



Post Disaster Needs Assessment (PDNA)

Floods due to Hurricane Lisa in Belize

EXECUTIVE SUMMARY

March 2023



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FOREWORD

Hurricane Lisa made landfall about 10 miles south of Belize City near the mouth of the Sibun River as a Category 1 hurricane with maximum sustained winds of 85mph on Wednesday, November 2, 2022. Tropical storm force winds moved well inland with the system affecting portions of the Cayo District and southern Orange Walk District. The country was affected by strong winds and intense rainfall with amounts of up to 5-9 inches especially over the northeastern areas. This, coupled with an estimated storm surge of around 3-5 feet led to flooding, particularly in Belize City and Ladyville.

Hurricane Lisa, despite its relatively small size and Category 1 status, resulted in damage and loss comparable to larger and more powerful storms. It is important to determining the physical damages, economic losses, and costs of meeting recovery needs after a natural disaster, hence the purpose of this document. The Post Disaster Needs Assessment is a joint approach of assessing disaster effects and impacts to then determine priority recovery needs.

Through application of the PDNA methodology, Belize has, for the first time, been able to get a more accurate and holistic picture of the total effects of incidents of this type. This PDNA also allowed the Government of Belize and its partners to look critically at actions taken before, during and after Hurricane Lisa. It allowed for a candid snapshot of the state of disaster risk management in Belize, and the picture that has developed indicates that there is a lot of work ahead to create a disaster resilient nation. The PDNA methodology required the Government and its partners to prepare one comprehensive assessment utilizing the data and analyses of losses, damages, and priority recovery costs generated by all NEMO committees, as well as recovery actions in a thorough and accessible manner. This represented a paradigm shift in Belize's recovery planning. The PDNA has indicated that the recovery plan should encourage the need to align all efforts and initiatives to reduce disaster risk and strengthen Belize for the inevitable next storm.

Beyond reporting disaster damage and losses, the PDNA has given the country the opportunity to develop meaningful and thoughtful recommendations which can be readily implemented using local resources. Belize should now use the opportunity to critically examine its disaster preparation, actions and reactions using the lens of disaster risk reduction. Luckily no lives were lost but this experience may lead citizens and residents to ask – “Is Belize really prepared?” Hurricane Lisa revealed many structural, procedural and administrative issues that have remained unaddressed and unresolved over the years. These issues became more acute given the country’s recent experience with COVID-19.

It would be irresponsible for the Government of Belize not to conduct a self-assessment and evaluation of its disaster management systems with the aim of improving them. Evaluation is oriented to assessing and helping to improve all aspects of society including emergency management and is a critical element of personal, societal and organizational learning. The PDNA contains not only estimates of damage and loss, but also key recommendations for improvement. The Government of Belize, through the Ministry of Sustainable Development, Climate Change and Disaster Risk Reduction, will be implementing many of these recommendations as part of its greater efforts to create a truly resilient Belize.

MESSAGE FROM THE MINISTER



HONORABLE ORLANDO HABET

Minister

Ministry of Sustainable Development, Climate
Change & Disaster Risk Management

On Wednesday, November 2, 2022, Hurricane Lisa made landfall about 10 miles south of Belize City as a Category 1 hurricane with maximum sustained winds of 85 mph. Tropical storm force winds affected portions of the Cayo District and southern Orange Walk District. The country was affected by strong winds and intense rainfall with amounts of up to 5-9 inches especially over the northeastern areas. This, coupled with an estimated storm surge of around 3-5 feet, led to flooding particularly in Belize City and Ladyville. Hurricane Lisa resulted in BZ\$131.1 million dollars in damage while losses amounted to BZ\$62.8 million. Importantly, this storm highlighted our extreme vulnerability to natural disasters and the impacts of climate variability.

This “Post Damage and Loss Assessment” serves as a reminder and proof of the Government of Belize’s resolve and commitment to risk reduction and the well-being of our people. The Government recognizes the necessity to better understand our climate and disaster risk context; it continues its efforts to reduce this risk and to improve resilience across all sectors.

This report provides a comprehensive damage and loss assessment of the affected sectors, with particular focus on social, productive and infrastructure sector to inform the Government’s recovery, re-construction, and financial planning. The analysis of the data has identified the needs and quantified financial requirements that will facilitate formulating comprehensive relief and early recovery actions.

The PDNA includes short- and medium-term recommendations designed to further incorporate disaster risk reduction and management into the decision-making processes so that we continue to develop into a country that is more resilient to natural disasters and climate change. This report has been jointly prepared by the Government of Belize and the United Nations, with the support of all NEMO Committees, the humanitarian and development community. The Government of Belize appreciates the collaborative spirit and the contributions from all partners to this important process. On behalf of the Government, I would like to thank all those who collaborated on this first Post Disaster Needs Assessment.

MESSAGE FROM THE MINISTER OF STATE



HONORABLE RAMON CERVANTES

Minister of State
Ministry of Sustainable Development, Climate
Change & Disaster Risk Management

Hurricane Lisa struck Belize on November 2, 2022, causing significant damage and losses to several districts in Belize. This Post Disaster Needs Assessment describes the loss and damage to physical assets, the subsequent losses sustained across all economic activities, and the impact of the disaster on both the national economy and household-level activities and well-being.

The PDNA allowed Government of Belize to determine the full scale of the impact of Hurricane Lisa and requirements for both immediate humanitarian assistance needs and medium to longer term recovery. This assessment is significant in the cooperation of national, humanitarian and development actors to bring together relief, early recovery and longer-term recovery in one assessment.

A continuation of this partnership between the Government of Belize and the international community that has resulted in this joint assessment will be essential in the near, medium and longer term to address the needs of affected populations and sectors.

The comprehensive methodology estimated humanitarian needs, damage to assets, changes in economic flows, and impacts on social and economic conditions. The estimates were based on information collected by the joint assessment teams during field surveys in the aftermath of the disaster.

The country must now enter into the post-disaster phase of socio-economic recovery and re-construction and face the longer-term issue of disaster reduction through improved risk management. This PDNA will provide the inputs to define the international support that the Government of Belize will require in future years to achieve this objective.

MESSAGE FROM RESIDENT REPRESENTATIVE



DENISE E. ANTONIO

UNDP Resident Representative for Jamaica, Belize, Bermuda, The Bahamas, Cayman Islands, and Turks and Caicos Islands.

