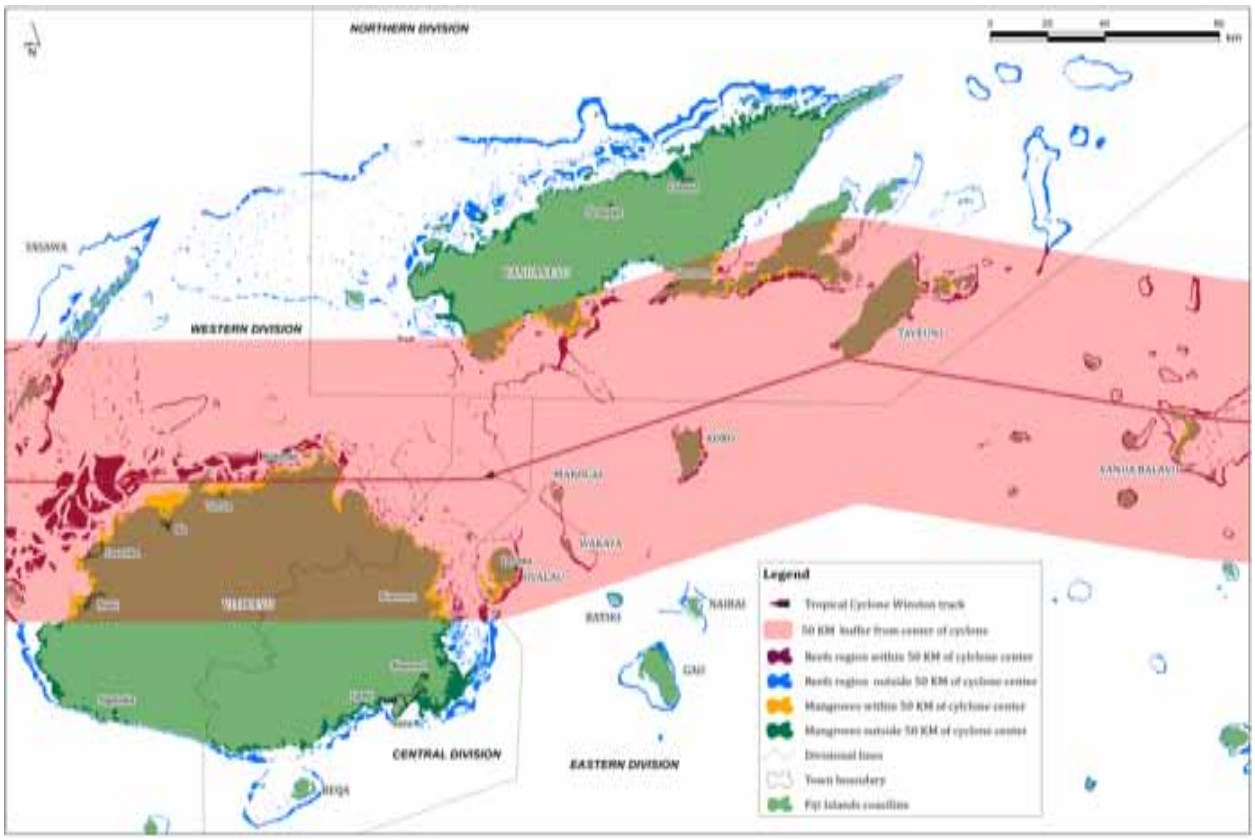


Figure 32: Distribution of Mangroves and Coral Reefs in Cyclone-Affected Provinces

Source: Estimations by Assessment Team.

Losses to the Environment (F$630 million)

The native forests and mangroves that were damaged by the cyclone are expected to take at least 15 years to deliver the same quality of ecosystem services than before the cyclone. Coral reefs are expected to take about 10 years to recover fully if intervention through structural restoration is undertaken, assuming no additional pressures from development activities. For the purposes of this report, the values of ecosystem services lost over a shorter timeframe more aligned with the recovery period for other sectors were used. The calculated losses are estimated to be F$629 million of which F$595 million are from ecosystem assets and the remainder are from the cost of disposal of debris and green vegetation generated by the damaged and destroyed buildings, as well as crops and trees in agricultural land. It was assumed that there would not be clearance of logs or salvage logging in native forests or mangroves. Most of these losses will be borne by traditional land holders and the government.

Table 67: Total Damage and Losses to the Environment Sector (F$ million)

Ecosystem Assets	Damage	Losses[a]	Total	Private	Public
Native forest	86	225	311	100	
Mangroves	27	66	93	100	
Coral reefs	119	304	423		100
Losses from waste management created as a result of TC Winston[b]		34	34		100
Total	**232**	**629**	**861**		

Source: Estimations by Assessment Team.

a. Estimation of environmental losses include ecosystem service losses for 2016-18 for native forests, mangroves and coral reefs.

b. Includes the disposal of the damaged/uprooted trees and crops from agricultural areas (green waste) and building debris resulting from damage caused by TC Winston to housing, schools and other buildings, and damage to waste management facilities that must cope with this waste. Some hazardous waste (approximately 5 percent of the total waste stream) includes treated pine and a limited amount of asbestos material. No information currently exists on landfill capacity, but such information must be considered as part of the recovery effort. In addition, mud and silt that were deposited are not included, as this was cleared as part of the emergency cleanup effort.

The distribution of losses (F$ million) for each division is shown in Figure 33.

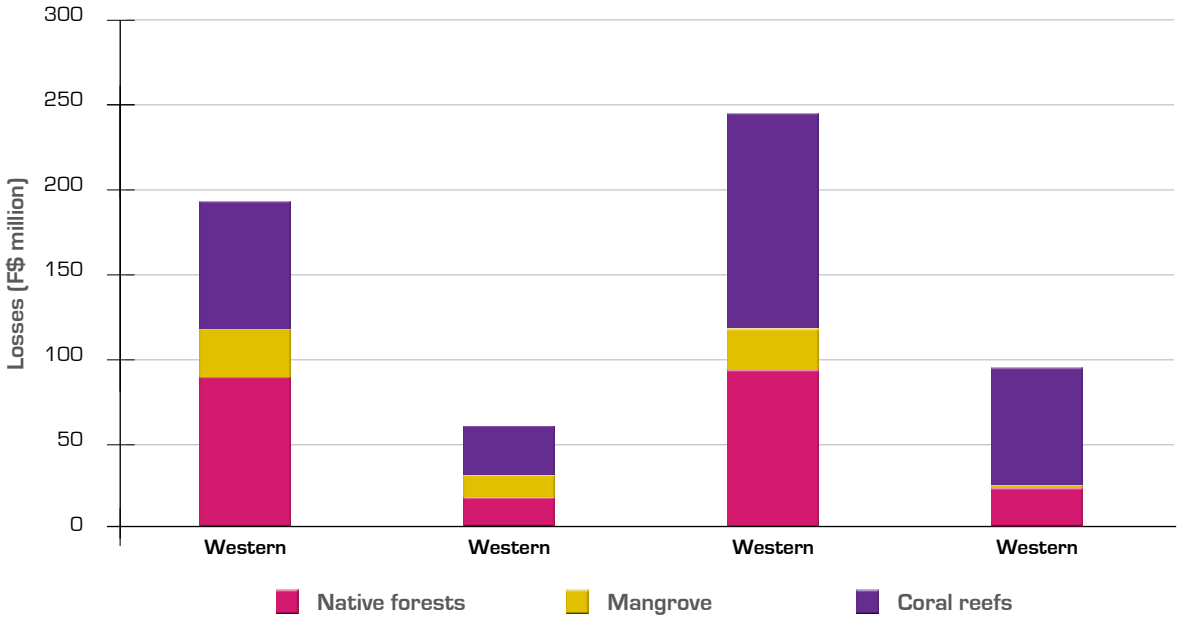


Figure 33: Losses to the Environment Sector by Division

Source: Estimations by Assessment Team.

Social Impact of Damage and Losses

Damage to the ecosystem and the services it provides is already affecting people (Box 1), and the impacts are likely to continue for at least a decade. Recovery efforts are aimed at reducing the timeframes of these impacts while supporting the recovery of ecosystem services and meeting some of the livelihood needs.

Box 1: Damage to Reef: Changing lives and livelihoods of people

The village of Namatala in Ra Province is a small typical coastal village with 24 households and 114 people that rely on fishing for their protein and cash income. TC Winston brought a lot of changes; the channels used to canoe through are now peppered with one metre tall "boulders" of coral, deposited by the storm surge generated by the cyclone. One of these boulders is 20m by 3m and has formed an island of dead coral mixed with shells unknown to people in the village, although they suspect these were lifted from deep waters. Half of the coral reef that is home to the fish they catch is damaged; coastline that was previously fine sand is now littered with rocks and coral "boulders"; the deeper waters are shallower; and their two fishing grounds were completely destroyed. The routes to the fishing areas, which were so well known to the community that they could be traversed at night without fear, have drastically changed. Following TC Winston, sea cucumbers, eels and other fish lay dead on the beaches, floated on the surface of the water and were deposited deep into the mangrove areas. The lives and the livelihoods of the people of Namatala village are now very uncertain.

Recovery and Reconstruction Needs for the Environment (F$74 million)

Total needs are estimated at F$73.9 million (Table 68). For effective recovery of environmental assets, a number of activities that build on ongoing programmes as well as some new ones are proposed and costed. Many of these translate into additional operational costs, such as those incurred in the management and control of invasive tree species like the African tulip. To enable coral reefs to rehabilitate and recover for the first two years, pressure on inshore fisheries must be reduced and interventions like the deployment of FADs will help provide alternative food and protein sources to communities. An ecological survey of damaged areas (for all environmental assets) and the sustained monitoring of information on the status of assets in the medium to long term are recommended. The establishment of a government centralized database to maintain and regularly update information and data is pivotal to recovery efforts and should be supported by community partners, NGOs and academia, where relevant.

Interventions for clearing debris will differ in cities, villages and agricultural areas, both in terms of methodology and equipment needed. Special treatment for hazardous wastes is critical and must be supported accordingly.

Table 68: Total Recovery and Reconstruction Needs for the Environment Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Increase operational cost to farmers to manage invasive tree species	10.1			10.1
Strengthen and enforce planning and environmental legislative and institutional frameworks	5.0			5.0
Provide operational funds for FADs	0.9			0.9
Increase operational costs for the management of protected coral reef, mangrove and native forest reserves/national parks	3.0			3.0
Increased cost of ecological surveys, damage assessment, monitoring and recovery of ecosystem asset and establishing a centralised database	8.2			8.2
Clearance of debris in cities and villages (housing, green waste, etc.) and clearance of agricultural land	28.1			28.1
Special treatment for potentially recyclable/reusable material and hazardous waste	5.5			5.5
Replanting of mangroves		1.8		1.8
Assisting recovery of coral reefs through transplants and protection		4.7		4.7
Waste processing equipment (cost of compactor and shredders)		6.6		6.6
Total	60.8	13.1		73.9

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

In economic terms, damage and losses to ecosystems are extensive in the provinces affected by TC Winston. The monetary values reflect the richness of Fiji's ecosystems and their importance to its people, livelihoods and the economy. The proposed and costed activities are aimed at supporting recovery of these ecosystems and are relatively modest compared to estimated losses. However, for the people and their livelihoods, the time that the ecosystems will need to recover will also mean continued socioeconomic impacts. Thus, ensuring that people's needs are met through other support (such as FADs) is critical for guaranteeing that ecosystems are not placed under additional pressure and have time to recover and help meet the people's needs in the near future.

3.4.2 Gender and Social Inclusion

Summary

The impact of TC Winston will be felt along the social lines and disparities that exist within Fijian society. Gender inequality is one of the determinants that has shaped not just who has been adversely affected by the disaster, but also who has the capacity to recover from it. It will also determine men's and women's participation in and benefit from recovery interventions and their general resilience to future disasters. Women, who make up about 49 percent of the Fijian population, are the largest disadvantaged population that has been negatively affected by TC Winston. While men are overrepresented in waged on- and off-farm employment, the high burden of reproductive work confines women to the poorly remunerated informal sector, particularly subsistence agriculture, which leaves them with no income security to respond to the disaster. Yet women's subsistence activities and earnings contribute directly to nutritional security and household economic welfare and foster human welfare. The impact of the cyclone on women may, therefore, result in increasing dependency on subsistence economic activity, increasing time poverty, deepening their poverty and widening gender inequality. While women have been disproportionately impacted by the cyclone, simply viewing them as victims only exacerbates their vulnerability. Instead, recognizing that they have knowledge, social capital and skills critical for recovery is important. Recovery interventions in housing and productive sectors present an opportunity to start redressing some of the inequalities that put women in a disadvantageous position. The gender gap of 34.9 percent points in labour force participation rates suggests significant opportunity to engage more women in recovery and reconstruction to rebuild their livelihoods, increase their asset base and achieve long-term resilience. Ensuring that no discrimination exists based on sex, age, ethnicity, sexual orientation or disability at all stages of the recovery process is also crucial.

Southern Taveuni, Vuna village
Source: Vlad Sokhin/World Bank

Gender and Social Inclusion Background

The Fijian population is diverse in terms of gender, ethnicity, religion and economic status. Based on the Fiji 2007 census,[111] females make up 49 percent of the population. The fertility rate per women is about 2.6 live births. Fiji has made some strides in achieving gender equality and lifting the status of Fijian women and girls. Fiji ranks relatively high on the gender equality scale, at 87 out of 187 countries.[112] According to the HDI,[113] female life expectancy of 73.2 years is higher than that of men, which stands at 67.2 years. School enrolment for women at primary, secondary and tertiary levels is higher than for men. Progress has also been achieved in women's participation in politics and public affairs. While Fiji still lags behind the global average of 21.9 percent, Fijian women hold 14 percent of seats in parliament, higher than any other country in the Pacific. However, only 5 percent of permanent secretaries are female and 7.07 percent of board and committee members are women,[114] making it difficult for them to have a substantial voice in public policy formulation and implementation.

Gender equality and women's empowerment remain enormous challenges for the country. Women's participation in the market labour force stands at 41.6 percent, more than 34 percent points lower than the male equivalent, which stands at 75.8 percent.[115] Time poverty due to domestic work explains, to some extent, the high prevalence of women in the informal sector, which provides them with more flexible working hours. The 2010/2011 Employment and Unemployment Survey (EUS) analysis indicates that women in both urban and rural areas spend far more time on employment and housework than men. Women, who do 74 percent of all domestic work, spend 54.2 hours per week on unpaid employment, compared to 32.3 hours for men. Violence against women and girls in Fiji is alarmingly high where 72 percent of ever-partnered women have experienced physical, sexual or emotional violence. An estimated 12 percent of households are headed by females[116] and 4 percent of the Fijian population is elderly (above the age of 65). The Fijian ethnic structure comprises of iTaukei at 57 percent of the population, Indo-Fijians (37 percent) and other ethnic groups (6 percent).

[111] Fiji Bureau of Statistics: Fiji 2007 Population Census.

[112] UNDP 2015: Human Development Report 2015.

[113] Ibid.

[114] Source: List of Board members, Ministry for Public Enterprise 2016. Unpublished data.

[115] ILO 2016: Fiji Labour Market Update.

[116] Fiji Bureau of Statistic 2011: Republic of Fiji Poverty Trends, Profiles and Small Area Estimation (Poverty maps) in Republic of Fiji (2003-2009).

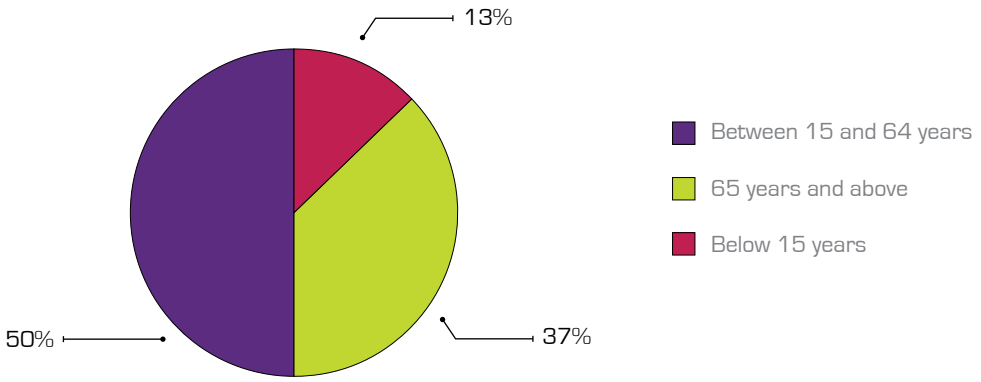


Figure 34: Death Rate among Different Age Groups

Source: MoHMS.

Assessment of Disaster Effects on Gender and Social Inclusion

TC Winston affected approximately 540,400 people, including 264,000 women and girls, equivalent to 40 percent of Fiji's population. A total of 44 people died from the cyclone. An analysis of 86 percent (38) of the deaths show some differences based on age and ethnicity. While the male population outnumbers females by 1.06 to 1, no real differences in mortality rates exist between females and males, which stand at 50 percent for each gender group. However, discrepancies exist among the age groups as shown in Figure 34.

The widest discrepancy is among the elderly (above the age of 65 years), who make up 4 percent of the population but 37 percent of deaths, which could be explained by their limited agility and physical strength to quickly move away from danger. The large discrepancies in the mortalities among the different racial groups require further analysis to inform the development of national DRM programmes and actions that reduce potential risks faced by different social groups. The iTaukei, which make up 57 percent of the population,[117] were overrepresented comprising 92 percent of the deaths. However, only three Indo-Fijians died from the disaster. Islands, such as Koro, where 21 percent of the deaths occurred, are largely iTaukei. However, even in affected districts where the proportion of the Indo-Fijian population is larger, such as Ba (54 percent), the death rate among iTaukei was still disproportionally high. The largest affected population is concentrated in the Western Division (Table 7) which could result in increased economic hardship among Indo-Fijians who are concentrated in this division.

Impact on the Social Sector

Within the social sector, housing and shelter is the subsector most affected by the cyclone. A house is more than a home for women; it is also a vehicle for economic livelihoods. Consequently, destruction of houses, kitchens and other household assets have different consequences for women and men. For example, in Tailevu, in the Central Division, women have become severely disadvantaged in their ability to take care of homes and derive livelihoods, such as mat and basket weaving[118] due to the destruction of houses, kitchens, raw materials and household equipment. Housing also shelters women and young girls from potential violence. Based on experience from previous disasters, lack of shelter and privacy, and crowded living arrangements with extended family and friends, can lead to a heightened risk of violence to and exploitation of women and girls. Single women, the elderly, widows and widowers, and PLWD have been impacted the most. Their homes are often poorly constructed or maintained and are likely to have sustained extensive damage. Lack of physical strength and/or financial resources will leave these households with severe challenges in quickly rebuilding homes. As the allocated F$70 million may be inadequate to reach all households that earn less than F$50,000 a year, it will be essential that the government's Help for Homes initiative targets the most vulnerable households as beneficiaries. Both women and men must participate in and benefit from home reconstruction programmes. As such, targeted training in masonry and building skills to support the home construction programme could assist women, who are underrepresented in the labour force, to augment their livelihoods. Issues relating to land tenure and ownership rights must be addressed to ensure that housing recovery does not reinforce inequality in access to land by disadvantaged groups.

The extensive destruction of agricultural produce could have serious repercussions on the nutrition and health of the affected population in the short and long term. The MoHMS is already recording an increase in malnutrition among children in places like Koro. As families struggle to meet competing basic needs with reduced incomes, some of the coping mechanisms may include reductions in both quantity and nutritional value, affecting the health of children, and pregnant or lactating women. Sustained surveillance of nutrition status among children, pregnant women and lactating mothers and response are essential. Households employ different, sometimes negative, coping mechanisms in response to disasters.

[117] Based on 2007 Census data.

[118] Based on interviews conducted by the Department of Social Protection, ILO, UN Women and UNDP on 13 April 2016.

As was the case in the 2012 floods, anecdotal reports suggest that women and girls are offering sex in exchange for food.[119] In light of this, reproductive health services and outreach should, therefore, be strengthened to provide information and services on maternal health, sexual violence and adolescent sexual reproductive health. With regard to education, the projected decrease in economic output attributable to TC Winston could impact school enrolment. In response to trauma among children following the disaster, school programmes should continue to provide psychosocial support to children in order to reduce the long-term impact of psychological distress.

Impact on the Productive Sector

From a gender perspective, an analysis of the whole productive sector indicates that women lost a total of about F$120 million in personal income loss (Table 69) as a result of the disaster, which is less than income losses incurred by men. This is because less women than men are employed. However, women are poorer, earn less income, are more dependent on subsistence economies, and, therefore, have fewer options to cope with the disaster impact than their male counterparts. Agriculture is an important form of employment for rural communities. Women hold a 33 percent share of the sector,[120] and losses in personal income due to TC Winston for women employed in the agriculture sector total F$99 million. This economic impact could have profound consequences at the household level as women's meager income is usually invested in food, nutrition and familial basic needs, and, hence, overall household wellbeing and economic advancement could be impacted.

Table 69: Personal Income Losses Borne by Men and Women by Productive Sector and Transport Sector

Sector	Women's share by sector (percentage)	Personal income losses (F$ million)		
		Total	Men	Women
Agriculture	0.33	298.2	198.9	99.3
Commerce	0.43	17.2	9.8	7.4
Manufacturing	0.31	18.5	12.8	5.7
Tourism	0.42	17.0	9.9	7.1
Transport[a]	0.11	0.7	0.6	0.1
Total	**0.32**	**351.6**	**232.0**	**119.6**

Source: Estimations by Assessment Team.

Extensive damage to and production loss of small livestock in general and damage to vegetables in the Western Division, resources normally under the control of women, have depleted women's asset base and deprived them of key protein sources and extra income, leaving them vulnerable to economic hardship. Furthermore, agricultural production losses, especially in fisheries, are expected to last close to a decade. Rural women's income will, therefore, remain depressed over a long period of time and, thus, rural women may require income and food assistance for a long time. Beyond agriculture, commerce and tourism, small and micro enterprises provide significant employment to Fijians. The proportion of women in the informal sector is large, especially in SMEs and trading. While the low entry capital requirement and the flexible hours allow engagement in the sector and meeting reproductive obligations, the informality of the sector also leaves women with limited social protection to cope with the impacts, unlike paid workers. Most micro-enterprises in the affected areas are agro-based, comprised mainly of food processing, handicrafts and weaving. Damage to homes, raw materials and raw materials processing equipment, transport disruptions and depressed markets[121] have affected the ability of both men and women to derive livelihoods. Worse still, savings needed to restore their businesses will be diverted towards meeting basic household and home reconstruction needs. Soft loans and medium- and long-term skills development and direct access to external markets are also needed for women entrepreneurs to restart their businesses, reduce their reliance on local tourist markets and enhance their resilience against future disasters.

In general, the combination of lost income, dependence on subsistence farming, constraints in mobility for other job options, limited access to finance and increased reproductive responsibilities will increase women's economic hardship and dependence. Taking into account women's large contribution to the informal sector and the constraints they face in recovery, efforts should be made to ensure that recovery programmes do not contribute to greater gender inequalities and increased poverty for women. Targeted investment in women should be an integral part of all recovery strategies in the productive sectors. Policies that seek to reduce the dependence of women on the natural resource base and proactively address the underlying drivers that make women more impoverished than men are essential. Affirmative action should be implemented to ensure the participation and benefit to women in reconstruction programmes. Skills development in entrepreneurship and masonry combined with market development will be important in reducing women's dependence on agriculture and building their resilience against future disasters.

[119] Based on the Gender Based Violence Sub-Cluster Advocacy Note: Gender-Based Violence in the Aftermath of the Fiji Tropical Cyclone Winston.

[120] ADB 2015: Fiji Country Gender Assessment.

[121] Based on interviews with women handcraft sellers in Lautoka.

One aspect that effectively limits and slows women's post-disaster recovery and economic growth is time poverty, which can perpetuate gender inequalities, where women burdened by domestic work lag behind men who have more time to engage in other income-generating activities and, thereby, recover more quickly. According to the 2010-2011 EUS, women and girls spend 23 hours per week on reproductive work, 15 hours more than men. As noted below, women are spending a longer time securing water and doing laundry, and a combination of reduced agriculture yields and cessation of food rations will increase the time necessary for gleaning food. While ensuring that women actively participate in community recovery programmes is important, such engagement should consider gender disparities in time use and the unequal distribution of unpaid work between women and men and, therefore, avoid increasing women's burden of further work. To enable women to participate in recovery and reconstruction programmes, the provision of childcare will be essential.

Impact on Infrastructure and Physical Assets

The largest impact of the damage to infrastructure has been changes in time use by women and girls, especially in areas that still continue to experience electricity and water supply cuts, which have increased the time necessary for fetching clean water and doing laundry. For example, a high prevalence of washing machines[122] in urban and rural areas has meant that power cuts increased laundry time from half an hour to three hours per week. In addition, time and labour expended in meeting water household needs has increased from zero to three hours a week. The disruptions have curtailed the ability of women and girls to engage in other productive and income-generating activities, since access to electricity affords women the opportunity for social and economic advancement, and provides mechanical power for agricultural food processing, cooking, lighting, refrigeration, communications and commercial enterprises, while minimising the time spent on domestic work. Disruptions in electricity supply have, therefore, undermined women's ability to derive electricity-dependent livelihoods (e.g., virgin coconut oil production). Less obvious, perhaps, is the impact of electricity on women's and girls' safety and sense of security,[123] since lighting is a deterrent of violence and its absence puts women at a heightened risk. Thus, speedy electricity restoration is essential for the return of power-dependent livelihoods and women's safety.

Protection Issues[124]

Sexual and Gender-Based Violence (SGBV): Violence against women in Fiji is alarmingly high, with 72 percent of ever-partnered women experiencing physical, sexual or emotional violence at some point.[125] Intimate partner violence against women imposes a high burden of injury on women and the economy. Each day, approximately, 43 women are injured, 16 are injured badly enough to need health care and one is permanently disabled.[126] While data on gender-based violence in the context of TC Winston is limited, we know from previous emergencies, including the 2012 Fiji floods, that sexual violence against women and girls was reported in evacuation centres and domestic violence increased due to the additional stress during crisis. Reports from the field indicate women feeling unsafe in some locations, including evacuation centres, and an increase in the use and abuse of alcohol by men as a coping mechanism, putting women and children at further risk of harm. Some women have reported feeling scared to sleep at night, and have reported increasing sexual harassment.[127] Similar to other disasters in Fiji, there are increased reports of domestic violence, in particular to the Fiji Women Crisis Centre. Violence, exploitation and abuse of children are heightened risks as community protection mechanisms are disrupted and populations are displaced and under distress. This is further exacerbated by extensive destruction of homes, which may leave women and girls living with relatives and extended families or living in unsecured homes. Female-headed households may be at a greater risk due to lack of male protection. Furthermore, reduced availability of food and a decline in living conditions both increase affected populations' exposure to sexual exploitation and abuse, including engagement in negative coping mechanisms in order to survive. For example, women and girls have already reported requests from men for sexual favors in exchange for food and other supplies.

Recovery interventions should increase access to reproductive health care, scale up the presence of specific services, including clinical care for physical and sexual assault, and actively seek women's views on how to improve safety and security in affected communities. Strengthened grievance and referral systems and support from national actors on SGBV to support victims of violence is also needed. In the short term, the scaled-up presence of police patrols and additional security measures, such as emergency lighting in order to safeguard affected communities and mitigate the risks of SGBV, are needed. In the medium to long term, review and reform of the legal process for reporting and responding to rape and gender-based violence in order to make it more accessible to women and girls may be required. Training of law enforcement on SGBV prevention and response and how to treat SGBV cases seriously and sensitively is essential.

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[122] Based on the same 51 percent increase change between 2002 (15 percent) and 2008 (31 percent), we can assume that washing machine prevalence at the household level in now 70 percent..

[123] Fiji Gender Based Violence Sub-Cluster Key Advocacy Note: April 9, 2016.

[124] No information was available on issues related to sexual orientation and ethnicity. Issues faced by the elderly population are covered in the ELSP Chapter.

[125] Fiji Women Crisis Centre 2013: Women's Health and Domestic Violence Against Women Study.

[126] "Someone's Life, Everybody's Business." National Research on Women's Health and Life Experiences in Fiji (2010/2011): A survey exploring the prevalence, incidence and attitudes to intimate partner violence in Fiji. Fiji Women's Crisis Centre.

[127] Fiji Gender Based Violence Sub-Cluster Key Advocacy Note: April 9, 2016.

Child Protection: An estimated 120,000 children have been moderately to severely affected (40 percent of the child population). Approximately 55 percent of schools and early childhood care and education centres were damaged or destroyed, disrupting schooling for almost 86,000 students. Use of violence against children is high with a baseline study on child protection in Fiji highlighting the acceptance of physical punishment as a means of disciplining children. Sexual violence against children is also high with almost one in five women sexually abused before the age of 15. Furthermore, Save the Children and the ILO highlight a significant market for child sex in Fiji.[128] In 2015, 115 cases of child sexual abuse were reported to the Department of Social Welfare and 612 child welfare cases were reported, including neglect, physical and emotional abuse, and severe malnutrition. As a result of the cyclone, increased stress on and vulnerability of families and caregivers, and abuse rates are expected to increase, with anecdotal reports from police and welfare officers already indicating the need for interventions. Continued support to the Ministry of Education's programme in tracking children who may have moved schools or dropped out is required. Programmes to provide psychosocial support to children and caregivers are also needed to reduce the long-term impact of psychological distress.

Disability Issues: The Fiji National Council for Disabled Persons estimated that 1 percent (11,402 people) of the Fijian population is living with some form of disability. The Pacific Disability Forum further estimates that about 4,534 PLWD have been affected by the disaster; however, this figure could be higher as a result of injuries sustained during the cyclone. Disasters make the situation worse for PLWD, with regard to access to essential services, such as the challenges created by debris caused from the cyclone. Physiotherapy services for those recovering from injuries will also be needed. Efforts should be made to reach women with injuries who may not seek services or who may have family members that do not see the need to support them in seeking medical help. Disasters can lead to loss of or additional burdens on caretakers, who are often women. Efforts to identify, document and support people who have become disabled as a consequence of the disaster through social benefit schemes are essential. This support should include linking people with debilitating injuries to the disability community for social support. Close linkages between the MoHMS and the Department of Social Welfare and NGOs providing psychosocial support is needed.

Gender and Social Inclusion Recommendations

While women and different social groups have been disproportionally affected by TC Winston, simply viewing them as victims of the disaster only serves to exacerbate their vulnerability. As women's contribution to the household economy is substantial, they will be a critical partner in the rapid recovery of Fijian households and wellbeing and the entire affected population. Post-disaster recovery resources must strive to safeguard, restore and promote the economic engagement and participation of disadvantaged groups. Recovery efforts must redress gender inequalities or, at the very least, not perpetuate unequal access to power and resources. Such recovery strategies are outlined below.

- Women's economic recovery must be protected and accorded the same status and importance as that of men. Targeted investment through extension, soft loans and skills development must be made in areas with a high representation of women, particularly in the informal sector in agriculture, markets and SMEs.
- As subsistence agriculture is the backbone of Fijian women, extension services for women must be provided, especially in food crops controlled by women. Investment in subsistence agriculture must be done in tandem with non-farm skills and market development.
- Measures to support tenure rights will be important to ensure that recovery in the housing sector does not reinforce inequality faced by women and vulnerable groups.
- Recovery programmes must ensure that women have access to investment funds and reconstruction/rehabilitation jobs, such as community infrastructure rehabilitation and public works.
- Expansion and monitoring of government social protection programmes to meet the basic needs of struggling families will be critical for ensuring that assistance reaches the most vulnerable groups, including pregnant women, the elderly and PLWDs.
- Considerations for childcare to enable women to participate and benefit from reconstruction programmes must be an integral part of recovery strategies for all sectors.
- To improve safety for women, children and PLWD, initiatives to repair community infrastructure should prioritize toilets and wash facilities that allow privacy and protection.
- Sustained messaging aimed at preventing SGBV and mechanisms to mitigate it should be made available in the affected communities. Psychosocial support should be made available to men, women and children in the affected areas.

[128] ADB 2015: Fiji Country Gender Assessment

Recovery and Reconstruction Needs for Gender (F$2 million)

Table 70 provides a summary of the gender recovery needs of approximately F$2 million. Gender sector recovery needs are discussed in detail within the respective sector chapters.

Table 70: Total Recovery and Reconstruction Needs for Gender Considerations (F$ million)[129]

	Recovery	Reconstruction	Resilience	Total
Skills development, training and market development	0.4			0.4
Consultations documentation and registration of vulnerable groups	0.1			0.1
Strengthening services and referral systems for prevention of SGBV	0.7			0.7
Psychosocial support to children and community members	0.1			0.1
Support for the elderly, PLWD and child protection	0.1			0.1
Reconstruction and rehabilitation of nine women resource centres		0.2		0.2
Gender recovery monitoring and evaluation	0.2	0.2		0.4
Total	**1.6**	**0.4**		**2.0**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

3.4.3 Culture and Heritage

Summary

TC Winston caused significant damage and losses to Fiji's cultural assets located within the severely affected areas. The Eastern Division (Lomaiviti and Lau Provinces) constituted the most significant impacts, accounting for 74 percent of the damage and losses suffered. In total, cultural (including built heritage) and natural sites endured almost F$5 million worth of damage, impacting on the livelihood, social and cultural sustainability of Fijian communities. Use of both traditional and modern materials during bure building endangers the continuity of such building, which reinforces the need to develop management plans that safeguard the country's cultural assets against disaster events.

Culture and Heritage Sector Background

Fiji acknowledges and celebrates the rich, varied and diversified cultural repertoire of its people, and these aspirations are embedded in the 2013 Fijian Constitution. Culture has also emerged as an integral element in the promotion of sustainable development and wellbeing. The Green Growth Framework articulates the contribution of the culture sector to economic livelihoods (local cultural producers and entrepreneurs), informed decision making (cultural statistics and data collection), knowledge sustainability (mainstreaming culture in the formal education curriculum) and resource conservation (intangible, documentary and built heritage mapping, and management). Fiji's culture sector safeguarding activities are linked to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) mandate and activities globally and much is owed to Fiji's ratification of the 1972 World Heritage Convention in 1990 and the 2003 Convention for the Safeguarding of Intangible Cultural Heritage in 2010. The National Cultural Policy for Fiji will facilitate a coordinated approach by cultural institutions to leverage the culture sector and its contribution to national development. The Fiji Museum Act (Cap 263), National Trust Act (Cap 265), Public Records Act (Cap 108), Libraries (Deposit of Books) Act (Cap 109) and the Preservation of Objects of Archaeological and Paleontological Interest Act (Cap 264) provide the legal underpinning for managing and protecting Fiji's cultural heritage.

Fiji's myriad cultural resources and assets are continuously being managed and updated in registers available with the National Archives of Fiji, Ministry of iTaukei Affairs, National Trust of Fiji, Fiji Museum and Fiji Arts Council. In 2013, Fiji successfully inscribed the Historical Port Town of Levuka as a UNESCO World Heritage site. Previously, the 'Documentary Heritage of the Indian Indentured Labourers to Fiji' was successfully listed in the International Register of the Memory of the World in 2011.

The Fiji Arts Council, with six multicultural centres located around the country, promotes artistic expressions and spearheads cultural industries in Fiji, thereby enhancing local resource use for cultural product development and marketing.

Levuka Historical Port Town (Levuka, Ovalau Island, Lomaiviti Province, Eastern Division), inscribed on the UNESCO World Heritage List (2013), is an outstanding example of the late 19th century Pacific port settlements and reflects the integration of local building traditions by a supreme naval power, leading to the emergence of a unique landscape. The site is currently managed by the Department of Heritage and Arts in collaboration with the Levuka Town Council and the

[129] Gender sector recovery needs are discussed within the respective sector chapters.

Damage to Navala Village cultural site, Ba
Source: Institute of I Taukei Lanuguage & Culture/Ministry of I Taukei Affairs Board

National Trust of Fiji. The site is an amalgamation of historical buildings, and associated infrastructure, such as bridges, seawall and landscape. Similarly, other built heritage in the greater Ovalau Island, including St. John's Cawaci Church and Presbytery, Bishop's Tomb and Nasuku Church (Cawaci), form an integrated whole in the protection and preservation of the Historical Port Town of Levuka as a World Heritage Site. The Levuka Management Plan defines the conservation approaches necessary to ensure that the authenticity and integrity of the site is maintained, while the Levuka Heritage Register maintains a listing of all buildings in the nominated property.

Navala Cultural Space (Navala Village, Ba Province, Western Division) is an important cultural space and the only surviving village in Fiji whereby bures are still used and maintained using natural raw materials. The genesis of the village traced back to ancestors of current keepers in the 19th century. The village now hosts about 700 residents who live in the thatched structures. Situated in a valley surrounded by scenic forest cover, Navala Village is a unique cultural space that has the potential to be listed under the 2003 UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage.