The United Nations Development Programme in Belize is pleased to have coordinated the technical support and associated training necessary for the implementation of this Post Disaster Needs Assessment (PDNA) in Belize following the impact of Hurricane Lisa at the beginning of November 2022. From December 2022, support was implemented, starting with the scoping mission, and orientation sessions resulting in the conclusion of the full PDNA in March 2023.

The offer to the Government of Belize for the implementation of the PDNA came as a part of the package of support from the United Nations following Hurricane Lisa. The PDNA is a government-led exercise, with integrated support from the United Nations, the European Commission, the World Bank and other national and international actors. Information is compiled into a single, consolidated report, on the physical impacts of a disaster, the economic value of the damages and losses, the human impacts as experienced by the affected population, and the early and long-term recovery needs and priorities.

Special thanks to the Government of Belize for leading this process under the Ministry of Sustainable Development, Climate Change and Disaster Risk Management as well as the extensive participation from the wider sectors including Social Sectors (Health, Education, Housing and Culture), Productive Sectors (Agriculture, Forestry, Fishing, Commerce and Tourism), Infrastructure (Transport and Public Utilities). Further to the sectoral analyses, the assessment of the Macroeconomic Impacts and the Human impact were also central to the process prioritized nationally. We also thank and appreciate the collective and collaborative efforts of the development partners: FAO, PAHO, ILO, UNECLAC, UNFPA, UNESCO, UNICEF, UNRCO, WFP, the World Bank, the Inter-American Development Bank and the European Union.

The PDNA estimated a total of BZD\$ 193 million in damages and losses of which the housing and agricultural sectors were most affected. In addition, it was determined that an estimated BZD \$ 212 million would be needed for recovery inclusive of building resilience.

The macroeconomic impact totaled 0.4% of GDP and an estimated 39% of the population were affected. Concurrent with the ongoing challenges of the Covid-19 pandemic and the continued vulnerability to natural hazard events, this impact cannot be viewed in isolation.

We therefore hope this report provides information that can inform Belize's Medium Term Development Strategy and support the rationale for concessional financing of small developing states beyond the traditional economic definitions based on GDP per capita or other established criteria.

ACRONYMS

BBB	Build Back Better
BDF	Belize Defense Force
BELTRAIDE	Belize Trade and Investment Development Service
BZ	Belize Dollar
CCRIF SPC	Caribbean Catastrophic Risk Insurance Facility Segregated Portfolio Company
CCCCC	Caribbean Community Climate Change Centre
CC	Climate Change
CCA	Climate Change Adaptation
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CDM	Comprehensive Disaster Management
COVID-19	Coronavirus Disease 2019
CRIS	Climate Risk Information System
DaLA	Damage and Loss Assessment
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EOCs	Emergency Operations Centres
EU	European Union
GDP	Gross Domestic Product
GoBZ	Government of Belize
GFDRR	Global Facility for Disaster Reduction and Recovery
IADB	Inter-American Development Bank
IFIs	International Financial Institutions
iGOPP	Index of Governance and Public Policy in Disaster Risk Management
KOBO	
MIDH	Ministry of Infrastructure, Development and Housing
MoECST	Ministry of Education, Culture, Science and Technology
MSMEs	Micro, Small and Medium Sized Enterprises
MTDS	Medium-Term Development Strategy 2022-2026
NEMO	National Emergency Management Organization
PDNA	Post Disaster Needs Assessment
RSCM	Relief & Supplies Management Committee
SO	Strategic Objectives
UN	United Nations
UNICEF	United Nations Children's Fund
USA	United States of America
WB	World Bank for Reconstruction

ACKNOWLEDGMENTS

The Post Disaster Needs Assessment is a result of collaboration and support among various entities and individuals. Gratitude is extended to all the stakeholders who participated in consultation sessions and focused group discussions and responded to requests from the lead authors.

The Ministry of Sustainable Development, Climate Change and Disaster Risk Management wishes to extend profound thanks to its government counterparts in the provision of data and for actively participating in this initiative since its commencement in December 2022.

The Ministry is largely appreciative of United Nations Development Programme for its guidance and leadership in assembling the team and providing logistical support to Belize in this PDNA process in the wake of Hurricane Lisa. The Ministry also wishes to commend the international partners supporting the process including the European Union,

The InterAmerican Development Bank, the World Bank, CDEMA and the UN Country Team including UNRCO, UNICEF, UNESCO, ILO, PAHO/WHO, WFP, FAO and ECLAC.

Special thanks the United Nations Resident Coordinator, Ms Birgit Gerstenberg for providing strategic and coordinated support to the Ministry and broader Government of Belize; to UNDP Deputy Resident Representative Mr. Ian King and Technical Specialist Ms Jeanette Fernandez in providing technical coordination and mobilizing resources to support Belize's recovery efforts; and to the international partners, the EU Delegation through Mr. Aniceto Rodriguez-Ruiz and Xavier Canton-Lamousse, the World Bank through Federico Baechli.

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CONTEXT

INTRODUCTION

The Government of Belize issued a hurricane watch (RED I) for the entire country at midday local time on Monday, October 31. The hurricane watch was later upgraded to a hurricane warning (RED II) for the entire coast of Belize on the following day, Tuesday, November 1 at midday local time. At that time, the identified system PTC#15 was about 385 miles east by south of Belize City and was heading to the west at 15 mph with maximum sustained winds of 65 mph. It was apparent that the system would make landfall on the coast of Belize somewhere between Dangriga and Belize City within 36 hours.

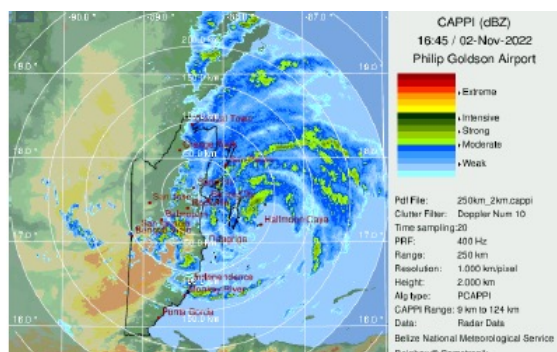


Figure 1. Radar image at 1:15 pm on Wednesday November 2, 2022 showing the eastern edge of the eyewall of Hurricane Lisa affecting Belize City and surrounding communities.