Cultural and Natural Heritage Sites: The Fiji Museum and the National Trust of Fiji manage various cultural and natural heritage sites. Twenty featured sites, which have archaeological, historical and aesthetic values, were surveyed, and three sustained damage from the cyclone. The first site, Makogai Research Station, was sanctioned in 1908 as a leprosarium for people infected with Hansen's disease (leprosy). Now a Marine Protected Reserve, it has numerous built and natural heritage and archaeological features. The second, Tavuni Hill Fort (c. 1800 AD) in Sigatoka, is an archaeological site with distinctive stone aligned house mounds, burials, historic stones and other cultural deposits. The site has been a tourist attraction for 27 years and is managed by the local community. The third site, the Bouma National Heritage Park in Taveuni, was established in 1991 as a natural heritage site.

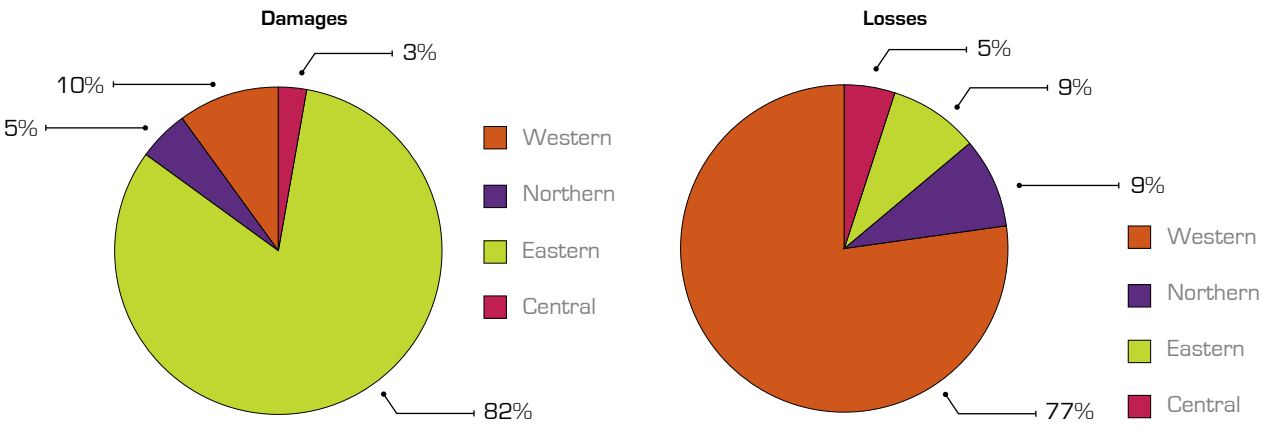

Figure 35: Summary of Damage and Losses Incurred at the Divisional Level
Source: Estimations by Assessment Team.

Intangible Cultural Heritage: The sustainability of traditional knowledge and intangible heritage of local cultures rests on the transmission of the latter from the bearer or keeper to the younger generation. Intangible Cultural Heritage defines the culture of the Fijian people, and research and documentation in Fiji's 14 provinces helps in the continuity of age old cultures and traditions. The data is stored in the Ministry of iTaukei Affairs' National iTaukei Database for Traditional Knowledge and Expressions (NTDTKE).

Repositories of Heritage: Fiji has a collection of built repositories housing numerous collections of art, artefacts and documentary heritage, among others, 12 of which were identified for assessment, including the Fiji Museum, Ba Museum, National Archives of Fiji and various art galleries.

Cultural Industries: Cultural industries are important for wealth creation, growth, sustainable development and social security. Fijian cultural industries feature local musicians, traditional handcraft, Fiji Fashion Week, Fiji visual arts, local media and advertising. The production and promotion of cultural goods and services significantly improves the quality of life of people.

Assessment of Disaster Effects on the Culture and Heritage Sector (F$6 million)

Culture and heritage have high symbolic value and mirror a nation incorporating elements ranging from built and intangible heritage to documentary heritage, repositories of heritage and cultural producers and products (which encompasses the cultural industries). TC Winston caused damage in provinces that feature a significant proportion of Fiji's cultural heritage assets and associated activities.

With the limited baseline information available, the cyclone damage assessment for the sector aimed to be a strategic rather than an exhaustive evaluation of the destruction. The assessment was province-based and later aggregated to divisional levels. The main provinces that were adversely affected included: Ba, Ra and Nadroga in the Western Division; Bua, Cakaudrove and Macuata in the Northern Division; Lau and Lomaiviti in the Eastern Division; and Rewa in the Central Division.

Levuka Historical Port Town (Levuka, Ovalau Island, Lomaiviti Province, Eastern Division): The cyclone has left Fiji's built heritage at a crossroads in the damage-affected regions and there is the risk of loss of original structures and materials at the Levuka World Heritage Site. While 70 percent of the heritage buildings in Levuka experienced minor damage, some did sustain major damage: 20 percent are uninhabitable or unusable without repair; 7 percent require major repairs; and 3 percent are damaged, beyond repair. These buildings, such as the Pacific American Fish Company Copra Sheds and Ports Building, still hold heritage values, yet must be reconstructed to ensure their integrity is protected. Little damage occurred to channels and bridges, but the seawall along Beach Street and the main wharf in Levuka suffered significant damage. Major damage was also sustained by the Catholic Churches at St. Johns College, and Nasuku at Cawaci. While there was less financial loss than expected, few businesses had to close while awaiting repairs to buildings. Despite this, the Levuka Wharf is closed for use, and the restoration budget set by the Department of Heritage and Arts for Levuka was diverted towards salvaging operations to recover materials onsite and 'first-aid' assistance for building owners. There is also the potential of loss in the movement of significant heritage collections/items stored within damaged buildings.

Navala Cultural Space (Navala Village, Ba Province, Western Division): Strong winds severely affected most of the bures. Twenty-five bures suffered minor damage but are still habitable; 39 bures are currently uninhabitable and require minor repairs to be habitable; 30 bures sustained major damage and will require extensive repairs before they become habitable; and 32 bures are permanently damaged and require reconstruction. Navala Village also pursues a small-scale cultural tourism venture, which is a major source of developmental income for the site.

Cultural and Natural Heritage Sites: Many of the built and natural heritage, including archaeological features of Makogai Research Station, were damaged by the cyclone including the old cleansing facility for leprosy patients. Associate accommodation structures owned by the Department of Fisheries were also severely damaged resulting in reduced visitors to the site. In Western Fiji, the Tavuni Hill Fort Archaeological Site was severely affected during the cyclone, including the uprooting of trees, village railing posts and a bure shelter. The site was closed for clearing of debris and there were restrictions on visitor access. Similarly, the Bouma National Heritage Park in Taveuni suffered damage to visitor facilities, tracks and other infrastructure, which hindered visitor arrivals.

Intangible Cultural Heritage and Repositories of Heritage: The PDNA assessment drew from the Ministry of iTaukei Affairs's NTDTKE data in the cyclone-affected provinces (the district of Vanua Balavu in Lau, the district of Koro in Lomaiviti and the entire province of Ra) in order to assess the effects on intangible cultural heritage. Damage concentrated on: raw materials necessary to fuel the production of costumes for rituals, prepare herbal medicine, etc.; totemic plants/trees; and crops and animals important for rituals and ceremonies. The loss of these important cultural agents has the potential to: contribute to the deterioration of cultural values of people; diminish sanctification of taboo areas; impact on social and cultural rituals, ceremonies and rites; and, in the worst cases, lead to a relocation of village sites and inhabitants.

In the cyclone-affected provinces, three out of the 12 repositories of heritage assessed experienced medium to extensive damage. While the National Archives of Fiji reported no damage to documentary heritage repositories, the Ba Museum suffered structural damage and was closed at the time of this PDNA assessment. The Fiji Museum suffered major roof leakage, causing flooding in most of its exhibition gallery areas and was also temporarily closed. The Waisiliva Art Gallery at Leleuvia Island suffered extensive damage, with the collapse of the gallery roof. The art collection, however, was not destroyed or affected. The cyclone hit the Tutu Training Centre in Taveuni and damaged 22 of its buildings. The Tutu Training centre provides vocational training to adult learners in the areas of craft development, and displays and markets its students' art.

Cultural Industries: Cultural producers (crafters and artisans) impacted by TC Winston have suffered significant losses to their raw material supply, including kuta from Vanua Levu, voivoi from Koro, Lau, Ra and Ba, and masi bark from Vatulele. The producers' livelihoods are strained, causing stress in trying to meet their families' needs.

Table 71: Damage and Losses in the Culture and Heritage Sector by Division (F$ million)

	Damage	Losses	Total Effects	Public (%)	Private (%)
Central	0.02	0.04	0.06	0	100
Eastern	4.30	0.08	4.38	32	68
Northern	0.25	0.08	0.33	0	101
Western	0.53	0.65	1.18	0	102
Total	**5.10**	**0.845**	**5.95**	**24**	**77**

Source: Estimations by Assessment Team.

Recovery and Reconstruction Needs for Culture and Heritage (F$9 million)

The estimated recovery needs for culture and heritage totals F$9.1 million (Table 72) and incorporates the principle of BBB.

The core of the short-term (2016-2017) strategy for recovery focuses on the rehabilitation and restoration works in the Historical Port Town of Levuka in the Eastern Division. Maintaining the outstanding universal value of the site is critical to ensuring that it retains its iconic status. The rehabilitation of Navala Village is also pivotal, as its tangible and intangible characteristics require urgent safeguarding. However, a thorough technical assessment will first be required. In the medium to long term, continued rehabilitation of the Levuka World Heritage Site will be ongoing, along with targeting enhanced opportunities for cultural producers through the regeneration of raw materials, and capacity-building initiatives to sustain and augment skills in cultural products and in traditional architectural building and conservation.

Knowledge management, capacity building and advocacy for DRR of the culture sector must be strengthened through a network of cultural heritage sites and institutions facilitated by an interim Blue Shield Pasifika in order to fully integrate DRR of the culture sector into the national DRR plan.

Table 72: Total Recovery and Reconstruction Needs for the Culture and Heritage Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Emergency technical assessment of damage, repair requirements and status of intangible cultural heritage	0.2			0.2
Repair and reconstruction of traditional houses, built heritage, repositories of heritage, etc.	0.1	7.4		7.5
Immediate capacity building of traditional architectural skills, basic conservation timber and stone architectural knowledge, and skills and product development workshop	0.2			0.2
Construction of Navala ethnological museum and adjoining exhibition office facilities for tourism purposes		0.2		0.2
Construction and installation of basic amenities in Navala, including electricity, water supply, fire hydrant system sewerage		0.5		0.5
Regeneration of essential traditional architectural raw materials (environmental)		0.1		0.1
Development and implementation of DRR plan for all cultural domains and safeguarding plans for intangible cultural heritage	0.1	0.1		0.2
Establishment of incubation spaces, galleries and advisory portals for cultural goods producers		0.2		0.2
Total	**0.6**	**8.5**		**9.1**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

4.

Damaged Police Station on Viti Levu
Source Chris Wensley/ADB

DISASTER RISK MANAGEMENT

4.1 Introduction

DRM in Fiji has evolved significantly over the past three decades towards a proactive, holistic and inclusive approach to DRR, preparedness, response and resilient recovery within and across all sectors. The Green Growth Framework, which underpins development planning in Fiji, calls for a more integrated and targeted approach to mitigation and prevention measures, contextualising global frameworks around DRR, climate change and sustainable development. TC Winston provided an opportunity to reflect on the performance of the DRM system, which includes the arrangements, as well as institutional and community capacities, that contribute to DRM in Fiji.

4.2 DRM Sector Background

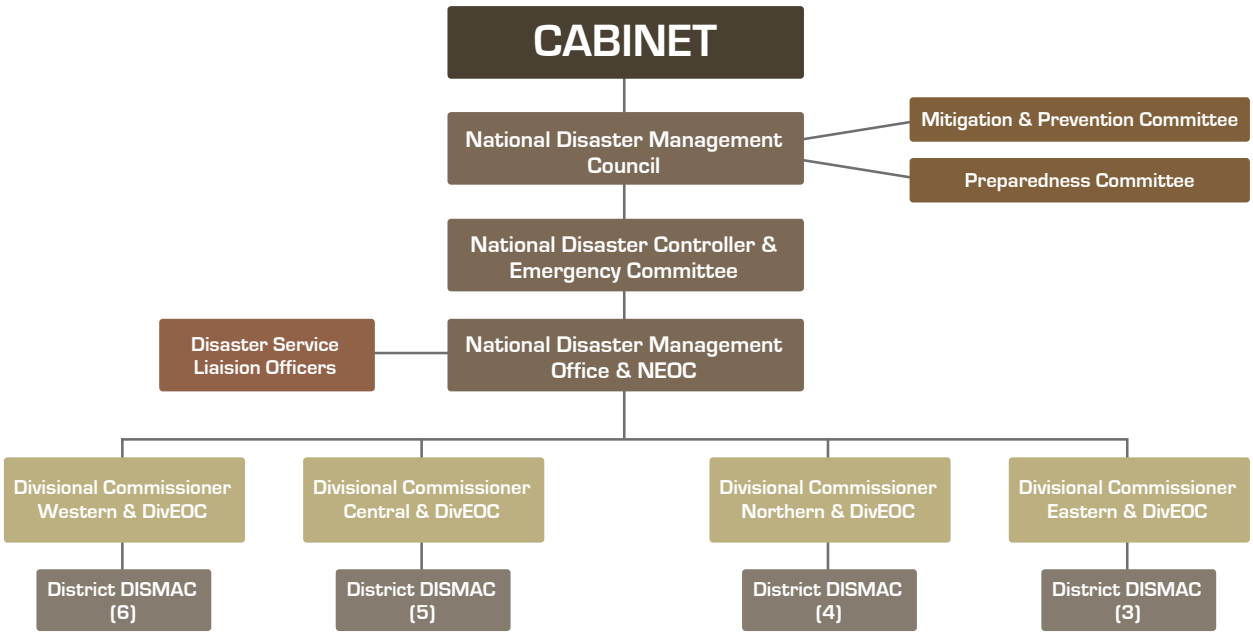

Figure 36: National Disaster Management Structure

Source: NDMO.

New Zealand Defense Force base of operations within the Adi Maopa Secondary School grounds on Vanuabalavu
Source: Litea Biukoto/SPC

Figure 36 illustrates the National Disaster Management structure, defined by the Natural Disaster Management Act 1998 and the National Disaster Management Plan 1995, which describes the governance and institutional arrangements for DRM in Fiji and the attendant operational systems and processes.[130] Fiji has had a "Cyclone Support Plan" in effect since 1997, which details procedures for preparedness, warnings, response and other practical aspects of cyclone management, as well as clear roles and lines of responsibility. A more detailed description of the responsibilities can be found in the Fiji PDNA (2013)[131] and in Annex 6: Disaster Risk Management of this PDNA.

4.3 Damage and Losses in the DRM Sector

Damage to the DRM sector totals F$2 million, while losses equal F$30 million. Damage within the DRM sector relates primarily to buildings and equipment within the Fiji Police Force and the Fiji Meteorological Services (FMS). The Ministry of Rural and Maritime Development and National Disaster Management incurred the majority of losses, which relate to the cost of purchasing and distributing emergency food rations. Losses in the private sector were limited and relate to rented buildings and vehicles.

Table 73: Damage and Losses in the DRM Sector by Agency (F$ million)

Agency	Damage	Losses	Total Effects	Private (%)	Public (%)
Ministry of Rural and Maritime Development and National Disaster Management	0.2	27.5	27.7	0.01	99.99
Fiji Police Force	1.2	0.0	1.2	0	100
Fiji Meteorological Service	0.6	0.0	0.6	0	100
Mineral Resources Department	0.1	0.0	0.1	0	100
Other DRM Actors	0.0	0.0	0.0	50	50
Total	**2.1**	**27.5**	**29.6**	**0.02**	**99.98**

Source: Estimations by Assessment Team.

[130] A description of the role of key government stakeholders in DRM in Fiji, as stipulated in the National Disaster Management Act and Plan is provided in Annex 6.

[131] Government of Fiji, 2013, PDNA Tropical Cyclone Evan December 17, 2012.

Table 74: Damage and Losses in the DRM Sector by Division (F$ million)

Division	Damage	Losses	Total Effects	Private (%)	Public (%)
Central	0.2	2.8	3.0	0.03	99.97
Eastern	0.6	3.5	4.1	0.07	99.93
Northern	0.3	8.7	9.0	0.00	100.00
Western	0.9	12.4	13.3	0.01	99.99
Total	**2.0**	**27.4**	**29.4**	**0.02**	**99.98**

Source: Estimations by Assessment Team.

4.4 Performance of the Fiji DRM System

Interviews, focus groups and questionnaires with key informants were used to examine the performance of Fiji's overall DRM system in relation to TC Winston. This section provides insights gleaned from these questionnaires in terms of what worked well and what areas need strengthening, as well as analysis on the performance of the DRM system undertaken as part of this PDNA.

4.4.1 Tropical Cyclone Forecasting

Although TC Winston was a challenging system to forecast with frequent and dramatic changes in its path, both the manned and automatic monitoring stations of the FMS were effectively transmitting data to the forecasting centre in Nadi allowing forecasters to track and predict TC Winston and prepare warning messages for the public. While a number of FMS weather stations sustained damage, their ability to forecast TC Winston's track was not affected. Ways to further increase resilience of the monitoring and early warning systems should be considered during the reconstruction and repairs of damaged equipment.

4.4.2 Early Warning

Early warning messages were issued by the FMS and the private sector weather forecaster, NaDraki, and distributed using print and social media, radio and websites. Pre-existing campaigns, such as Get Ready. Disasters Happen. (getready.gov.fj), were rolled out in preparation for TC Winston, which provided the public with regular messaging on what to do to prepare for and what to do following TC Winston. However, complementary resources to support the development and regular dissemination of risk reduction messages are lacking.

Social media campaigns, such as #FijiWillRise and #StrongerThanWinston, were quickly established and rapidly gained momentum, creating a sense of hope and resilience within the community, which is essential for both material and psychosocial recovery.

Fiji's limited experience with such intense tropical cyclones as TC Winston meant that public understanding of the characteristics of a Category 5 system and its associated risks was inadequate. A number of coastal communities expected strong winds, but were unprepared for the intensity of the storm surge, which contributed to poor decision making in relation to the location of evacuation centres and housing in coastal areas.