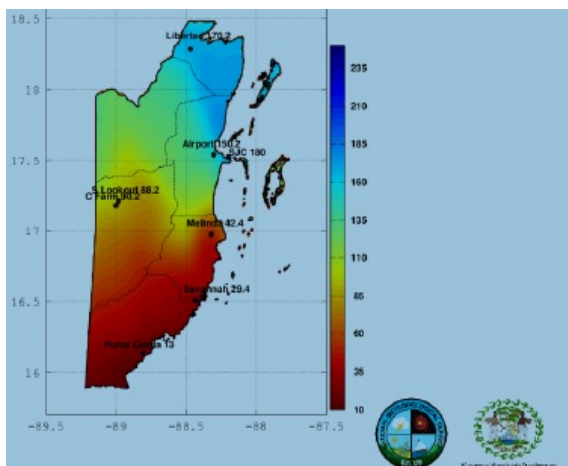


Figure 2. Map showing rainfall accumulation from November 1-3 associated with Hurricane Lisa. Highest amounts were recorded over the north-eastern parts of the country.

The system was upgraded to a hurricane with 75 mph maximum sustained winds at 6 am local time on Wednesday November 2, 2022. At that time, the system was only 100 miles east southeast of Belize City and was heading just north of due west at 15 mph. The forecast of slowing down had not materialized as early as anticipated and it was clear that strong winds and heavier rainfall from the system would start to affect the country within hours. Outer bands from the system had already started to affect Belize from the previous afternoon and these became more frequent and intense on Wednesday morning as shown in Figure 1.

A few hours later Hurricane Lisa began to affect the Belize City area with very strong winds and intense rainfall (Figure 3). Maximum sustained winds increased to 80 mph at midday and to 85 mph just prior to landfall which occurred about 10 miles south of Belize City near the mouth of the Sibun River at around 3:20 pm (see Figure 4). A minimum pressure of 990 mb was measured at the Phillip Goldson International Airport around 3 pm. Maximum sustained winds (1-minute averaged) of 68 mph were recorded during four separate occasions between 2:44 pm and 3:26 pm at the National Meteorological Service (NMS) automatic weather station at the Municipal Airstrip in Belize City. That same station recorded wind gusts to 92 mph at 2:42 pm and again at 3:18 pm just before landfall.

Lisa produced around 5-9 inches of rainfall over the north-eastern portions of the country between Tuesday, November 1 and Thursday, November 3.

The highest rainfall total was recorded at Altun Ha in the Belize District (214 mm or 8.4 inches) while 5.9 inches and 7.1 inches were recorded at the Airport and in Belize City, respectively (Figure 2). Lower amounts affected the southern and western parts of the country. An estimated storm surge of about 3-5 feet affected portions of Belize City and surrounding areas including Vista Del Mar in Ladyville.

Strong winds from the system moved well inland into areas in the Cayo and Orange Walk Districts in the western and northern parts of the country. It is estimated that those areas received tropical storm force winds. Hurricane Lisa was downgraded to a tropical storm at 9 pm on Wednesday November 2 while her centre was well inland over Belize and about to move across the border into Guatemala. At that time the hurricane warning for Belize was downgraded to a tropical storm warning. By 3 am the following morning Thursday, November 3 the tropical storm force winds had died down across the country and all coastal watches and warnings were discontinued for the entire country.

Hurricane Lisa was an upper Category 1 hurricane. Notwithstanding the lower classification on the Saffir-Simpson Hurricane Wind Scale, the storm caused major impacts on the population of Belize, especially throughout the Belize District, but also in major parts of the Cayo District, and in parts of the Orange Walk and Corozal Districts. The hurricane also affected the residents of the cayes in the path of the storm and those persons who make their livelihood in these areas.

The hurricane had little to no impact on the population in the Stann Creek and Toledo Districts.

On Thursday, 3rd November 2022, the Prime Minister of Belize declared the Belize District, except for Ambergris Caye and Caye Caulker, a disaster area as a result of the special damage suffered from the winds, storm surge, and flooding brought by Hurricane Lisa (Declaration of Disaster Area (Hurricane Lisa) Order, 2022, S.I.142 of 2022). As per the law, the declaration of the Hurricane Lisa disaster area will remain in force for a period of three (3) months from the date of the declaration, unless earlier revoked or extended with the approval of the National Assembly for a further period not exceeding three months. On Thursday, 3rd November 2022, the Prime Minister adopted regulations imposing a curfew from 7:00 pm to 6:00 am the following day commencing on Thursday, 3rd November 2022, and ending on Sunday, November 6th, 2022, for the entire Belize District, except for Ambergris Caye and Caye Caulker. The curfew was adopted considering the dangerous situation in the Belize District, and the risk to lives and safety caused by the effects of the hurricane, including but not limited to, flooding and down power lines.

On Thursday, 3rd November 2022 the National Emergency Management Organization (NEMO) issued the "ALL CLEAR", and the various NEMO Committees, Government Ministries and Departments, and other partners commenced assessments of the impact of Hurricane Lisa.

HUMANITARIAN RESPONSE

After the 'ALL CLEAR' was declared Relief & Supplies Management Committee (RSMC) officers reported to the various EOCs and began its Damage Assessment process. It was established that Hurricane Lisa impacted the Belize City, Belize District Rural Areas and parts of the Cayo District. The most major impact was noted in Belize City and Belize Rural Areas. The RSMC along with the Belize Defence Force (BDF) personnel began reaching out to the affected families and began issuing food packages and water to persons in hurricane shelters. RSMC issued food packages, water, cleaning supplies to affected households in the impacted areas.

Food packages, water, cleaning supplies and limited household sundries were procured for use at the shelters prior to landfall of Hurricane Lisa. Supplies were obtained from the NEMO warehouses and where items could not be obtained from the NEMO warehouses, they were purchased from local stores.

Cleaning supplies and water were obtained from stores at an approximate cost of One Million Forty- Five Thousand, One Hundred Sixty-Five Dollars **(\$1,045,165)**.

The Ministry of Human Development, Families and Indigenous Peoples' Affairs rented apartments for persons whose homes were destroyed while Ministry of Infrastructure repaired or constructed new homes for those persons whose houses had been destroyed. According to the Belize KOBO system a total of Four Thousand Three Hundred and Eighty-Three Households (4,483) were assessed, indicating that fourteen thousand seven hundred eighty-nine people including children (14,789) persons were directly affected. The RSMC organized meals for the Emergency Operations Centres countrywide and where necessary for shelter wardens.

No deaths were reported by the respective authorities because of Hurricane Lisa.

2 POST DISASTER NEEDS ASSESSMENT

OBJECTIVES, APPROACH, AND SCOPE

A field mission to complete a Post Disaster Needs Assessment (PDNA) for Hurricane Lisa was conducted between 15 to 25 January 23 at the request of the Government of Belize. The PDNA was led by a national team and supported by international partners from the EU, WB, the UN, the IADB with the technical facilitation of UNDP.

Sectors and sub sectors identified for assessment were as follows: Productive Sector – Agriculture, Forestry and Fisheries; Tourism and Commerce; Social – Housing, Education, Health and Culture; and Infrastructure – Public Utilities and Transport. Three cross cutting issues were examined – Governance, Gender which was elaborated within the Human Impacts analysis and Disaster Risk Reduction.

The primary objective of the PDNA is to promote full recovery, resilience and building back better at both the macro- and micro-levels. The PDNA proceeded as presented in the table 1.

Table 1. PDNA Milestones

Activity	Date	Comments
3 November 2022	NEMO begins assessment and data collection	Preliminary DDSA completed 7 December made available to team January 2023
14 November 2022	Official request from GoBZ	
28 November	UN RCO Official positive response	UNDP confirmed as technical lead
12-16 December 2022	Scoping Mission	
15-25 January 2023	Field mission with all partners	
25 January 2023	Preliminary Report submitted to Government	Delivered as power point presentation
26 February 2023	Consolidated Draft submitted to government for review	

METHODOLOGY

The Post-Disaster Needs Assessment (PDNA) is an internationally accepted methodology for determining the physical damages, economic losses, and costs of meeting recovery needs after a disaster through a government-led process. This is done through the assessment of disaster impact and estimation of recovery needs to define a comprehensive program of recovery, reconstruction and disaster risk management.

It is expected that the financing formula for such a programme of recovery would be a combination of domestic government funding and interventions, private sector savings and contributions, insurance proceeds and grants and loans from International Financial institutions (IFI's).

The methodology involves a five-step approach in which to carry out a successful assessment ensuring each impacted sector is assessed and cross cutting issues are taken into consideration. The steps are as follows:

1. Analyze the pre-disaster context: This would include an overview of performance, structure and existing gaps exhibited by each sector to be assessed. This information is presented in the baseline data sets that are used in the assessment process and written script.
2. Identify the effects of the disaster: this step examines how each sector has been affected by the disaster in terms of its physical infrastructure and assets, production of goods and services and access to goods and services, governance and emerging risks.
3. Compare pre-disaster with the disaster effect to analyze the impact: This step looks at the macro-economic impact by examining the GDP, balance of payment, tax revenue, public revenue & expenditures and a Human Impact which examines the impact on Living Conditions, Gender equality, Food Security Employment and livelihoods and social inclusion.
4. Identify priority recovery needs: This includes resilience measures to improve preparedness for the next disaster, considering the need to build back better (BBB) and the needs for disaster risk reduction (DRR).
5. Formulate a recovery strategy: The intent is to mitigate the effects of the impacts and return the affected sector/s to normalcy. Both policy recommendations and a strategy for implementation form part of the recovery strategy.

LIMITATIONS AND ASSUMPTIONS

Time is always a constraint in the process of conducting an assessment. A period of two or three weeks may have been allotted for the verification of data collected and to fill the gaps where data did not exist. An assessment produces a snapshot of what occurred during a specific period. Information that comes to light following the period of the assessment cannot be used. The findings are also limited by the quality of the data available both from the pre disaster period and from the data collected during the period of the assessment.

Where data does not exist or is unavailable to the assessors, assumptions must be made to allow for an estimate to be derived. Each sector details the assumptions made to arrive at the estimate of damage and loss and the identification of the needs for recovery.

3 TOTAL EFFECTS OF THE DISASTER

The estimated value of the effects to physical infrastructure and assets arising from Hurricane Lisa in Belize amounted to **BZ\$131.1 million** while loss because of the disruption in the production of goods and services and access to goods and services, governance and emerging risks amounted to **BZ\$62.8 million**.

The Social Sector accounted for 51.1% of the damage but only 7.2% of the Loss.

As expected, the Productive sector accounted the largest proportion of the change in economic flows or Loss, amounting to 84.3% of the total value of loss while accounting for a significant proportion of the value of damage accounting for some 34% overall. Infrastructure accounted for 14.9% of the value of damage and 8.2% of the value of loss. Table 2 below presents the detailed summary of Damage and Loss as a result of Hurricane Lisa.

Table 2. Summary of Damage and Loss by Sector and sub-sectors

Sector	Damage	Loss
Social Sub Total	66,990,084	4,489,268
Housing	54,391,262	3,509,541
Education	10,572,494	406,037
Culture	2,026,329	573,689
Productive Sub Total	44,603,014	52,902,867
Agric., Fish, Fors.	31,433,760	33,370,330
Tourism	6,591,861	18,744,063
Commerce	6,577,393	788,474
Infrastructure Sub Total	19,520,575	5,123,681
Infra. & Trans	13,959,325	4,157,681
DRM		268,339
TOTAL	131,113,673	62,784,155

Source 1: Estimates based on Government data

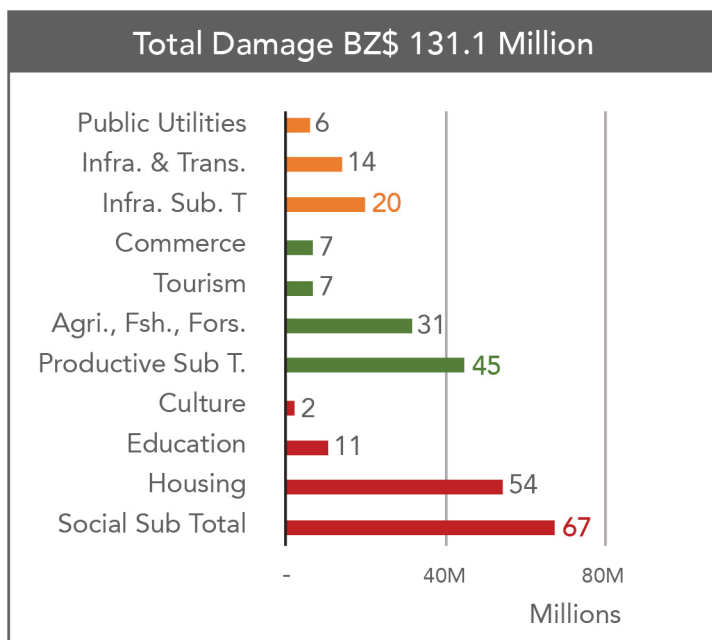


Figure 3: Damage by Sectors and Sub sectors
Source 2: Estimates based on Government Data

The distribution of the damage in Figure 3 illustrates that overall Housing suffered the most significant amount of damage at BZ\$54 million followed by Agriculture, Fisheries and Forestry at BZ\$31 million. Infrastructure and transportation followed with approximately BZ\$14 million. The Education sector also suffered some BZ\$11 million in Damage.