Regular DRM training for journalists should be encouraged to maximise the impact of public information campaigns and to ensure that journalists and broadcasters are clear and confident when they relay early warning messages to the public in English, iTaukei and Hindi. Training should also be provided on ethical reporting during disasters to avoid insensitive or sensationalist reporting.

4.4.3 Addressing the Needs of Vulnerable Groups

More can be done to further disseminate early warnings to a wider audience, especially the vulnerable population. Television broadcasts could add sign language to the warnings, and text messages could be sent targeting the hearing impaired.

Disability inclusive DRR in Fiji was initially accepted and supported by NDMO through its implementing partner Act for Peace and a toolkit adopted in 2013. Further work remains to ensure that evacuation centres are accessible and safe for people with disabilities and that an information management system is available so that necessary data is collected to ensure appropriate support can be provided to people with disabilities.

4.4.4 Key Highlights

The 'Build Back Better' Strategy

The BBB Strategy applied by the Ministry of Rural and Maritime Development and National Disaster Management to the reconstruction of homes destroyed by TC Evan in 2012 paid clear dividends as these homes, despite being in its path, withstood TC Winston's impact. BBB messaging has been strong after TC Winston. For example, the Shelter Cluster had released a graphical poster in English, iTaukei and Hindi to promote simple BBB construction techniques. Similar campaigns should be used for non-structural recovery measures.

National Cluster System

The national cluster system was introduced for TC Evan and tested for the second time during TC Winston. The cluster system is designed to supplement existing DRM institutional structures, as well as improve coordination with national and international partners. The Food Security and Livelihoods Cluster, for example, is a model of good practice with work plans, monthly meetings and a dedicated Disaster Liaison Officer, who is also active in risk reduction activities outside of a disaster. The nine national clusters are: Communications; Education; Food Security and Livelihoods; Health and Nutrition; Logistics; Public Works and Utilities; Shelter; Safety and Protection; and WASH.

Civil-Military Coordination

Civil-military coordination was also strengthened. NEOC set up dedicated liaison capacity during TC Winston to assist in deploying military assets from Australia, New Zealand, France and Fiji. Liaison and coordination improvements enabled the rapid deployment of equipment, personnel and supplies to affected areas.

Emergency Response Operations

The disaster response operations clearly demonstrated the high level of leadership and commitment by the government to respond effectively to the various humanitarian requirements in the immediate post-event period. The NEOC was fully activated well in advance of the cyclone making landfall and coordination worked well between the NEOC and various agencies, such as the FMS, which issued regular advisories on the cyclone track, enabling a good understanding of areas of potential impact that allowed for adequate preparations.

4.4.5 Areas for Improvement

National Disaster Management Plan and Legislation

Reviewing and revising the National Disaster Management Plan 1995 and the Natural Disaster Management Act 1998 is timely, as their respective promulgation instruments have undergone reviews on several occasions, particularly following major disasters. Despite this, no significant adjustments have been made to the arrangements. Such a revision would, for example, better contextualize the PDNA, recovery process, national cluster system and other systemic changes introduced over time.

The current NDMO governance arrangements could benefit from updating given the increasingly complex interrelations between and among agencies, nationally, regionally and globally. The more active roles of NGOs and the complex intertwining of issues between disaster and climate change and the environment require a range of engagement and diplomacy beyond the conventional scope of disaster preparedness and response. In addition, expectations have increased over time such as the need to recruit and retain specialist skills in, for example, planning, operations management, information management and risk management.

Information and Communications Platform

An upgraded information and communications platform is needed to better facilitate information flows prior to and after events. This will help to expedite damage reporting particularly from rural areas and formally incorporate the use of social media as an additional tool to enhance the understanding of disaster impacts.

Common Incident Management System

Establishing a common incident management system will complement the overarching governance arrangements as captured in the National Disaster Management Plan 1995 and Natural Disaster Management Act 1998. The incident management system will facilitate more coordinated preparedness and response operations at the national and sub-national levels, and, thus, more effectively unite all stakeholders under a single operating system.

Relief Tracking System

The current system of tracking the distribution of relief supplies requires strengthening, as supplies are only able to be tracked as far as the Fiji Procurement Office warehouses. However, once supplies are distributed to the divisions, no real-time system exists to record the subsequent movement of supplies. As a result, the NEOC and the National Disaster Management Council (NDMC) have no evidence that relief items centrally provided through the government system are reaching the targeted communities. The inability of the government to track relief supplies means that other non-governmental entities are unable to coordinate their efforts effectively with the national system.

Adapting the Cluster System at Sub-National Levels

The decentralisation of the national response system to the division and district level, while a sound concept in principle, has not included the requisite budget, planning, information management and logistical capabilities to enable more effective coordination. The cluster system is properly functional at the national level but not at the sub-national level, where having stakeholders coalesce for preparedness and response is imperative. However, the majority of venues where cluster meetings were held, including the NEOC, are inaccessible to people with disabilities, which compromises their ability to contribute to the clusters.

Recovery Coordination

In terms of recovery, overall responsibility currently rests with the Ministry of Rural and Maritime Development and National Disaster Management, based on the National Disaster Management Plan 1995 and the National Disaster Management Act 1998. However, for TC Winston, the government has designated the SPO within the Ministry of Finance, National Planning and Statistics to provide leadership and coordination for recovery implementation. Thus, revisions to the disaster legislation should refer to the new role and responsibilities of the SPO accordingly.

Damage Assessment Forms

The design of the damage assessment field survey forms used post-event in the field should be revisited as opportunities were missed for some PDNA sectors in collecting baseline/damage data. When the necessary data is captured during initial field surveys, the subsequent PDNA processes can be efficient.

Information collected during this rapid stage, when done well, could be very useful for subsequent recovery planning. Considerations on using standardized software, for example, the free, open source software KoBo Toolbox, and electric handheld data collection systems for damage assessments, could be made to speed up data collection, collation and analysis and address consistency issues of the data recorded.

4.4.6 Partnerships

The need for improved networking and coordination among stakeholders involved in DRM in Fiji was again highlighted by TC Winston. Current governance arrangements, while providing the opportunity for improved partnerships, still have a strong government-centric disposition. The national cluster system provides for networking and coordination with international partners, but local NGOs and the private sector are not privy to regular consultations on matters pertaining to DRM.

Consultations revealed that the private sector met challenges in obtaining information from the NEOC to inform the community support initiatives that various businesses were involved with, necessitating separate assessments and decision making that may have duplicated the government's own initiatives. A stronger relationship with the private sector through mechanisms, such as the Fiji Commerce and Employers Federation, hotels association and others would enhance efforts being undertaken to improve preparedness and response to disasters, as well as DRR.

Civil society and NGOs are also a significant group through which the government can ensure widespread DRM efforts. Local NGOs, in particular, must have stronger linkages with the government, and its umbrella coordination body, the Fiji Council of Social Services, must be strengthened so that it can more effectively act as the conduit through which local level actors interface with the government.

In relation to the international community and, in particular, those that supported the cluster system, the relationship with the government system appeared to function well. International partners were active in providing advice and technical support to enable decision making on relief and early recovery by the various clusters. National communications cluster members were highly effective and a successful example of good practice in public-private sector engagement. In the early stages of the response, the Pacific Humanitarian Team was also active.

The national cluster system is maturing well and the reliance on external partner support may not be as critical in the future. For example, in terms of logistics, this role was largely fulfilled by the Fiji Procurement Office and NDMO with the support of military assets from Fiji, Australia, New Zealand and France. The role, therefore, of international partners, in particular, must be redefined in the context of ensuring the strengthening and sustainability of Fiji's own future capacities.

4.4.7 Monitoring and Evaluation

TC Winston led to the deaths of 44 people and a significant number of serious injuries. Further investigation should be undertaken to derive lessons learned from the factors that caused these deaths and injuries to prevent deaths from occurring during the next event.

The future performance of the DRM system in Fiji will improve significantly if a focused and well-structured monitoring and evaluation system is in place. In recent years, Fiji has benefitted from global initiatives, such as the periodic national review of the Hyogo Framework for Action, which was superseded by the Sendai Framework for DRR. Such reviews allow Fiji the opportunity to self-evaluate its performance against a series of DRR and DRM indicators. In this connection, a biennial report on the state of DRM could be produced. Such a report would provide an overview of progress of DRM initiatives established in policies and plans and help determine the nature and extent of further investments in DRM that may be required across the economy.

For the recovery programme, strong and effective monitoring and evaluation capacity is required to determine the extent of the application of BBB principles, including, for example, the use of hazard risk information to inform building reconstruction and policy development. Priority 4 of the Sendai Framework for DRR, 'Enhancing disaster preparedness for effective response and BBB in recovery, rehabilitation and reconstruction' will provide useful guidance.

4.5 Understanding Risk

In disaster-prone areas, the availability of reliable and relevant risk information is critical in making decisions for reducing the negative effects from natural hazards, such as droughts, floods, tropical storms and cyclones. While risk assessment tools are available in Fiji, their application is not a requirement for development planning and implementation. Thus, such tools are often overlooked, resulting in development activities that do not address hazard-related risks and associated vulnerabilities. Stronger efforts should be made to embed the use of hazard and risk information in development planning and decision making. Demonstration projects, such as Strengthening Disaster and Climate Risk Resilience in Urban Development in the Pacific (Nadi), should be extended to other towns in Fiji to improve land-use planning and development consent processes.

Homes destroyed by storm surge on Koro Island, Eastern Division
Source: Ministry of Information

Mainstreaming disaster and climate risk within the national (and sub-national) development planning and budgetary system varies between sectors and levels of government, and needs to be consistent and enforced to ensure sustainable development, more resilient systems and safer communities to reduce future damage and loss from disasters.

4.5.1 Identifying Increased Risks as a Result of TC Winston

Following TC Winston, the damage incurred on some communities may have increased future risks from hazards. For example, where coastal defences were destroyed by storm surges, the risk from future storm surges, king tides and high tides to the community will have increased. Similarly, damage to vegetation on slopes has increased the future risk from landslides. As such, detailed surveys should be conducted to identify new risks in affected communities. Identification of new risks should be prioritized in areas where schools, health centres and critical infrastructure will be reconstructed.

4.5.2 Promoting Risk Awareness at the Community Level

Resilience at the community level is a critical component and outcome of an effective DRM system. Investment in community-based DRM (CBDRM) and climate change adaptation (CCA) activities can enhance community understanding of the risks to which the community is exposed and support the implementation of effective prevention, mitigation and preparedness activities. CBDRM initiatives are implemented by many agencies and government departments in Fiji. For example, Nawaqarua village in Ba Province constructed a community evacuation centre and conducted evacuation drills following participation in CBDRM training, which contributed to the fact that no lives were lost during TC Winston despite Ba being one of the most affected areas.

Common methodologies for CBDRM and CCA initiatives with clear links to sub-national government processes should be encouraged. For instance, in the Western Division, CBDRM and CCA activities are already being integrated into the community and divisional development process, thereby ensuring that root causes of disaster risk are being addressed. This also provides an opportunity for investment in community infrastructure to be informed by an understanding of current and future risks to ensure resilience.

4.6 Funding and Finance Mechanisms

4.6.1 Building Fiscal Resilience

While improving the resilience of the citizens of Fiji is paramount, the Government of Fiji should also aim to improve the country's fiscal resilience to natural and climatic disasters. The first step to building fiscal resilience is to understand the country's disaster risk profile as mentioned above. Once the hazard exposure is understood, actuarial analysis can be undertaken to provide indicative financial losses to these disasters.

This analysis was undertaken for tropical cyclones and earthquakes/tsunamis in the PCRAFI, which noted that Fiji faced average annual losses of F$158 million (US$85 million) due to earthquakes and tropical cyclones. Furthermore, in the next 50 years, Fiji has a 50 percent chance of experiencing a loss exceeding F$1.5 billion (US$806 million) and a 10 percent chance of a loss exceeding F$3 billion (US$1.6 billion).[132]

This PDNA provides an actual calculation of damage and losses which, when combined with past expenditures from disasters, help the government to better understand the contingent liabilities placed on the national budget from disasters. This will enable the government to develop an informed disaster risk finance and insurance strategy to build fiscal resilience against disasters.

4.6.2 Disaster Risk Finance Tools in Fiji

Fiji has approximately F$3 million (US$1.6 million) available in contingent disaster risk finance and insurance (DRFI) instruments to facilitate disaster response. The National Disaster Relief and Rehabilitation Fund, also known as the Prime Minister's Fund, can release up to F$1 million (US$0.5 million), and the recently established Rehabilitation Fund receives an annual appropriation of F$2 million (US$1 million). That said, in any given year, there is a 57 percent chance that Fiji will experience government emergency losses that exceed the F$3 million (US$1.6 million) contingency provision.[133]

[132] PCRAFI (Pacific Catastrophe Risk Assessment and Financing Initiative) (2011) Country Risk Profile: Fiji, September 2011.

[133] PCRAFI (2014) Disaster Risk Finance and Insurance Note: Fiji, https://www.gfdrr.org/sites/gfdrr/files/publication/Country-Note-Fiji.pdf

4.6.3 Developing a Disaster Risk Finance and Insurance (DRFI) Strategy

Options for consideration for the development of a DRFI Strategy include:

- **Identify the level of contingent liabilities from natural disasters.** This is the first step to understanding which financial tools will be most effective to reduce the burden on the fiscal purse.
- **Develop an overarching disaster risk financing strategy aligned to existing processes.** Fiji has taken a proactive ex-ante approach to DRFI by establishing dedicated domestic reserves. Available funds are limited, however, and options for risk transfer should be considered. Thus, an overarching DRFI strategy should be developed and endorsed by the cabinet, which would create a single document to articulate available financing options and the associated policies behind these tools. An action plan for implementation activities is also recommended.
- **Consider additional financial tools beyond domestic reserves.** Additional financial tools, such as contingent credit and risk transfer, will help reduce the level of contingent liabilities faced by the Government of Fiji.
- **Build capacity within the domestic insurance industry to provide catastrophe risk insurance for buildings.** This will help to reduce the rebuilding cost faced by the government and private households while providing incentives to ensure that building codes are followed and assets are maintained to an insurable quality.

4.7 Recovery and Reconstruction needs for DRM

In addition to the recovery and reconstruction needs identified in Table 75, there is also a need for the identification of safe relocation areas within the worst hit provinces (e.g., Lomaiviti and Ba), with existing social infrastructure. The social infrastructure and relocation costs are not adequately captured in this assessment due to unknown parameters such as scale, availability of safe relocation sites and relocation distances. These factors are not yet known and need to be further studied. A comprehensive multi-hazard risk assessment will be required to inform the resettlement planning and decision making process for both residential as well as public infrastructure, such as hospitals and schools. Priority also needs to be given to zoning of at risk areas for the various types of natural hazard risks, to enable application of appropriate engineering design solutions.

Relocation of settlements must be resorted to only when no other solution is feasible. Communities requiring relocation on account of high risk areas should be consulted with a view to building a consensus on the issue, particularly with regard to livelihoods as well as socio-cultural sensitivities.

Table 75: Recovery, Reconstruction and Resilience Needs in the DRM Sector (F$ million)

	Recovery	Reconstruction	Resilience	Total
Reconstruction, replacement and repair of priority assets and buildings		2.7		2.7
Strengthen governance and institutional arrangements			0.9	0.9
Understand risk			2.1	2.1
Strengthen community resilience			4.7	4.7
Develop a comprehensive DRM communications strategy			0.2	0.2
Develop a monitoring and evaluation framework and system to track the development and implementation of DRM across government agencies and publish a biennial state of DRM report			0.1	0.1
Invest in catastrophe risk insurance, including regional schemes			4.0	4.0
Total		**2.7**	**12.0**	**14.7**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of recovery needs by sector is included in Annex 2.

5.

Cleaning up at Ra High School, Ra, Viti Levu
Source: Vlad Sokhin/World Bank

SUMMARY OF RECOVERY, RECONSTRUCTION AND RESILIENCE NEEDS

This PDNA identifies a number of key needs to support recovery and reconstruction objectives. The identification and valuation of disaster effects has been used for estimating disaster impacts at the sector, macro and micro levels, and the results of the effects and impact analyses have provided inputs for the quantification of recovery and reconstruction needs. Workshop discussions with key stakeholders, and interviews with affected people and government officials, have also supported the process.

Recovery and reconstruction needs for all disaster-affected sectors of social and economic activity have been estimated within this PDNA. Recovery and reconstruction needs refer to both the private and public sectors, as both have been affected by the disaster and, thus, have also been included. This does not imply that the government should finance recovery and reconstruction for all stakeholders. Rather, it allows the government to quantify and finance those needs within its purview, and facilitate private sector recovery, for example, through interactions with the banking sector to ensure that the required credit lines are available. This approach will support the full recovery of social and economic activity by all disaster-affected sectors, people and enterprises.

No one agency or group will be able to achieve recovery alone. Collaboration is essential to connect those who have a role in recovery, including those in government, business, cultural and other non-governmental sectors. By establishing and maintaining constructive relationships, agencies will be able to undertake initiatives that are coordinated, timely and enduring. Recovery activities will also need to be implemented in various ways. For example, some agencies will coordinate with each other on new initiatives and others will reorient or adapt business as usual.

5.1 Modalities for Recovery and Reconstruction

A range of modalities for recovery and reconstruction exist, a combination of which may be comprised of:

- Direct assistance from the government to the poorer strata of the population, using cash grants and in-kind donations for recapitalization and reconstruction purposes;
- Provision of softer-term credit (using lower interest rates and longer repayment periods) through the banking system to credit-worthy private individuals and businesses for both working capital replenishment and reconstruction purposes; and
- The introduction of incentives for DRR via expanding the role of private and public insurance and increasing coverage until universal participation is eventually reached.

The government will seek to facilitate private sector participation in recovery, given that damage and losses to the private sector are approximately three quarters of the total effects.

5.2 Overview of Recovery and Reconstruction Needs

The total damage and losses for TC Winston is approximately F$1.99 billion (excluding the environment). Total recovery and reconstruction costs are estimated at F$1.96 billion (US$0.9 billion). Of this amount, F$0.22 billion (US$0.1 billion) will focus on recovery needs, F$1.71 billion (US$0.8 billion) will focus on reconstruction and F$31 million (US$14 million) will focus on resilience activities.

Recovery and reconstruction efforts will initially focus on the most affected sectors, while also ensuring that other affected sectors are supported.