Tourism and Commerce suffered BZ\$7 million damage each, while Public Utilities saw BZ\$6 million in damages and BZ\$2 million to culture.

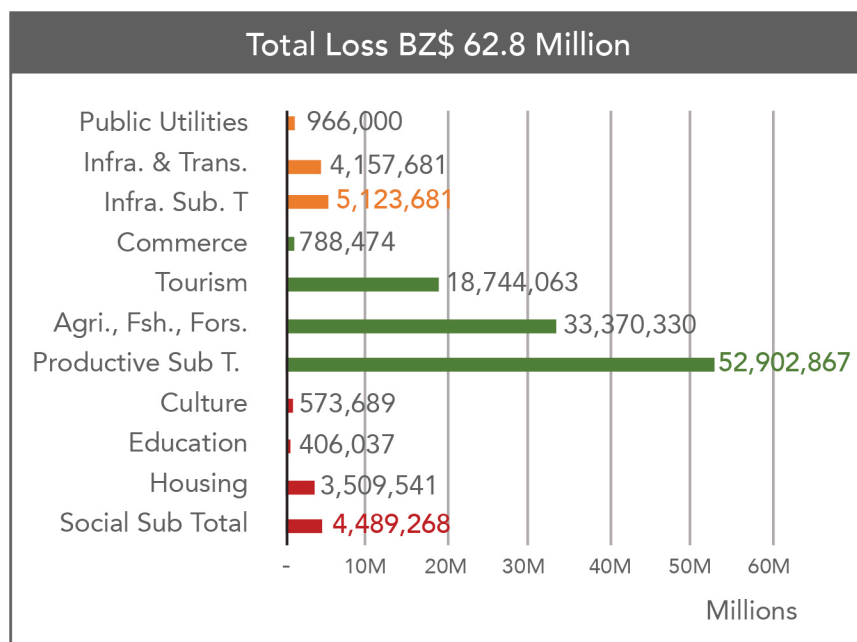


Figure 4: Loss by Sectors and Subsectors

As expected, most of the loss value were from the effects in the productive sector. Agriculture, Forestry and Fisheries experienced the highest value of loss amounting to some BZ\$33 million dollars. This was followed by Tourism which suffered some BZ\$19 million.

4 IMPACT

HUMAN IMPACT

The effects of Hurricane Lisa following swiftly on the heels of the COVID-19 pandemic have harmed the livelihoods of over 172,000 persons or approximately thirty-nine (39%) of the population, limiting capacities to generate income and resulting in significant personal income losses. Hurricane Lisa extensively damaged villages, cities, towns, in the District of Belize (City and Rural) and to some extent the Cayo District.

In addition to private homes and businesses, community infrastructure such as market spaces also suffered, disrupting daily life

during a time when lost income makes it difficult to pay for repairs or replacement of damaged assets. Enabling households to restore their productive and income-generating activities and increasing the resilience of livelihoods to future shocks will need to be a key component of the reconstruction and recovery process.

The weakened position of many households due to the ongoing livelihood consequences of the Coronavirus pandemic (COVID-19) and high inflation, overlayed by the direct impacts of Hurricane Lisa, suggests that household-level recovery will be a slow process.

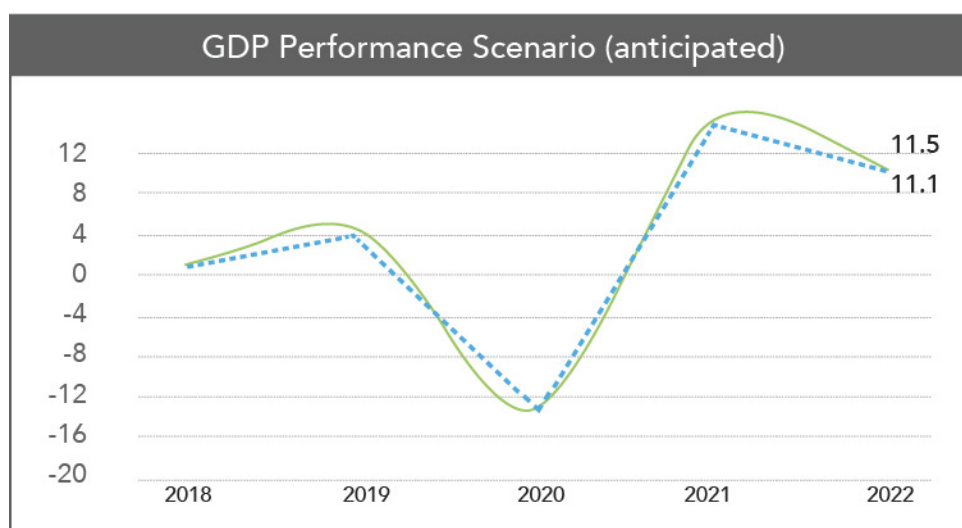


Figure 5: Belize's anticipated GDP Performance Scenario, for year period before and after Hurricane Lisa (taking into account disaster of 2020 and 2022)
Source 4. Assessment team based on official Government data

MACROECONOMIC IMPACT

The macroeconomic team concluded that the effects of the disaster associated with Hurricane Lisa did not represent a problem of significant misalignment of the main macroeconomic aggregates. Statistical and econometric models show the likelihood of GDP's growth rate dropping around 0.38% points in 2022 due to this disaster.

For this reason, it is possible that the GDP will experience a very slight drop (from 11.5% to 11.1%) and that it will also depend on the speed of the reconstruction works. In fact, considering the expansion of demand through construction, a certain dynamism of economic activity can be expected by the end of 2022 and the beginning of 2023.

5 RECOVERY

Recovery is defined as the restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk. The notion of recovery takes into account the costs of reconstruction following a disaster, and the need to kick start economic activities to ensure economic functions return to pre-disaster normalcy.

Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. It is imperative for countries to build resilience to the reality of climate change – being able to adapt to and mitigate expectant hazards.

Reconstruction needs that have been identified for Belize have been estimated on the value of damage caused by total or partial destruction of physical infrastructure and assets in each sector, the need for quality and technological improvement, and appropriate and effective mitigation measures. The value of loss in each sector acts as a guide to the needs for restarting the production of goods and services in each sector. It does not equate to the value of loss in the sector. The total cost of recovery amounted to BZ\$212.4 million dollars. Details of the cost of the needs for recovery following Hurricane Lisa are presented in table 3.

A major contributor to the recovery effort is the Government of Belize, but the government’s DRM system itself will have to be addressed.

The Index of Governance and Public Policy in Disaster Risk Management (iGOPP)¹ evaluates the formal, and therefore provable, existence of a series of legal, institutional, and budgetary conditions that are considered fundamental for the processes of Disaster Risk Management to be effectively implemented in a particular country. Relative to its Central American neighbors, Belize scored low in the implementation of the 2018 iGOPP components of recovery planning (7.5%), disaster preparedness (12.8%) and financial protection (7.9%) in terms of governance and public policy conditions for such processes. This low score is due to the lack of an institution responsible for leading recovery planning and of the technical mechanisms and instruments to develop recovery processes incorporating best practices. It is essential for Belize to make progress in these areas to be able to promote recovery processes that contribute to resilience and to reduce vulnerability. Figure 6 presents an Illustration of how the recovery costs are distributed among the sectors and sub sectors.

1 <https://publications.iadb.org/en/publication/16887/igopp-index-governance-and-public-policy-disaster-risk-management>

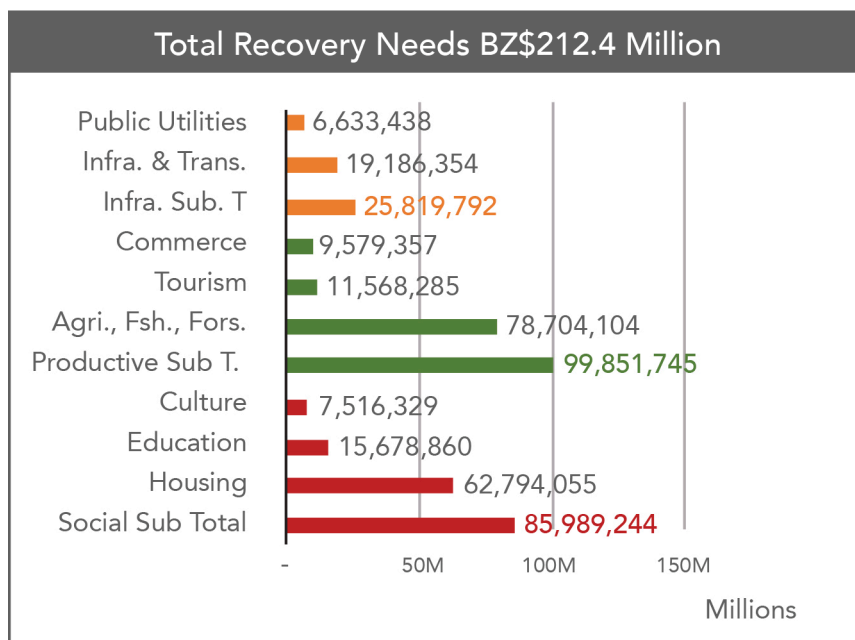


Figure 6. Recovery Needs by Sectors and Sub-sectors
Source 6: Estimates based on official Government data

The largest portion of the recovery cost is represented in the Productive sector, with Agriculture, Forestry and Fisheries absorbing 37% of the cost. The next highest component of recovery cost can be found in the Social sector with Housing accounting for 30% of overall cost. Infrastructure accounts for 9% of cost of recovery needs followed by Education at 7%, Tourism 5% and Commerce 5%. Culture accounts for 4%, followed by Public Utilities at 3% and DRM 0.3%.

6 RECOVERY STRATEGY

The recovery strategy for Hurricane Lisa takes as its point of departure the Government's Plan Belize Medium-Term Development Strategy (MTDS) 2022-2026 which identifies six strategic goals to be pursued: Poverty Reduction, Economic Transformation and Growth, Trade Deficit Reduction, Improving Citizen Security, Protection of the Environment and Natural Resources, and Good Governance.

Highlights of the recommended recovery strategies for each sector are as follows:

SOCIAL SECTOR

Housing

Based on the findings of the PDNA in the Housing Sector, it would be advisable to include a vulnerability assessment of the building stock of the most exposed geographic areas especially for winds and floods. Retrofitting of light roofing to withstand stronger winds and the provision of engineering or green solutions to protect investments against flooding could show high returns in terms of the protection of lives and assets.

Education

The recovery strategy will build on the efforts already made by the school communities and Central Government. With their own resources, the schools have already undertaken immediate actions to restore education service provision, with the involvement of the school community. The Ministry of Infrastructure (MIDH) has supported the rehabilitation of some schools, particularly those with higher levels of damage. In the recovery strategy, multi-hazard vulnerability risk assessments of all affected schools might be developed to inform a mid-term resilient education infrastructure and capacity strengthening

programme. Moreover, special attention will have to be paid to assisting the children with disabilities and learning difficulties, who have been affected by the disasters. In all construction-related work, focus should be on the fact that they need to be made disabled friendly.

Culture

Given the prospect for growth and further development of Belize's Culture Sector, the rapid assessment revealed needs in three areas. Firstly, there is a need to strengthen the management systems for historic built heritage sites and spaces. Belize already enjoys a strong track record of work in the management of Maya Archaeological Sites and Reserves. However, there are several historic built heritage sites in Belize City which were affected by Hurricane Lisa and will remain vulnerable to future disaster events. These, therefore, require systemic attention for repair, rehabilitation and management consistent with the vernacular architectural styles. Secondly, there is a need to collect data to understand the composition, size and scale of the Culture Sector as a whole. There exists already a well-structured governance framework for cultural management through the National Institute of Culture and History as well as the potential for collaboration with other governmental and non-governmental entities. Therefore, comprehensive data collection is required for the sector to also determine Culture's macroeconomic contributions. Finally, there is a need to better understand the interdependence between culture and tourism with specific emphasis on the creative sector. Given that this sector provides income generation opportunities, emphasis should be placed on identifying the characteristics of this sector in order to support economic growth, entrepreneurship and disaster mitigation and recovery for this sector.