Table 76 presents the recovery, reconstruction and resilience needs by sector. The majority of the activities are required in the short to medium term, with the objective of restoring stability to livelihoods and services in the various sectors. The identification of priority and rehabilitation efforts will be implemented by the relevant government agencies and statutory bodies with assistance from development partners. The timeframes for these interventions (indicated in Annex 2) are purely indicative, as institutional arrangements, financial support and other factors will influence the timetables and length of involvement (please refer to the individual sector assessments within Chapter 3 of this PDNA for further details). Short-term needs will be developed further in the DRF. Medium- and long-term needs will be developed further in the National Development Plan.

Based on damage, losses and identified needs, and in order to promote social, economic, cultural and environmental wellbeing over the next two years, key recovery and reconstruction needs can be classified around following themes.

- **Production Recovery:** Includes recovery of production levels in the productive sectors of agriculture, commerce and manufacturing, mining and tourism.
- **Service Supply Access Recovery:** Focused on recovery of supply and access to basic services of education, health, housing, transport, communications, water supply and sanitation, and electricity. In particular, the repairing and rebuilding of housing, and ensuring more resilient and liveable houses will be a priority, through a combination of government support, household savings, family remittances and local credit.
- **Personal and Household Income Recovery:** Focused on improving the livelihoods of those affected, particularly those who are vulnerable and below the poverty level.
- **Reconstruction:** Recovery of physical assets, including infrastructure and buildings in adherence to BBB principles. Repairing and strengthening public infrastructure and buildings, including educational facilities, will be a primary focus. The repairs, reconstruction and rehabilitation of key infrastructure, such as roads, bridges, seaports and airports, will enable the delivery of social and economic services to other affected communities and facilitate greater movement of people, goods and services.

5.2.1 Production Recovery

In each of the productive sectors (i.e., agriculture, manufacturing, trade, tourism and mining), the values of goods that will not be obtained due to the disruption of production induced by the disaster have been estimated. While such production losses have in fact vanished from the economy and cannot be replaced, production recovery needs are the amounts of working capital that producers would require in order to restore pre-disaster production levels.

While different in each productive sector, the need for working capital by the producers is a function of the value of annual losses sustained due to the disaster. That is, producers need a fraction of the value of their annual production as working capital.[134] In addition, consideration will be made of any additional and parallel needs involving the possible requirement to refinance or reschedule (under softer-term loan conditions) pre-disaster loans that producers may have had prior to the disaster, as well as, in some cases, the potential to provide temporary tax relief to individual and business producers after the disaster, by lowering taxation rates related to production and sales.

5.2.2 Service Supply and Access Recovery

The value of recovery requirements for the supply of and access to social and infrastructure services (housing, education, health, transport, communications, electricity, and water and sanitation) includes two possible types: (i) recovery needs by service providers; and (ii) recovery needs by individual households.

Service recovery requirements by provider enterprises (public or otherwise) refer to the amounts required to cover higher costs of service operation and provision which have arisen from the disaster. This involves expenditures above the normal operations budget of the service providers, which are estimated as higher costs of operation in the sectoral assessments within Chapter 3 of this PDNA.[135] These needs must be met as part of the recovery in order to ensure the providers avoid using their normal budget resources, since such uses would take away from undertaking normal activities.

Service providers that do not obtain recovery resources to reinforce their financial position may elect to increase tariffs or rates charged to clients, thereby transferring the higher costs to consumers. In some cases, an alternative solution to this, in order not to affect further personal or family finances, may be the temporary introduction or increase of government subsidies for the services in question.

Service recovery requirements at the personal or household level may arise when the enterprise service providers decide to transfer higher operation costs to the consumers, which would cause an overall higher cost of living for the affected people and households, thereby leading to a lower quality of life.

[134] As an example, farmers require about 18-25 percent of the value of the crop to use as working capital, depending on the specific crop and varieties.

[135] Higher education fees, higher health care costs, temporary housing costs, higher transport costs, electricity and water supply are typical examples of these increased costs of operation in service provision.

5.2.3 Personal and Household Income Recovery

The value of personal income recovery represents the amounts of income losses sustained by the affected labour force across all affected sectors of economic activity, formal or informal, as a result of the disaster. These amounts may be used to define the scope and financial requirements of special "cash-for-work" schemes that may be part of reconstruction.

Consideration will be given to programmes that assist those people and households that would otherwise face income decline, with special reference to those falling below the poverty level threshold. The cost of such assistance programmes, including cash-for-work programmes and income-diversification assistance, represents the needs for personal income recovery.

5.2.4 Reconstruction

The value of reconstruction requirements (also known as physical recovery) has been obtained by estimating the value of damage for all sectors, and incorporating additional costs that would be required to strengthen resilience, through improved design and construction standards, or if required the relocation of strategic activities to safer geographical areas where disaster risk is much lower.

Table 76: Recovery and Reconstruction Needs by Sector

	Recovery	Reconstruction	Resilience	Total
Productive Sectors	**94.1**	**173.6**		**267.7**
Agriculture	65.3	96.1		161.4
Commerce and Manufacturing	17.8	43.5		61.3
Tourism	5.0	29.0		34.0
Mining	6.0	5.0		11.0
Social Sectors	**12.4**	**1,261.7**		**1,274.1**
Education		385.9		385.9
Health	12.1	18.8		30.9
Housing	0.3	857.0		857.3
Infrastructure Sectors	**15.3**	**250.7**	**18.8**	**284.8**
Transport	3.2	174.7		177.9
Water and Sanitation	3.6	20.7		24.3
Electricity	2.1	25.9	5.8	33.8
Communications	6.4	29.4	13.0	48.8
Cross-Cutting Issues	**63.0**	**27.4**	**12.0**	**99.7**
Environment	60.8	13.1		73.9
Gender	1.6	0.4		2.0
Culture and Heritage	0.6	8.5		9.1
Disaster Risk Management		2.7	12.0	14.7
ELSP	**31.5**			**31.5**
Total	**216.3**	**1,713.4**	**30.8**	**1,957.8**

Source: Estimations by Assessment Team.

Note: A detailed breakdown of needs is included in Annex 2.

6.

Family outside their destroyed home. The cyclone blew away the walls and swept away their belongings
Source: Murray Lloyd/UN Women

WAY FORWARD

The recovery needs that were identified during the PDNA process are not linked to the availability or form of recovery funding, but are driven by the sectoral needs analyses. 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:

- 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; and
- Restoration and rebuilding of critical infrastructure and services.

The recovery programme, while implemented under the government's leadership, will be carried out in close and collaborative partnership with international donors, the private sector, civil society and the community as a whole.

6.1 Development of a Disaster Recovery Framework

The PDNA and similar disaster assessments are an essential component of a successful DRF, which will include: (i) developing a central vision for recovery; (ii) defining guiding principles; (iii) identifying primary recovery sectors; (iv) assessing government capacity to manage recovery; (v) appointing an appropriate recovery leader; (vi) establishing appropriate institutional arrangements; (vii) clarifying institutional roles and responsibilities; and (viii) establishing coordination mechanisms, conducting funding gap analysis and mobilizing funds.

The DRF will cover immediate and short-term needs identified in this PDNA for the first two years of recovery (2016-2018). The National Development Plan will cover recovery and reconstruction needs and priorities from two years onwards in the medium term (2018-2020) and long term (2020 onwards).

Following the first annual results review for the respective flagship programmes conducted by the Ministry of Finance, in conjunction with line ministries, the required long-term strategies, including policy options, can be reassessed. The results can then be incorporated into the National Development Plan to guide the programmatic approach, planning, implementation and monitoring of the medium- and long-term recovery and rehabilitation programmes and projects.

6.2 Institutional and Policy Setup (including Goods and Services)

Policy and institutional gaps to implementation can cause headaches for agencies involved in recovery in affected communities. These gaps will need to be identified immediately by the government and addressed to support an efficient and effective recovery. Currently, there is the need to:

- Establish a legal mandate for the Ministry of Finance to lead recovery efforts;
- Confirm coordination mechanisms on the ground among ministries, divisions, the private sector, development partners, communities and civil society organizations;
- Establish a volunteer accreditation and deployment mechanism to tap the people who want to help in implementing recovery projects;
- Ensure the availability and on-time releases of funds to line ministries for implementing projects; and
- Increase implementation capacity (including from challenges with business-as-usual requirements), as recovery requires a mix of skills (in particular for procurement, financial management and safeguard requirements) that should be made available to support the programme's processes and procedures.

Upturned home in Viti Levu
Source: Chris Wensley/ADB

ANNEXES

Annex 1: Detailed Breakdown of Disaster Effects

Table 77: Summary of Damage, Losses and Effects by Sector and Ownership (F$ million)

	Damage			Losses			Total Effects		
	Public Ownership	Private Ownership	Total Damage	Public Ownership	Private Ownership	Total Losses	Public Ownership	Private Ownership	Total Effects
Productive	**62.9**	**178.9**	**241.8**	**36.7**	**557.8**	**594.6**	**99.7**	**736.6**	**836.3**
Agriculture	22.0	59.3	81.3	7.6	453.1	460.7	29.6	512.4	542.0
Commerce and Manufacturing	40.9	32.0	72.9	29.1	40.8	69.9	70.1	72.7	142.8
Tourism		76.1	76.1		43.9	43.9	0.0	120.0	120.0
Mining		11.5	11.5		20.0	20.0	0.0	31.5	31.5
Social	**76.9**	**751.0**	**827.9**	**25.5**	**14.5**	**40.0**	**102.4**	**765.5**	**867.9**
Education	69.2		69.2	7.4	0.0	7.4	76.6	0.0	76.6
Health	7.7		7.7	6.2	0.0	6.2	13.9	0.0	13.9
Housing		751.0	751.0	11.9	14.5	26.4	11.9	765.5	777.4
Infrastructure	**183.4**	**24.8**	**208.2**	**24.8**	**15.6**	**40.4**	**208.2**	**40.4**	**248.6**
Transport	126.3	0.8	127.1	0.0	2.4	2.4	126.3	3.2	129.5
Water and Sanitation	16.9		16.9	7.8	0.1	7.9	24.7	0.1	24.8
Electricity	33.0		33.0	8.1	0.0	8.1	41.1	0.0	41.1
Communications	7.2	24.0	31.2	8.9	13.1	22.0	16.1	37.1	53.2
Cross-Cutting Issues	**3.3**	**236.3**	**239.6**	**29.6**	**630.6**	**660.1**	**32.9**	**866.9**	**899.7**
Environment		232.5	232.5		629.8	629.8	0.0	862.3	862.3
Culture	1.3	3.8	5.1	0.1	0.8	0.8	1.4	4.6	5.9
Disaster Risk Management	2.0		2.0	29.5	0.0	29.5	31.5	0.0	31.5
Total	**326.5**	**1,191.0**	**1,517.5**	**116.6**	**1,218.5**	**1,335.1**	**443.2**	**2,409.4**	**2,852.5**

Source: Estimations by Assessment Team.

Table 78: Contribution of Each Sector to Total Damage and Losses

	Damage		Losses		Total Effects
	F$ million	Percentage of Total Damage	F$ million	Percentage of Total Losses	F$ million
Productive	**241.8**	**19%**	**594.6**	**84%**	**836.3**
Agriculture	81.3	6%	460.7	65%	542.0
Commerce and Manufacturing	72.9	6%	69.9	10%	142.8
Tourism	76.1	6%	43.9	6%	120.0
Mining	11.5	1%	20.0	3%	31.5
Social	**827.9**	**64%**	**40.0**	**6%**	**867.9**
Education	69.2	5%	7.4	1%	76.6
Health	7.7	1%	6.2	1%	13.9
Housing	751.0	58%	26.4	4%	777.4
Infrastructure	**208.2**	**16%**	**40.4**	**6%**	**248.6**
Transport	127.1	10%	2.4	0%	129.5
Water and Sanitation	16.9	1%	7.9	1%	24.8
Electricity	33.0	3%	8.1	1%	41.1
Communications	31.2	2%	22.0	3%	53.2
Cross-Cutting Issues	**7.1**	**19%**	**30.3**	**0%**	**37.4**
Culture	5.1	0%	0.8	0%	5.9
Disaster Risk Management	2.0	0%	29.5	4%	31.5
Total (Excluding Environment)	**1,285.0**	**100%**	**705.3**	**100%**	**1,990.2**

Source: Estimations by Assessment Team.

Table 79: Summary of Damage by Ownership

	Public Ownership		Private Ownership		Total Damage
	F$ million	Percentage of Total Public Damage	F$ million	Percentage of Total Private Damage	F$ million
Productive	**62.9**	**19%**	**178.9**	**19%**	**241.8**
Agriculture	22.0	7%	59.3	6%	81.3
Commerce and Manufacturing	40.9	13%	32.0	3%	72.9
Tourism			76.1	8%	76.1
Mining			11.5	1%	11.5
Social	**76.9**	**24%**	**751.0**	**78%**	**827.9**
Education	69.2	21%			69.2
Health	7.7	2%			7.7
Housing		0%	751.0	78%	751.0
Infrastructure	**183.4**	**56%**	**24.8**	**3%**	**208.2**
Transport	126.3	39%	0.8	0%	127.1
Water and Sanitation	16.9	5%			16.9
Electricity	33.0	10%			33.0
Communications	7.2	2%	24.0	3%	31.2
Cross-Cutting Issues	**3.3**	**1%**	**3.8**	**0%**	**7.1**
Culture	1.3	0%	3.8	0%	5.1
Disaster Risk Management	2.0	1%			2.0
Total (Excluding Environment)	**326.5**	**100%**	**958.5**	**100%**	**1,285.0**

Source: Estimations by Assessment Team.

Table 80: Summary of Losses by Ownership

	Public Ownership		Private Ownership		Total Losses
	F$ million	Percentage of Total Public Losses	F$ million	Percentage of Total Private Losses	F$ million
Productive	**36.7**	**32%**	**557.8**	**95%**	**594.6**
Agriculture	7.6	7%	453.1	77%	460.7
Commerce and Manufacturing	29.1	25%	40.8	7%	69.9
Tourism			43.9	7%	43.9
Mining			20.0	3%	20.0
Social	**25.5**	**22%**	**14.5**	**2%**	**40.0**
Education	7.4	6%		0%	7.4
Health	6.2	5%		0%	6.2
Housing	11.9	10%	14.5	2%	26.4
Infrastructure	**24.8**	**21%**	**15.6**	**3%**	**40.4**
Transport			2.4	0%	2.4
Water and Sanitation	7.8	7%	0.1	0%	7.9
Electricity	8.1	7%			8.1
Communications	8.9	8%	13.1	2%	22.0
Cross-Cutting Issues	**29.6**	**25%**	**0.8**	**0%**	**30.3**
Culture	0.1	0%	0.8	0%	0.8
Disaster Risk Management	29.5	25%			29.5
Total (Excluding Environment)	**116.6**	**100%**	**588.7**	**100%**	**705.3**

Source: Estimations by Assessment Team.

Table 81: Summary of Total Effects by Ownership

	Public Ownership		Private Ownership		Total Effects
	F$ million	Percentage of Total Public Effects	F$ million	Percentage of Total Private Effects	F$ million
Productive	**99.7**	**22%**	**736.6**	**48%**	**836.3**
Agriculture	29.6	7%	512.4	33%	542.0
Commerce and Manufacturing	70.1	16%	72.7	5%	142.8
Tourism	-	0%	120.0	8%	120.0
Mining	-	0%	31.5	2%	31.5
Social	**102.4**	**23%**	**765.5**	**49%**	**867.9**
Education	76.6	17%	-	0%	76.6
Health	13.9	3%	-	0%	13.9
Housing	11.9	3%	765.5	49%	777.4
Infrastructure	**208.2**	**47%**	**40.4**	**3%**	**248.6**
Transport	126.3	28%	3.2	0%	129.5
Water and Sanitation	24.7	6%	0.1	0%	24.8
Electricity	41.1	9%	-	0%	41.1
Communications	16.1	4%	37.1	2%	53.2
Cross-Cutting Issues	**32.9**	**7%**	**4.5**	**0%**	**37.4**
Culture	1.4	0%	4.6	0%	5.9
Disaster Risk Management	31.5	7%	-0.0	0%	31.5
Total (Excluding Environment)	**443.2**	**100%**	**1,547.0**	**100%**	**1,990.2**

Source: Estimations by Assessment Team.

Table 82: Summary of Total Effects by Public Ownership

	Public Sector Damage		Public Sector Loss		Total Public Sector Effects
	F$ million	Percentage of Total Public Sector Damage	F$ million	Percentage of Total Public Sector Damage Losses	F$ million
Productive	**62.9**	**19%**	**36.7**	**32%**	**99.7**
Agriculture	22.0	7%	7.6	7%	29.6
Commerce and Manufacturing	40.9	13%	29.1	25%	70.1
Tourism					
Mining					
Social	**76.9**	**24%**	**25.5**	**22%**	**102.4**
Education	69.2	21%	7.4	6%	76.6
Health	7.7	2%	6.2	5%	13.9
Housing			11.9	10%	11.9
Infrastructure	**183.4**	**56%**	**24.8**	**21%**	**208.2**
Transport	126.3	39%			126.3
Water and Sanitation	16.9	5%	7.8	7%	24.7
Electricity	33.0	10%	8.1	7%	41.1
Communications	7.2	2%	8.9	8%	16.1
Cross-Cutting Issues	**3.3**	**1%**	**29.6**	**25%**	**32.9**
Culture	1.3	0%	0.1	0%	1.4
Disaster Risk Management	2.0	1%	29.5	25%	31.5
Total (Excluding Environment)	**326.5**	**100%**	**116.6**	**100%**	**443.2**

Source: Estimations by Assessment Team.

Table 83: Summary of Total Effects by Private Ownership

	Private Sector Damage		Private Sector Loss		Total Private Sector Effects
	F$ million	Percentage of Total Private Sector Damage	F$ million	Percentage of Total Private Sector Damage Losses	F$ million
Productive	**178.9**	**19%**	**557.8**	**95%**	**736.6**
Agriculture	59.3	6%	453.1	77%	512.4
Commerce and Manufacturing	32.0	3%	40.8	7%	72.7
Tourism	76.1	8%	43.9	7%	120.0
Mining	11.5	1%	20.0	3%	31.5
Social	**751.0**	**78%**	**14.5**	**2%**	**765.5**
Education					
Health					
Housing	751.0	78%	14.5	2%	765.5
Infrastructure	**24.8**	**3%**	**15.6**	**3%**	**40.4**
Transport	0.8	0%	2.4	0%	3.2
Water and Sanitation			0.1	0%	0.1
Electricity					
Communications	24.0	3%	13.1	2%	37.1
Cross-Cutting Issues	**3.8**	**0%**	**0.8**	**0%**	**4.5**
Culture	3.8	0%	0.8	0%	4.6
Disaster Risk Management					
Total (Excluding Environment)	**958.5**	**100%**	**588.7**	**100%**	**1,547.0**

Source: Estimations by Assessment Team.