PRODUCTIVE SECTOR

Agriculture

The main strategic initiatives will focus on:

- Diversifying agriculture through the Blue Economy, new growth industries, and MSMEs for food security and sovereignty, import replacement and substitution, and export.
- Promoting food and nutrition security aimed at reducing the incidence of infant mortality, undernourishment, obesity, and diabetes.
- Implementing climate-smart alternatives and natural resource conservation for different ecosystems of high importance for Belize.
- Integrating disaster risk management and climate change adaptation measures into national policies, strategies, and planning.
- Strengthening resilience and adaptive capacity of the Agriculture sector to climate-related hazards and natural disasters.
- Reforming and updating land policies, laws, and regulations.

Tourism

To address rebuilding for resilience, the Government and Tourism sector may seek to develop and implement a disaster risk management strategy for the tourism sector, with the intent to reduce the vulnerability of the tourism sector to natural hazards by integrating/mainstreaming comprehensive disaster management. In addition to the strategy, a special project aimed at increasing the disaster management capacity of the main stakeholders in all tourism businesses would be useful. Such a project can achieve improvement of local authorities' and the private sector's ability to manage natural

and man-made disasters and by educating residents and tourists on how to properly prepare and react to disasters.

Commerce

The recovery needs for MSMEs engaged in the sector have been categorized into three main areas: the repair and reconstruction of the physical infrastructure and assets of the MSMEs, the support for livelihoods inputs to the most vulnerable which would be the micro entrepreneurs; and capacity building for all affected MSMEs over a three-year period.

INFRASTRUCTURE SECTOR

Public Utilities (Water, Energy and Telecommunications)

The recovery strategy for each of the sub-sectors should take into consideration the following principles:

- Government should develop comprehensive disaster risk management in Infrastructure policy to reduce disaster risks by developing the technical expertise required and utilizing system-wide perspectives in the infrastructure sector's resilience processes.
- Utilities and other important entities involved in disaster recovery and management should be mandated or at the minimum encouraged and supported by the Government of Belize to carry out annual simulation exercises and provide a post-mortem report to the NEMO and its relevant partners.
- Government, infrastructure owners, and operators should coordinate efforts to mitigate disaster risk throughout the life cycle of infrastructure assets.
- Multi-hazard disaster and emergency managers must apply the use of geographic information system (GIS) technology to plan and design their operations to better prepare and respond to disaster events.
- Governments must facilitate access to innovative financial and market mechanisms that are directly built to support disaster risk management and build resilience.

- Utilities and public institutions must carry out resource assessments to better execute their disaster management functions. For example, a telecommunication committee member of the National Restoration of Utilities Committee indicated during the Hurricane Lisa post-mortem meeting that they did not have enough skilled personnel to carry out the recovery works required to restore services as fast as they would like. A shortage of skilled staff in the country can present a barrier to restoration efforts.

Infrastructure and Transport

The recovery strategy for each sub-sector must take into account the reconstruction of affected assets to better serve users in a resilient approach. It is essential to take advantage of the opportunity to carry out a process that provides better results, with a longer lifespan of investments. The investments to be developed should be inserted within the Belize Plan 2022-2026 Medium Term Development Strategy, which opens opportunities for each sub-sector, especially about housing and urban development, which proposes the following projects listed on the next page.

HUMAN AND MACROECONOMIC RECOVERY

Human Recovery

These recommendations are in alignment with the Belize Medium-Term Development Strategy.

- Continuation of the emergency cash transfer program to bridge short term gaps in household needs.
- Transportation subsidies for the most vulnerable populations are necessary to facilitate livelihood recovery and access to health care and markets, reducing food and livelihood insecurities.
- Continued distribution of building materials for housing along with resources to pay the costs of labour to rebuild.
- Development of a social protection policy and social protection floor for the poorest members of the community, reducing risks and vulnerabilities.
- Development of data collection instruments that provide disaggregated data to target interventions.
- Build a resilient national reserve to support direct preparedness on a risk-informed and forecast based basis.
- Implementation of index based or parametric insurance options to reduce the costs and difficulties of administering and delivering agricultural insurance against specific perils at regional levels rather than at individual farm levels.

Macro-Economic Recovery

The reallocation of resources to ensure the effectiveness of the economic reactivation needed to offset the temporary increase in unemployment following Hurricane Lisa. There will be a redirection of resources on expenditure above all, to attend to activities of emergency, reconstruction and recovery.

DISASTER RISK REDUCTION (DRR)

The country will need to review its National Hazard Management Plan with the view to revise it in line with the CDEMA Comprehensive Disaster Management (CDM) approach. This will require a comprehensive review of the existing legislations, policies, disaster plans, development documents, including the draft Country Work Program and other requisite documents that set out disaster issues and programs.

To ensure that risk information is properly incorporated in recovery planning in the short and medium-term, it will be necessary to perform a complete review of all existing SOPs, processes and procedures of NEMO's functional units including committee to determine the effectiveness and efficiency in the disaster management cycle as articulated in the CDM assessment tool. The current NEMO structure should be examined and strengthened in order to ensure that the PDNA is effectively implemented.