Malake landing, Ra, Viti Levu
Source: Vlad Sokhin/World Bank

Annex 2: Detailed Breakdown of Recovery Needs by Sector

Recovery and Reconstruction Needs for Agriculture

Table 84: Recovery and Reconstruction Needs for Agriculture

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**161.4**
Recovery Needs		
Crops		
Immediate response from the MoA	MoA	1.8
Provision of seeds, seedlings, suckers, cuttings and other agricultural inputs for re-planting of crops, market rehabilitation	FAO/UNWomen/UNDP/ Ramakrishna/L&L Care	0.6
Temporary provision of food ration to most affected population	NGOs (PLAN INT/PCDF, MSP, DFAT)	0.02
Monitoring and evaluation of TC Winston response, agriculture sector	MoA, Donors	0.5
Land clearance support with cash-for-work activity	UNDP, ILO	0.1
Advisory support, communications support, CCA-DRM support (MoA post)	UNDP - PRRP	0.2
Provision of agro-inputs, land clearance	MoA, Donors	6.4
Provision of improved varieties of seeds for coconunt (existing variety - Fiji Tall), cocoa, dalo and yaqona, including tissue culture mass propagation. Establish tissue culture, mass propogation centres to build capacity. Expand existing and establish new capacity.	MoA and Donors	8
Plant protection mechanisms - pest and disease diagnostics and management (e.g., groud trapping/biological control)	FAO and Donors	2
Soil testing for land areas damaged by the cyclone (bleaching, soil erosion, storm surge) and supporting land rehabilitation including training	Donors and FAO	4
Technical assistance for the finalisation of a Fiji farmers (crop & livestock) baseline	SPC, FAO, MoA, Donors	1.2
Development of a national disaster assessment system for crop and livestock,	MoA and Donors	0.1
Provision of disaster resilient crops (tivoli, via, dalo ni tana, taro)	MoA and FAO	1
Development of an agriculture value chain management strategy	MoA	2
Support sustainable disaster mitigation-oriented land management programme	MoA	0.5
Promotion of smal scale income generating organic and back yard farming systems	MoA	0.5
Food security and economic recovery campaign (awareness)	MoA	0.2
Setting up a reliable disaster communication system (sat phones, solar power sources) for inaccessible areas (e.g. Lau group)	MoA and Donors	1.3
Establishment of community nurseries (model farms & knowledge hubs, aligning existing work with Govt/NGOs)	NGOs (CARE/L&L)	0.2
Sugar Cane		
Emergency actions through the sugar sector	GoF, MOS, SCGC, FCU	3.8
Farmers' support services enhancement	SRIF, SPF	0.8
Capacity building MOS/sugar sector for immediate recovery support	MOS	0.1
Cane recovery programme for farmers	MOS, EU-AMSP, GoF	5.1
Farmers' support services enhancement	SRIF, SPF	1
Capacity building MOS/sugar sector for medium to long term support	MOS	1.5
Livestock		
Distribution of veterinary drugs, feeds, fertilizers, seeds for pasture, feed for apiculture	MoA	0.4
Restocking, biosecurity livestock support, including provision of day old chicks and poultry feed	MoA & FAO	0.2

Activity	Responsible Agency	Cost (F$ million)
Monitoring and evaluation of TC Winston response, livestock sector, including training	Donors	0.1
Establishment of new small scale village level livestock projects in most affected areas	Donors and MoA	0.5
Fisheries		
Immediate needs packages of fisheries and aquaculture materials	FAO	0.2
Training on boat, motor, fishing gear repair and sustainable fishing practices	FAO and Donors	0.1
Distribution of materials for repair, or complete replacement of boats, motors and fishing gear, and premix vouchers	FAO and Donors	1
Rapid re-deployment of FADs and training in FAD fishing and sea safety	FAO, SPC, ADB, NZ Govt	0.4
Assessment of coral reef impacts and recovery, to support management of fisheries and coastal development	Donors	0.2
Strengthen community-based fisheries management in a post-disaster context	Donors	0.1
Distribution of fish feed supplies and farm materials to small-scale aquaculture farms	FAO	0.1
Establish temporary hatcheries and staff accommodation to start immediate fish farm restocking programs	Department of Fisheries (DoF)	0.5
Restore small-scale aquaculture farms: provide materials to repair ponds and hatcheries, clean debris (cash for work)	FAO	0.1
Provide capacity building to small-scale fish farmers in simple methods for on-farm fish fingerling production	FAO	0.1
Provide guidelines for aquaculture biosecurity issues related to cyclone recovery work, e.g. import of live aquatic species	DoF	0
Management support for fisheries managers and communities in a post-disaster context	DoF and Donors	0.8
Training of fishers, gleaners and harvesters, fish farmers on disaster preparedness and resilience	DoF and Donors	0.2
Assessment of coral reef impacts and recovery to support management of fisheries & coastal development	DoF and Donors	4.2
Strategies to increase visibility of non-licensed fisheries sector in fisheries management and disaster responses	DoF and Donors	0.1
Medium- and long-term monitoring of cyclone impacts on food security, CPUEs, livelihoods, etc.	DoF and Donors	2
On-going deployment of FADs, establishment of FAD infrastructure and teams, training for fishers in FAD fishing and sea safety	DoF and Donors	2.2
Increase resilience of aquaculture hatcheries, brood stock holding facilities, and aquaculture infrastructure to withstand future natural disasters	DoF and Donors	5
Support rehabilitation of pearl farms affected by TC Winston	Donors	0.2
Spread out risk of disaster to hatcheries by fostering on-farm fish fingerling production	DoF and Donors	0.1
Assess TC Winston impacts on technical and economic viability of Fiji's leading aquaculture production sectors	DoF and Donors	0.5
Forestry		
Propping up of windblown trees	Private companies	0.1
Removing fallen trees	Private sector, DoF	0.3
Supply of seedlings	DoF, SPC/EU	1
Supply of seeds	Donors, Private companies, DoF	0.5
Maintenance of rehabilitated areas	Donors, Communities, Private companies	1.4
Total Recovery Needs		**65.3**
Reconstruction Needs		
Crops		
Input support to enablers (agriculture extension stations): tents, computers, printers	UNDP-PRRP/R2R, DFAT	0.1
Land clearance support through contractors, purchase of chainsaws	MoA	2

Activity	Responsible Agency	Cost (F$ million)
Purchase/hire of farm machinery and tools	MoA	1
Provision of virgin coconut press, including training and market establishment	MoA and Donors	0.5
Provision of Farm tools (fork, knives, knapsack sprayer)	MoA and FAO	0.6
Repairs and maintenance of private and public nurseries	MoA	0.3
Provision of farm tools	ILO	0.01
Rehabilitation of nurseries with innovative materials to enable nurseries to sustain further disasters (e.g. removable nurseries with storage facilities)	MoA and FAO	0.3
Set up on-farm nursery at strategic locations (extension and farmers)	MoA and FAO	0.04
Purchase/hire of farm machinery and tools	MoA	1.5
Provision of backup power source (solar)	MoA	0.8
Land clearance	MoA	2
Provision of farm tools (fork, knives, knapsack sprayer)	FAO	0.1
Rehabilitation of drainage, seawalls, farm roads	MoA and Donors	0.3
Sugar cane		
Cane seed replanting for farmers	MOS, EU-AMSP, GoF	2
Sugar and farm roads	GoF and Donors	0.6
Farm sheds and stores rehabilitation	GoF and Donors	2.7
Cane harvest labour gang asset restoration	MOS	1.1
Sea bunds and major drainage systems	MoA/Drainage boards	0.6
Cane harvest labour gang asset restoration	MOS	1.1
Sugar and farm roads	GoF and Donors	1.8
Cane seed replanting for farmers	MOS, EU-AMSP, GoF	9.5
Sea bunds and major drainage systems	MoA/Drainage boards	9.4
Livestock		
Distribution of fencing materials and roofing iron and syringes	MoA and FAO	0.7
Distribution of bee frames and wax	MoA	0.1
Purchase of equipment, including water tanks, generator, chains	MoA	0.3
Replacement of stock (including beehives)	Donors	2.9
Rehabilitation of infrastructure (shed) using disaster resilient standards	Donors	4.1
Replacement of feed and fodder	Donors	0.3
Replacement of machineries and equipment (fencing, roofing, solar lighting system and mistblowers)	Donors	1
Rehabilitation of farm roads	MoA and Donors	0.1
Forestry		
Rehabilitation/replacement of assets (portable mills, nurseries, machineries, sawmills, sheds, solar panels)	Donors	0.6
Replanting of trees	Donors, Communities, Private companies	0.6
Fisheries		
Replacement of pearl farm assets (seeding houses, jetties, etc.)	Donors	0.4
Reconstruction of fisheries and aquaculture infrastructure: private sector	DoF, Private sector and Donors	42
Reconstruction of fisheries and aquaculture infrastructure: DoF ice plants, hatcheries, staff quarters, etc.	DoF and Donors	4.7
Total Reconstruction Needs		**96.1**

Source: Estimations by Assessment Team.

Table 85: Recovery and Reconstruction Needs for Commerce and Manufacturing

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**61.3**
Recovery Needs		**17.8**
Commerce		2.0
Manufacturing, excluding sugar	Ministry of Agriculture/ Development partners	2.0
Sugar industry (less insurance)	Fiji Sugar Corporation	10.7
SMEs	MITT / NCSMED/Development partners	2.6
Cooperatives	Cooperative members/ MITT/Development partners	0.5
Reconstruction Needs		**43.5**
Commerce subsector		0.9
Manufacturing subsector, excluding sugar	Ministry of Agriculture/Development partners	7.4
Sugar industry (less insurance)	Fiji Sugar Corporation	31.4
SMEs	MITT / NCSMED/Development partners	3.0
Cooperatives	Cooperative members/ MITT/Development partners	0.8

Source: Estimations by Assessment Team.

Table 86: Recovery and Reconstruction Needs for Tourism

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**34.0**
Recovery Needs		**5.0**
Marketing – immediate info campaign	Tourism Fiji, and individual hotels/resorts and tourism operators	1.0
Marketing – destination confidence campaign	Tourism Fiji, and individual hotels/resorts and tourism operators	2.0
Import duty waivers for reconstruction materials	Ministry of Finance, individual hotels/resorts and tourism operators	2.0
Reconstruction Needs		**29.0**
Reconstruction (F$83.9 million, less F$54.8 million insurance)	Individual hotels/resorts and tourism operators	29.0

Source: Estimations by Assessment Team.

Table 87: Recovery and Reconstruction Needs for Mining

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**11.0**
Recovery Needs		**6.0**
Recovery of lost revenue by increasing gold production (VGM)	VMG	6.0
Reconstruction Needs		**5.0**
Maintenance/repair of buildings and infrastructure (insurance excess)	VMG	5.0

Source: Estimations by Assessment Team.

Table 88: Recovery and Reconstruction Needs for Education

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**385.9**
Recovery Needs		**.007**
Travel costs associated with counselling	MOE	.007
Reconstruction Needs		**385.9**
Replacement of education materials	MOE	8.3
Design construction and project management	MOE	348.9
Furniture and equipment	MOE	28.7

Source: Estimations by Assessment Team.

Table 89: Recovery and Reconstruction Needs for Health

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**30.9**
Recovery Needs		**12.1**
Additional drugs and supplies drugs and supplies	MoHMS/Development partners	3.6
Additional laboratory chemicals and reagents	MoHMS/Development partners	1.4
Psychosocial services	MoHMS/Development partners	1.3
Mental health strengthening	MoHMS/Development partners	0.1
Health promotion and outreach programmes including mobile clinics	MoHMS/Development partners	2.1
Vector control	MoHMS	1.6
Nutrition	MoHMS/Development partners	0.8
Disaster/Climate change contingency funding (health)	MoHMS/Development partners	0.3
Human resource personnel	MoHMS/Development partners	0.7
Strengthening workforce capacity for disaster response and recovery	MoHMS/Development partners	0.2
Reconstruction Needs		**18.8**
Repairs and maintenance	MoHMS/Development partners	0.9
Rehabilitation of facilities	MoHMS/Development partners	0.9
Reconstruction of facilities	MoHMS/Development partners	3.6
Relocation of medical facilities	MoHMS/Development partners	11.3
Procurement of non-medical equipment	MoHMS/Development partners	1
Procurement and repairs of non-medical equipment	MoHMS/Development partners	0.4
Replacement for damaged drugs and supplies	MoHMS/Development partners	0.1
Medical equipment	MoHMS/Development partners	0.3
Cold chain equipment	MoHMS/Development partners	0.3

Source: Estimations by Assessment Team.

Table 90: Recovery and Reconstruction Needs for Housing

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		
Recovery Needs		**0.3**
Establish Public-Private Housing Reconstruction Steering Committee	MoF/MLGHE/FIE/FIA/ Civil Society	0.1
Construction Implementation Unit (CIU policy and overall coordination)	MoF/MLGHE/Fiji Consulting industry	0.2
Reconstruction Needs		**857.0**
Management Information System, M&E	MoF/MLGHE	0.5
Expert Advisory Groups	MoF/MLGHE/FIE/FIA/HfHF/MTCT	0.3
Dept of Social Welfare eligibility vetting, identifying needy people	MWCPA/Fiji Consulting Industry	0.5
MoIT/MR&M/MiTA & sub-contractors to establish provincia hubs with mobile units (building and social)	MoF/MoIT/MRMD&NDMO/MLGHE/ Fiji Consulting Industry	10.1
Prepare multi-year communications plan (how to apply, elgibility, standard to build to, how to access advice)	CIU	0.1
"8-point Build Safer" flyer market saturation	CIU	0.8
Monthly dissemination of key messages	CIU	2.2
Training Dept. Social Welfare officers on elgibility criteria and follow up advice to be provided to hhds	CIU/MWCPA	0.4
Training MoIT staff and sub-contractors on damage assessments, advising hhds on repair priorities	MoIT/MRMD/NDMO/MiTA	0.4
Review and update building code and include 'deemed to comply' materials standards and specs for critical building elements affordable by low income hhds	MLGHE	0.5

Activity	Responsible Agency	Cost (F$ million)
Professional development training of building inspectors	MoIT/MoH/MLGHE	1.8
House addressing system in affected cane farming areas	MoS/ FSCL	0.2
House addressing system in affected peri-urban informal settlements	MLGHE/MoL/PCN	0.2
Replace minimum household goods and school uniform (destroyed houses only)	MOF/Individual Households/FNPF	53.8
Prepare and pre-approve 4-6 'model' houses (one room starter that can be incrementally expanded over many years) with materials list and specifications for voluntary uptake by hhds	MoIT/MLGHE/MRMD&NDMO/ HfHF/MTCT (Rotahomes)/FIE/MRH	0.1
Reconstruct 11,030 to starter house/core unit	MoIT/MLGHE/MRMD/NDMO/ Individual Households	77.2
Reconstruct 11,030 to build back better standards	MoIT/MLGHE/MRMD/NDMO/ Individual Households	490.6
Initial repairs to critical elements (partial roof) of major damage houses	MoIT/MLGHE/MRMD/NDMO/ Individual Households	26.9
Initial repairs to critical elements (partial roof) of minor damage houses	MoIT/MLGHE/MRMD/NDMO/ Individual Households	135.6
30,369 household repairs toolkit	GoF with support from NGOs and Donors	13.2
Prepare and pre-approve 2 wet area designs with materials lists and specs	GoF with support from Development partners	0.1
Reconstruct 11,030 water and shower units	MoH/MRMD/NDMO/households	36.2
Transportation to Viti Levu	GoF	1.2
Transportation to Vanua Levu	GoF	1.2
Transportation to Maritime islands	GoF	1.0

Source: Estimations by Assessment Team.

Table 91: Recovery and Reconstruction Needs for Transport

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**177.9**
Recovery Needs		**3.2**
Restoring full access and connectivity through affected road sections	FRA	2.8
Salvage grounded vessels	Private sector	0.3
Clear debris from runways and rebuild security fences	AFL	0.05
Reconstruction Needs		**174.7**
Reconstruction of bridges, crossings, culverts, and approaches. Repair of associated facilities.	FRA	131.2
Reconstruction of rural jetties	FRA	37.0
Repair of aids to navigation	MSAF	2.3
Repair of port terminal buildings	FPCL	0.8
Repair of airport terminal buildings	AFL	3.4

Source: Estimations by Assessment Team.

Table 92: Recovery and Reconstruction Needs for Water and Sanitation

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**24.3**
Recovery Needs		**3.6**
Repair or buy new water storage tanks, fees for carting, water monitoring and testing, rural water schemes	WAF	1.1
Urban waste disposal costs, upgrade waste water treatment plants (add mechanical screens)	City Councils	2.2
Purchase generator sets	WAF	0.3
Strengthen institutional capacity in sector, including provision of experienced advisor with technical expertise of water treatment in the strategic planning department in WAF, review of tariff, preparation of water and waste management plans	WAF	0.04
Reconstruction Needs		**20.7**
Water		
Repair of WAF assets	WAF	6.8
Repair of rural water schemes	WAF	0.2
Have experienced advisor with engineering expertise of water treatment in the strategic planning department in WAF	WAF/Development partners	0.2
Reconstruction of WAF assets	WAF	9.4
Reconstruction of rural water schemes	WAF	2.6
Provide microbiological testing facilities in every urban drinking water treatment plant	MoH/WAF	0.1
Repair or buy new water storage tanks	WAF	0.9
Repair of EPS	DWS	< 0.1
Issue annual water quality monitoring plan & report	MoH/WAF	< 0.1
Review tariff so that contingency costs can be covered at minimum	WAF/Development partners	< 0.1
Comprehensive management plan together with environmental water use	WAF/Development partners	< 0.1
Sanitation		
Reconstruction of WAF assets	WAF	< 0.1
Upgrade WWTPs (add mechanical screen)	WAF	0.1
Comprehensive waste management plan incorporating feasibility study for incineration	MLGHE	< 0.1
Solid waste		
Build transfer stations	MLGHE/City Councils	0.4

Source: Estimations by Assessment Team.

Table 93: Recovery, Reconstruction and Resilience Needs for Electricity

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		
Recovery Needs		**2.1**
Communications	FEA	2.0
Property	FEA	0.1
Reconstruction Needs		**25.9**
Generation	FEA	1.8
Transmission	FEA	6.7
Distribution and retail	FEA	17.4
Resilience Needs		**5.8**
Rural mini grids and stand-alone solar systems	FEA	5.8

Source: Estimations by Assessment Team.

Table 94: Recovery and Reconstruction Needs for Communications

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**48.8**
Recovery Needs		**6.4**
Urgent rehabilitation of communication towers and equipment	Vodafone, Digicel, TV and radio broadcasters	4.5
Repair/replacement of damaged infrastructure and equipment	TFL, with assistance from government and donor agencies	1.9
Reconstruction Needs		**29.4**
Replacement of damaged stock and urgent building repairs and maintenance	Post Fiji	0.1
Repair/replacement of damaged infrastructure and equipment	Vodafone, Digicel, TFL, with assistance from government and donor agencies	29.3
Resilience Needs		**13.0**
Complete fiber ring around Viti Levu to provide redundancy to existing infrastructure	TFL, with assistance from government and donor agencies	5.6
Establish a second redundant link from Viti Levu to Vanua Levu through Lomaiviti	TFL, with assistance from government and donor agencies	2.0
Build CAT3/ 4 resilient heavy duty guyed masts (45 metres) at remote sites	Digicel	5.3
Build CAT4 resilient bunkers to house transmission equipment.	CFL	0.1

Source: Estimations by Assessment Team.

Table 95: Recovery and Reconstruction Needs for the Environment

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**73.9**
Recovery Needs		**60.8**
Control of Invasive African Tulip	GoF/NGOs/Development partners	10.1
Strengthening and enforcement of planning and environmental legislative and institutional frameworks (through budget arty support from donors) including native forest areas adjoining to the cyclone damaged coral reefs	Ministry of Fisheries and Forest/ NGOs/Development partners	5.0
Use of Fish Aggregated Devices (FDAs)	Ministry of Fisheries and Forest/ NGOs/Development partners	0.9
Operational cost for the management of existing protected areas & reserves (coral reef, mangrove and native forest).	GoF/NGOs/Development partners	3.0
Increased cost of ecological surveys, damage assessment, monitoring and recovery of ecosystem assets and establishing a centralised database)	GoF/NGOs/Development partners	8.2
Clearance of debris in cities and villages	MLGHE	13.9
Clearance of debris from agricultural land	MoA	14.2
Special treatment for potentially recyclable / reusable material	MLGHE	4.5
Special treatment for potentially hazardous waste	GoF/MLGHE	1.0
Reconstruction Needs		**13.1**
Replanting of mangroves	GoF	1.8
Assisting recovery of coral reefs through transplants and protection using the techniques used by the privates sector (hotel and coral export industry)	GoF/NGOs/Development partners	4.7
Waste processing equipment (cost of compactor and shredders) with locations aligned with proposed waste transfer stations to avoid expansion of waste sites – strengthen recycle/reuse. (Year two costs are based on government operational cost of 40%)	MLGHE/Development partners	6.6

Source: Estimations by Assessment Team.

Table 96: Recovery and Reconstruction Needs for Gender and Social Inclusion

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**2.0**
Recovery Needs		**1.6**
Skills development, training and market development	Ministry of Women, Children and Poverty Alleviation/Development partners	0.35
Consultations documentation and registration of vulnerable groups	Ministry of Women, Children and Poverty Alleviation/Development partners	0.07
Strengthening services and referral systems for prevention of SGBV	Ministry of Women, Children and Poverty Alleviation/Development partners	0.70
Psychosocial support to children and community members	Ministry of Women, Children and Poverty Alleviation/MoHMS/Development partners	0.05
Support for the elderly, PLWD, and child protection	Ministry of Women, Children and Poverty Alleviation/MoHMS/Development partners	0.14
Reconstruction and rehabilitation of 9 Women Resource Centres	Ministry of Women, Children and Poverty Alleviation /Development partners	0.18
Gender Recovery Monitoring and Evaluation	Ministry of Women, Children and Poverty Alleviation /Development partners	0.15
Reconstruction Needs		**0.4**
Reconstruction and rehabilitation of nine women resource centres	Ministry of Women, Children and Poverty Alleviation /Development partners	0.20
Gender recovery monitoring and evaluation	Ministry of Women, Children and Poverty Alleviation /Development partners	0.20

Source: Estimations by Assessment Team.

Table 97: Recovery and Reconstruction Needs for Culture and Heritage

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		9.1
Recovery Needs		**0.6**
Emergency salvaging of heritage fixtures and materials (Makogai Island)	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	<0.1
Emergency technical assessment/mission of extent of damage and appropriate repair methodology including recovery efforts	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Inventory of intangible cultural heritage in Navala	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	<0.1
Immediate capacity building of traditional architectural skills (Navala) and basic conservation timber and stone architectural knowledge (Levuka)	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Immediate rehabilitation of damaged repositories of heritage	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Immediate full assessment of status of intangible cultural heritage element mapped	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Skills and product development workshop for visual, craft and heritage practitioners using recyclable materials	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Development and implementation of DRR plan for all cultural domains	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Reconstruction Needs		**8.5**
Repair and reconstruction of traditional houses in Navala Village	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.6
Immediate rehabilitation and restoration of built heritage (residential houses) in Levuka	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	2.0
Restoration of built heritage on Makogai and establishment of protection buffer	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.3

Activity	Responsible Agency	Cost (F$ million)
Rehabilitation and restoration of other built heritage in Levuka (Levuka Heritage Infrastructure)	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	4.2
Construction of Navala ethnological museum and adjoining exhibition office facilities for tourism purposes	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.2
Construction and installation of basic amenities in Navala, including electricity, water supply, fire hydrant system sewerage	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.5
Regeneration of essential traditional architectural raw materials (environmental)	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Full restoration of damaged repositories of heritage	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.3
Development of safeguarding plans for intangible cultural heritage with bearers and communities	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.1
Development of social education tools to enhance sustainable culture and heritage	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.0
Establishment of incubation spaces, galleries and advisory portals for cultural goods producers	Ministry of iTaukei Affairs, National Trust of Fiji/ Development partners	0.2

Source: Estimations by Assessment Team.

Table 98: Reconstruction and Resilience Needs for Disaster Risk Management

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**14.7**
Reconstruction Needs		**2.7**
Reconstruction, replacement and repair of priority assets and buildings	NDMO/Development partners/Donors	2.7
Resilience Needs		**12.0**
Strengthen governance and institutional arrangements	NDMO/Development partners/	0.9
Understand risk	NDMO	2.1
Strengthen community resilience	NDMO/Development partners	4.7
Develop a comprehensive DRM communications strategy	NDMO/Development partners	0.2
Develop a monitoring and evaluation framework and systems to track the development and implementation of DRM across government agencies and publish a biennial state of DRM report	NDMO/Development partners	0.1
Invest in catastrophe risk insurance, including regional schemes	GoF	4.0

Source: Estimations by Assessment Team.

Table 99: Recovery and Reconstruction Needs for Employment, Livelihoods and Social Impact

Activity	Responsible Agency	Cost (F$ million)
Total Recovery and Reconstruction Needs		**34.0**
Recovery Needs		**5.0**
Micro-enterprise support and preparedness	Integrated Human Resource Development Programme (lead), Ministry of Employment, Ministry of Social Welfare, Ministry of Youth/ National Youth Council of Fiji Islands, Fiji Disabled Peoples Federation, Women Entrepreneurs & Business Council (WEBC), Young Entrepreneurs Council (YEC)/ILO/UNDP	7
Enterprise Recovery Programme (to support enterprises in the formal sector)	Ministry of Industry & Trade (lead)/ Fiji Commerce & Employers Federation (FCEF)/ ILO/UNDP	10
Expansion of existing social benefit scheme	Ministry of Women, Children & Social Welfare (lead)/Fiji Council of Social Services	7

Activity	Responsible Agency	Cost (F$ million)
Capacity Building of Government agencies and CSOs that support micro enterprises	ILO/UNDP	3.5
Skills Development & Business Confidence Programme for Construction Sector using Employment Intensive Infrastructure Programmes (EIIP)	Ministry of Employment/National Employment Center (lead), Ministry of Youth, Ministry of Women, Children and Social Services/ National Youth Council of Fiji Islands, Fiji Disabled Peoples Federation/ILO/UNDP	3
Child labour monitoring, advocacy and withdrawal programme	Ministry of Women, Children & Social Welfare/ Fiji Council of Social Services	0.5
Study on the Fiji National Provident Fund (FNPF) on the impact of withdrawals for disasters and social security support programmes for informal workers	Ministry of Employment/National Employment Center with support from Development partners	0.5

Source: Estimations by Assessment Team.

Annex 3: Supplementary Material for Employment, Livelihoods and Social Protection

Table 100: Population Affected by TC Winston

Division	Deaths	Missing	Hospitalised	Injured	Number of people affected due to loss of livelihood of main bread winner	Number of people displaced	Total number of those affected
Central	6		2	24	162,698	5245	167,975
Eastern	22	1	3	59	30,222	7595	37,902
Northern	3		5	10	93,488	10210	103,716
Western	13		17	24	198,622	32145	230,821
Total	**44**	**1**	**27**	**117**	**485,030**	**55,195**	**540,414**

Source: Estimations by Assessment Team.

Table 101: Poverty Alleviation Government Programmes by Year (F$ million)

Programmes	2009	2010	2011	2012	2013	2014	2015	2016
Department of Social Welfare								
Poverty Alleviation Projects	1.0	0.6						
Poverty Benefit Scheme					22.6	22.0	22.0	22.0
Child Protection Allowance	0.4	4.4	4.4	4.4	6.0	4.5	2.0	3.2
Social Pension Scheme					3.2	3.0	8.0	13.0
Food Voucher Programme		7.4	11.0	12.6		1.3	1.0	0.5
Women's Plan of Action	0.4	0.3	0.3	0.6	0.6	0.8	1.0	1.0
Cottage Industry Development	0.3	0.1						
Integrated National Poverty Eradication Programme				0.3	0.3	0.3	0.3	0.3
Welfare Graduation Programme			0.6	0.6	0.5	0.5	0.5	0.5
Fiji National Council of Disabled Persons					0.3	0.3	0.3	0.4
Capital Grant to Voluntary Organizations	0.4	0.4	0.2	0.2	0.1	0.2	0.2	0.3
Family Assistance Scheme	20.0	15.0	15.0	15.0				
Women's Resources Centre						0.2		
Grants to Girls' Home					0.1	0.1	0.1	0.2
Fire Victims Relief					0.1	0.1	0.1	0.2
Education								
Education/ Poverty Relief Fund	0.2	0.3						
Bus Fare Subsidy			12.0	12.0	11.0	20.8	20.0	19.0
Health								
Free Medicine							8.0	10.0
Department of Housing								
HAG (2011)/Housing Assistance for First Time Home Buyers			10.0	10.0		10.0	10.0	10.0
Low Cost Housing Project (HA)						12.0		
Public Rental Housing Project						10.0		
Lagilagi Housing Development Project - Phase 2						3.0	2.0	3.3
Savusavu Development Project						2.5	3.4	2.6

Programmes	2009	2010	2011	2012	2013	2014	2015	2016
Squatter Upgrading and Resettlement Programme	2.0	1.5	1.5	2.0	1.0	2.0	3.0	4.0
Kalabu Development Project						1.5	0.7	
HART	1.0	1.0	1.0	0.6	0.6	1.0	0.5	0.5
HA Social Housing Policy					1.0	1.0	0.5	0.5
Informal Settlement Project						1.0	3.0	1.0
Sustainable Income Generating Project				0.5	0.4	0.7	0.5	0.3
City Wide Squatter Upgrading Project						0.5	0.5	0.4
National Housing Policy Implementation Plan				0.2	0.2	0.2	0.2	0.2
HA Matavolivoli Development Project								4.9
Housing Assistance to Fire Victims							1.0	1.0
Prime Minister's Office								
Funds for the Education of Needy Children							0.2	0.2
Strategic Planning								
Northern Development Programme	3.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5
Miscellaneous								
Tertiary Education Loan Scheme						52.5	42.5	42.5
Student Loan Scheme	1.0	1.0	1.0	1.0	1.0			
National Toppers Scholarship Scheme							10.0	10.0
Existing Scholarship Scheme						26.0	15.7	8.0
FDB Subsidy	5.6	4.0	2.5	4.0	3.9	5.0	5.5	4.8
FDB - Interest Subsidy (Northern Division Projects)	0.6	0.6	0.5	0.6	0.2	0.2		
FEA Subsidy			3.5	3.5	3.5	3.5	5.7	5.7
Commerce								
Micro Finance	0.5							
Multi Ethnic Affairs								
Multi Ethnic Affairs Scholarships	5.5	5.5	5.5	5.5	5.5			
Ministry of Labour								
National Employment Centre				1.1	0.8	0.8		
TOTAL	**41.8**	**43.0**	**70.0**	**75.6**	**63.8**	**189.0**	**169.9**	**172.0**

Source: Estimations by Assessment Team.

Annex 4: Supplementary Material for the Commerce and Manufacturing Sectors

Financial Sector Damage, Losses and Recovery Needs

The direct impact of TC Winston on the financial sector was very low, with limited damage to buildings from wind or flooding, which is a testament to resilient design. Most financial services were fully operational by February 26, with only a few locations offering limited services and two banks closed, and a week later all were operational. The financial sector is fully insured for damage.

All the banks are offering affected customers a relief package, which will come in the form of the postponement of loan repayments and restructuring to reduce debt stress and make funds available to those who need to rebuild or restock. While on the one hand the postponement of payments will affect income in the short term, the new lending to fund rebuilding will supplement income. The degree of default on loans particularly for those customers whose business were damaged, remain closed and have no insurance will remain unknown for some time. The financial sector has donated upwards of F$700,000 to the humanitarian effort. The Provident Fund announced that all members could draw F$1,000 from its superannuation account and up to F$5,000 for members who had to rebuild houses.

Insurance companies have reported total claims of F$255 million offset by F$49.9 million in recoveries (excess) resulting in a net F$155 million impact on the industry. The majority of claims have yet to be assessed and, invariably, the total value of claims paid will be lower. Additionally, some claims will not be considered valid as they may fall outside the terms of the relevant insurance policy and will therefore be rejected. Total claims processed are expected to be around 85 percent of the current value. The process of validating claims and making payments will typically take 12 to 14 months, and longer still when litigation is required.

Recovery Needs

The financial sector can disburse and manage funding to help rebuild the industry. Where not viable for the banks themselves to lend, they lend donor/soft loans through their system and networks, for example agri loans to sugar farmers or housing finance to small value home owners. To facilitate this, banks will need access to soft/subsidized loans and a fee to cover operation costs.

Annex 5: Supplementary Material for the Housing Sector

Methodology Used for Determining TC Winston Housing Sector Damage and Losses

The process for estimating the effects of TC Winston on the residential housing stock has two steps: one, estimation of the baseline housing stock and its economic value; and, two, estimation of the effects on the housing stock following TC Winston. The analysis for the housing sector was carried out at the Tikina level (equivalent to the provincial level), later aggregated up to the divisional level.

Estimated Breakdown of the Baseline Building Stock by Building Type

The baseline building stock was estimated through use of 2007 Census data, which shows the breakdown of the number of households living in six different building typologies. This information was overlaid on the exposure data available from the PCRAFI data compiled in 2010 for estimating the total number of buildings. Population growth rates were derived for each Tikina using population census growth rates between 1996 and 2007. This growth rate was applied to the 2007 census household data to estimate the 2010 average household numbers per building type per Tikina, from which the number of housing units per building type per Tikina were derived. This established the housing stock baseline for 2010, which was then projected to 2014 using the population growth rate between 1996–2007 per Tikina. Table 102 shows the pre-event housing building stock as estimated using the method described above.

Table 102: Estimated Pre-Event Building Stock by Province

Province	Concrete	Wood	Tiniron	Bure	Makeshift	Other	Total
Ba	21,796	7,503	17109	675	282	168	47,533
Bua	158	841	1611	127	28	30	2,795
Cakaudrove	1,128	4,182	2,105	278	109	56	7,858
Kadavu	621	845	644	44	5	2	2,161
Lau	1,051	2,920	1,823	68	16	18	5,896
Lomaiviti	861	802	774	43	19	19	2,518
Macuata	1,278	2,099	1,967	134	55	101	5,634
Nadroga	4,034	1,163	3,532	349	90	83	9,251
Naitasiri	11,681	4,900	8,141	277	119	122	25,240
Namosi	256	311	678	103	46	25	1,419
Ra	1,441	934	3,019	385	90	77	5,946
Rewa	9,609	3,125	3,555	69	58	10	16,426
Rotuma	368	124	92	52	3	1	640
Serua	864	783	904	35	8	3	2,597
Tailevu	2,682	2,983	4,398	188	58	69	10,378
Total	57,828	33,515	50,352	2,828	986	784	146,292

Source: Estimations by Assessment Team.

Estimated Damage to the Housing Stock by Building Type

Data on damage to the housing stock collected in the field and compiled by the NDMO was made available for the PDNA and was the main source of information for damage estimation. Information on damage is available for the four divisions in Fiji. The data from NDMO reports damage to residential buildings using two classes: destroyed and damaged. The challenge was to disaggregate this information by building type to be able to estimate the economic impact on the housing sector, and to further separate the buildings reported as damaged into major damage and minor damage. Considering

the damage observed in the field characteristically caused by strong winds, major damage was defined as major damage to the roof (blown off), whereas minor damage was defined as partial damage to the roof and/or some claddings or other non-structural building elements. For the disaggregation of these reported buildings into building types, information on the vulnerability of typical building types in the Pacific was used. Vulnerability was assessed at various intensity levels—in this case wind speed of the cyclone—using information available from the scientific literature.

To further disaggregate into major damage and minor damage, all buildings in the damaged category reported by NDMO were simply split 50:50, using expert judgement and reflecting the field reports, which described the observed proportion of the damaged buildings in the field to be 60:40 in the high-intensity (=high wind speed) areas. The assumption was that the further away from the center of the hurricane track, the lower the damage. Using this logic, in low intensity areas the nominal split between major and minor damage was assumed to be 40:60, meaning that the average of the split across the country would be 50:50. With the information available, coming up with a more realistic ratio between the two damage levels was not possible, unless an extensive field survey was carried out. After splitting the number of NDMO reported damaged category buildings into 50:50 for major and minor damage, the breakdown of the number of buildings in each damage class by building type was estimated again using the information about the vulnerabilities of the building types in the literature.

The entire country was divided into three intensity areas (based on wind speed), using 80-160 kph (intensity 1), 160-240 kph (intensity 2) and 240-320 kph (intensity 3). Cyclone wind speed maps were used to allocate an intensity level to each province, assuming a homogeneous wind speed within a province. Figure 37 shows the provinces colored according to the intensity level assigned for this exercise.

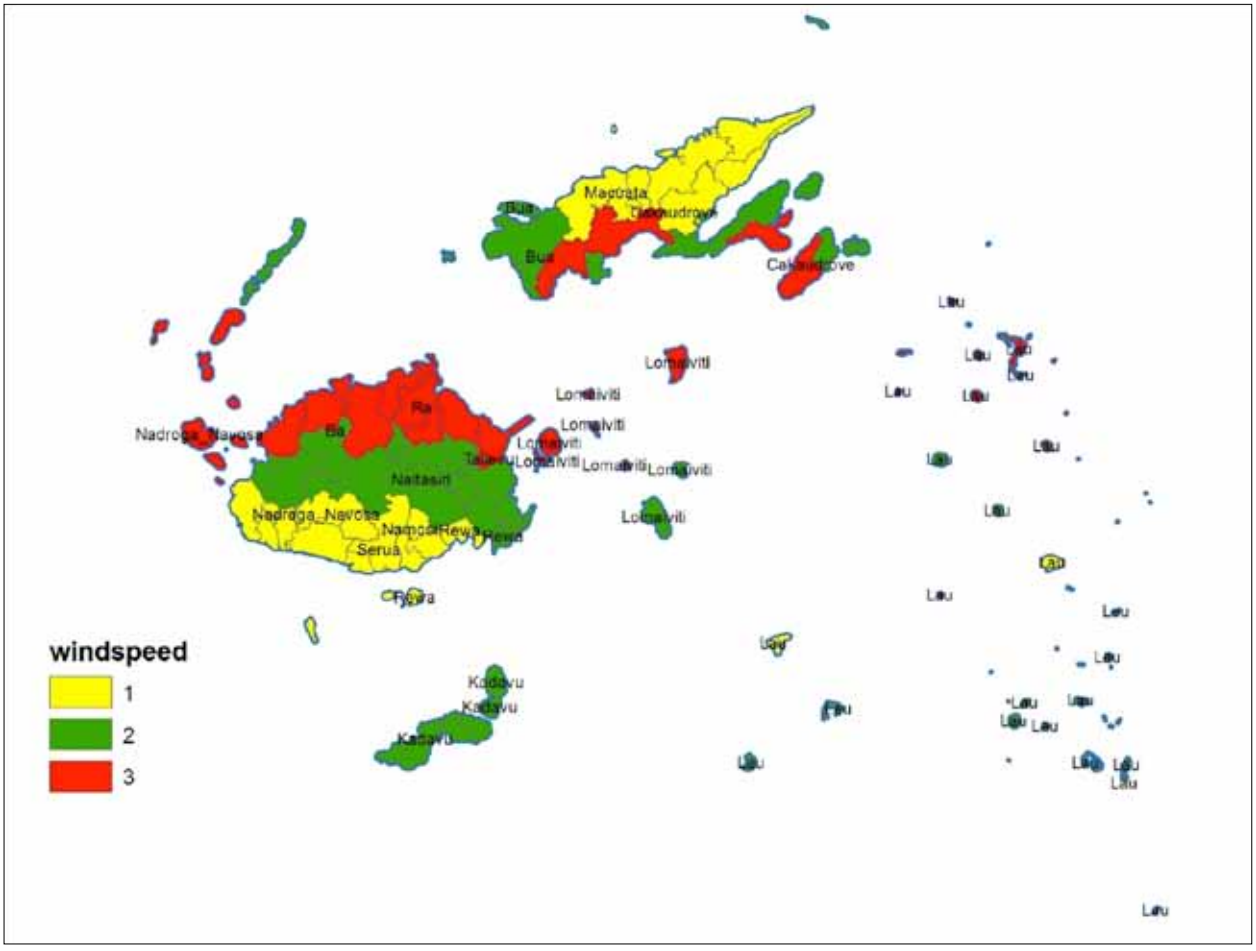

Figure 37: Provinces Color Coded According to Wind Speed Intensity Levels

Source: Estimations by Assessment Team.

The final estimated breakdown of the number of housing units[136] by building type, damage class and Tikina. Table 103 shows results aggregated at the province level.

[136] An assumption was made that, in Fiji, most housing units are single dwellings.

Table 103: Breakdown of Affected Residential Buildings into Damage Levels by Province

Province	Destroyed	Major Damage	Minor Damage	Destroyed and Major Damage as % of all Units
Ba	3,494	4,241	4,241	16%
Bua	524	605	605	40%
Cakaudrove	1,513	2,199	2,199	47%
Kadavu	0	0	0	0%
Lau	328	63	63	7%
Lomaiviti	1,191	296	296	59%
Macuata	5	10	10	0%
Nadroga	113	259	259	4%
Naitasiri	542	365	365	4%
Namosi	27	14	14	3%
Ra	2,813	757	757	60%
Rewa	66	77.5	77.5	1%
Rotuma	0	0	0	0%
Serua	19	19	19	1%
Tailevu	395	287	287	7%
Total	11,030	9,130	9,130	

Source: Estimations by Assessment Team.

To calculate the economic impact of TC Winston on the housing sector, information on average floor size and unit cost was gathered through extensive consultation with local construction experts. Furthermore, the PCRAFI data provided a national view of the ratio of urban (46 percent) and rural (54 percent) buildings in the country. The assumptions used in the analysis are shown in Table 104.

Table 104: Assumptions Used to Determine Damage and Losses to the Housing Sector (Average Floor Size and Unit Cost for Various Building Materials)

	Concrete	Wood	Tin or iron	Bure materials	Makeshift material	Other
Average Floor size (m^2)	80	60	60	35	75	24
Urban Unit Cost F$/$m^2$	750	650	650	300	200	250
Rural Unit Cost F$/$m^2$	650	650	650	300	200	250

Source: Estimations by Assessment Team.

Using this information, damage to the housing stock was estimated to be F$667 million. The breakdown of the number of affected residential buildings by division is shown in Table 105.

Table 105: Estimated Damage to Residential Buildings by Division (F$ million)

Division	Total Value of Pre-Disaster Housing Stock	Cost of Damage to Housing Stock		
		Destroyed	Major Damage	Minor Damage
Central	3,122.8	46.5	12.0	6.3
Eastern	558.7	75.0	6.2	2.7
Northern	692.9	96.1	44.7	22.3
Western	3,430.7	304.4	90.1	45.4

Source: Estimations by Assessment Team.

Annex 6: Disaster Risk Management

6.1 The Role of Government in DRM in Fiji

The National Disaster Management Council (NDMC) is the forum that formulates disaster management policies. The responsibility for national disaster management rests with the National Disaster Controller, who assumes powers on the formal declaration of a natural disaster under the National Disaster Management Act 1998.

The National Disaster Management Office (NDMO) implements NDMC policies and establishes the National Emergency Operations Centre (NEOC) during emergencies. The NDMO/NEOC is assisted by Disaster Service Liaison Officers from government agencies as the main points of contact for liaison and coordination. At the division and district levels, the Commissioner and District Officer, respectively, are responsible for the emergency operation, in close coordination with the National Disaster Controller and NDMO/NEOC.

Divisional Commissioners have overall authority to manage and direct disaster emergency operations within their respective divisions and are subordinate to the National Disaster Controller and NDMC-Emergency Committee. However, the Commissioner has the autonomy to activate Divisional Emergency Operations upon issuance of a warning of an approaching disaster, with powers to control all agency resources within the Division. The Commissioner is also responsible for developing a comprehensive disaster management plan for the division and, in close cooperation with NDMO, contributes to the implementation of disaster management policies.

At the district level, the District Officer is responsible for preparing a District Disaster Management Plan and ensures that various agencies and NGOs in the district prepare detailed disaster operation plans which the District Officer must vet and adopt as part of the District Plan.

6.2 Detailed Recommendations for Financial Resilience

Once the government has an understanding of its contingent liabilities, it can consider developing a DRFI strategy with a combination of tools to meet different levels of post-disaster funding needs. The DRFI note prepared in 2014 (PCRAFI, 2014) outlines existing financial instruments available to Fiji and details options for consideration. Revisiting this note and its recommendations in the aftermath of TC Winston is suggested.

Importantly, no single tool will remove all of the financial burden from disasters. Rather, the government should look to 'layer' its financial tools to best meet the disaster needs at different levels of severity. For example, Fiji has the Prime Minister's Fund to manage those events that occur frequently and cause a low level of damage, but these domestic reserves will be quickly exhausted when more severe disasters occur. Therefore, this funding source should be complemented by additional tools.

To help avoid costly budget reallocation when these events occur, the government should consider establishing a line of contingent credit for mid-sized disasters. The advantage of this is that since it is arranged in advance, funds can be disbursed within 24 hours of an event, as was the case in the Philippines following TC Haiyan.

For the most extreme events, such as TC Winston, the Government of Fiji should consider risk transfer. Under the PCRAFI insurance programme, countries pay a premium to transfer some of their risk to international reinsurance markets. Following an eligible event and based on their policy choices, countries will receive a payout within 10 days as an injection of cash to provide direct budget support. Both Tonga (TC Ian, January 2013) and Vanuatu (TC Pam, March 2015) have received payouts under this scheme. However, risk transfer is only cost effective for less frequent, more severe events.

Another key decision that the government must make is to stipulate what it will cover in the aftermath of a disaster and what can be managed by the private sector. By crowding in the private sector insurance markets, the government may be able to transfer some risk to the domestic insurance industry. For example, building capacity within the domestic insurance market and ensuring the industry is properly regulated, the cost of reconstruction to private households can be transferred to the domestic insurance industry. Using insurance in this way also reinforces the need to adhere to the building code as the assets must be of an insurable quality. In the same vein, the government can also insure its key public buildings, which would complement the PCRAFI insurance (which acts as budget support) by providing finance for the reconstruction of these buildings and helping to reduce their contingent liability.

A review of the domestic insurance industry was contained in the DRFI note produced for Fiji, which states that the Fiji non-life (general) insurance market is the second-largest in the Pacific island countries, with a total premium of F$174.5

million (US$$93 million). Seven local insurers are currently operating with a total premium income of F$145.5 million. The balance of F$29 million (US$16 million) is equal to 17 percent of the market and is placed with offshore insurers by the four local brokers (PCRAFI, 2014). This suggests that there is scope to build the capacity of the domestic insurance industry to provide catastrophe risk extensions to help alleviate the contingent liabilities faced by the Government of Fiji.

Kings Road, Navutulevu Village, Rakiraki, Ra Province, Viti Levu
Source: Vlad Sokhin/World Bank

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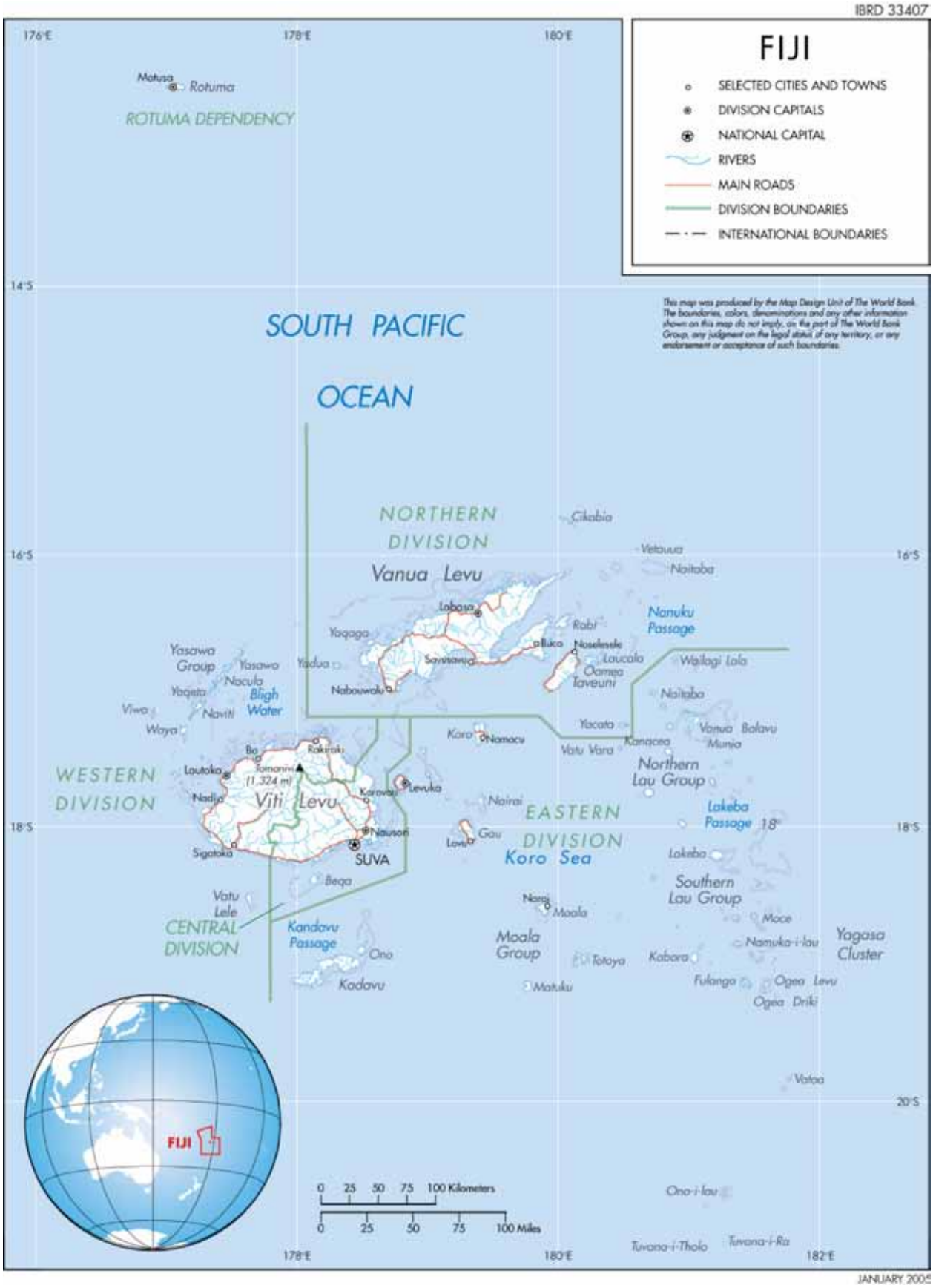
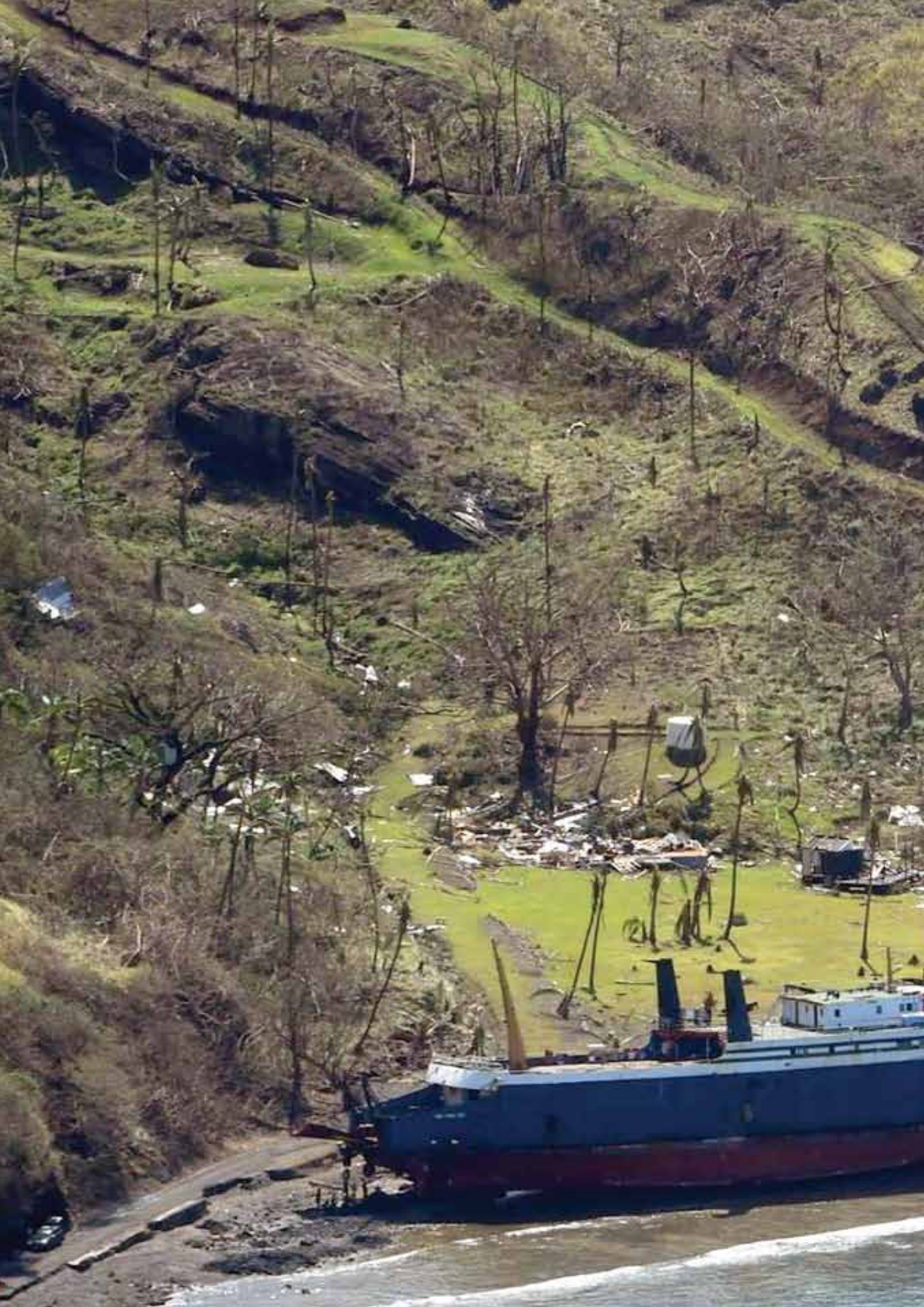
Annex 9: Map of Fiji





Damage to Ovalau Resort
Source: Ministry of Information

Southern Taveuni Island, near Kanacea
Source: Vlad Sokhin/World Bank

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