7 SUMMARY OF SECTOR REPORTS

A. SOCIAL SECTORS

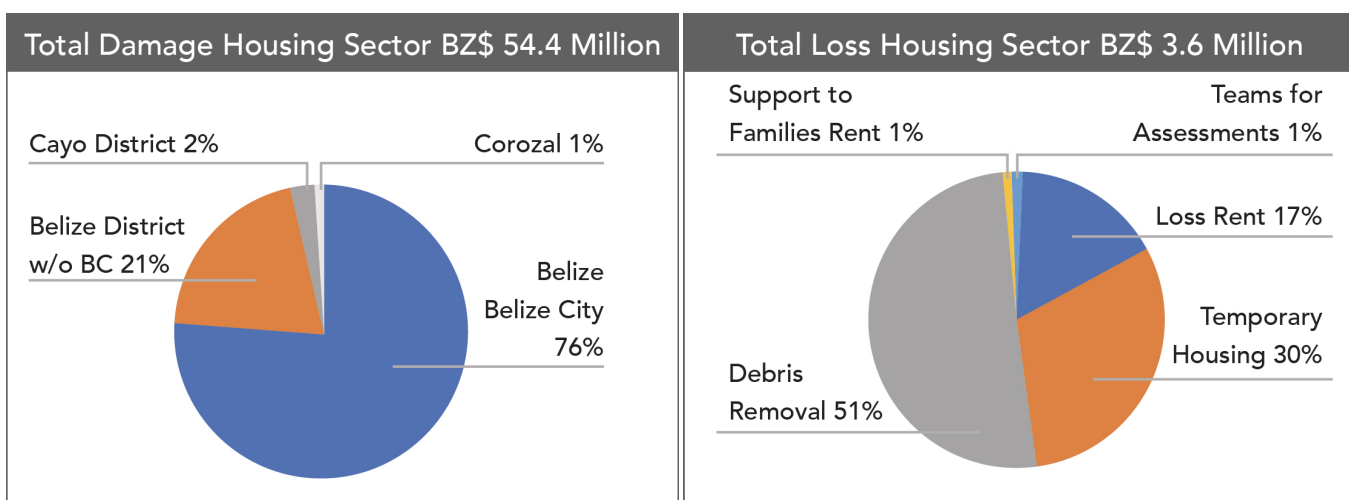
HOUSING

Total damage in the housing sector was estimated at BZ\$ 54.4 million of which, Belize City accounted for the 76%, Belize Rural for the 21%, Cayo and Corozal for 2 and 1% respectively. Loss amounts to BZ\$ 3.51 million. The largest loss was associated with cleaning and debris removal representing the 51%, while temporary housing accounted for the 30% and rent loss was estimated at 17%. Costs related to housing were also incurred in shelters; one hundred and thirty-six (136) shelters opened countrywide with an estimated total 5400 persons at peak during Hurricane Lisa. It was also reported that a small number of families benefited from support for temporary rental to avoid the use of shelters.

The housing recovery strategy should reflect that this is an opportunity to build not just safer homes, but resilient communities. To achieve more sustainable post-disaster settlements, housing reconstruction should have a longer-term horizon and be supported

by better planning, updated development regulations, coordinated infrastructure service delivery, and stronger capacity of communities and government institutions to cope with and manage disaster risks. This strategy will address the burden, uncertainty and strain experienced by individuals and families experiencing displacement.

Recovery needs comprise cost to repair and rebuild the affected housing stock, bringing it to better standards to withstand future hurricanes, thus increasing resilience. Total needs amounted to BZ\$ 62.8 million, which also include all the costs associated with debris removal and cleaning, and support to the affected population through temporary shelter. Other needs look into the longer term and the need to increase resilient capacity at the country level, looking at better information on hazards, risks and vulnerabilities, the use of updated building codes, the promotion of risk sensitive land use and planning, among others. The recovery strategy for the housing sector is directly linked to the Belize Medium-Term Development Strategy as several of the proposed strategic objectives already include some of the needs discussed in this report.



EDUCATION

In the aftermath of Hurricane Lisa, disaster effects in the education sectors were recorded in the districts of Belize, Cayo, Orange Walk, Corozal and Stann Creek. The PDNA for the education sector was a joint exercise of the Government of Belize (GOB), led by the Ministry of Education, Culture, Science and Technology (MoECST) with the assistance of development partners such as UNDP and UNICEF. This assessment covered preschools (3-4 years old), primary schools (5-12 years) and secondary school (13-16 years). The disaster effects (comprising damages and losses) for the sector were calculated based on the data and information provided by the affected schools through a survey managed by the MoECST.

Hurricane Lisa impacted a total of 90 schools, of which 59 are located in Belize, 25 in Cayo, 3 in Orange Walk, 3 in Corozal and 2 in Stann Creek district, affecting approximately 20,190 students at different degrees. The damage to preschool buildings, furniture, learning materials, stationery and utensils has been estimated at BZD 10,572,494. Losses related to this event are estimated in BZD 406,037, which corresponds to debris removal and cleaning-up costs, and additional MoECST and Education District Offices monitoring costs. Overall, the total effects are estimated in **BZD 10,978,531**. The public sector suffered more in terms of damage and losses when compared to the private sector. More specifically, of the total impact, 91% accrues to the public sector, and only 9% to the private sector.

The total recovery needs for the education sector, using the principle of 'Building Back Better', were estimated to cost **BZD 15,678,860**.

The Education Sector recovery strategy encompasses actions oriented to rehabilitate the affected facilities (mostly roofing and fencing) and physical assets, to restore a proper service provision through cleaning-up and debris removal from damaged facilities, to strengthen governance capacities to monitor and manage recovery processes, and to reduce risks and vulnerabilities related to this event while setting the basis towards a more resilient education sector.

The recovery strategy adopts an evidence-based child-centred approach to education sector risk reduction, putting children's safety and well-being at the centre of national, sub-national and local levels efforts. Sector specific risk assessments, strategic and operational planning, institutional commitment, partnerships and continued financing is required to that end.

CULTURE

The Post Disaster Needs Assessment focused on the geographic zone directly affected by Hurricane Lisa as well as a cross-section of cultural communities immediately outside of the cone of direct impact. The data collection approach was informed, in part, by the national administrative structure for Culture Sector as well as the National Cultural Policy for Belize (2016-2026). The report examined the impact on the administration of cultural heritage and its institutions, archaeological sites and historic built heritage, including vernacular architecture, other historical buildings, and monuments of national significance), intangible cultural heritage (encompassing practices, representations, expressions, knowledge and skills recognized by communities as part of their heritage), museums, collections and repositories, and the creative industries.

The greatest impact to physical infrastructure occurred in Belize City with damage to historic built structures, resulting in the displacement of government offices and personnel. Archaeological sites within the hurricane impact zone experienced varying degrees of tree damage, soil erosion and damage to access pathways. Despite partial damage to other historic built structures and spaces, cultural administrators exhibited an experienced approach to hurricane preparedness and recovery.

Based on current assessments, **total damage amount to BZ\$ 2,026,328.58** (US\$ 1.01 million) and **losses \$ 573,689.35** (US\$ 287,000). **Total cost for recovery needs is estimated \$ 7,516,328.58** (US\$3.758 million).

The Belize Culture Sector exhibited a great deal of resilience due in part to Pre-Hurricane preparations undertaken by administrators of cultural sites, the rapid response in the clearing and re-opening of cultural spaces combined with a relatively short interruption in tourism visitation which serves as a source of income generation for archaeological sites and the creative sector. The recovery strategy must be based on three key findings. Firstly, there is a need to strengthen the management systems for historic built heritage sites and spaces. Secondly, there is a need to collect data to understand the composition, size and scale of the Culture Sector as a whole. Thirdly, there is a need to better understand the interdependence between culture and tourism with specific emphasis on the creative sector.

B. PRODUCTIVE SECTOR

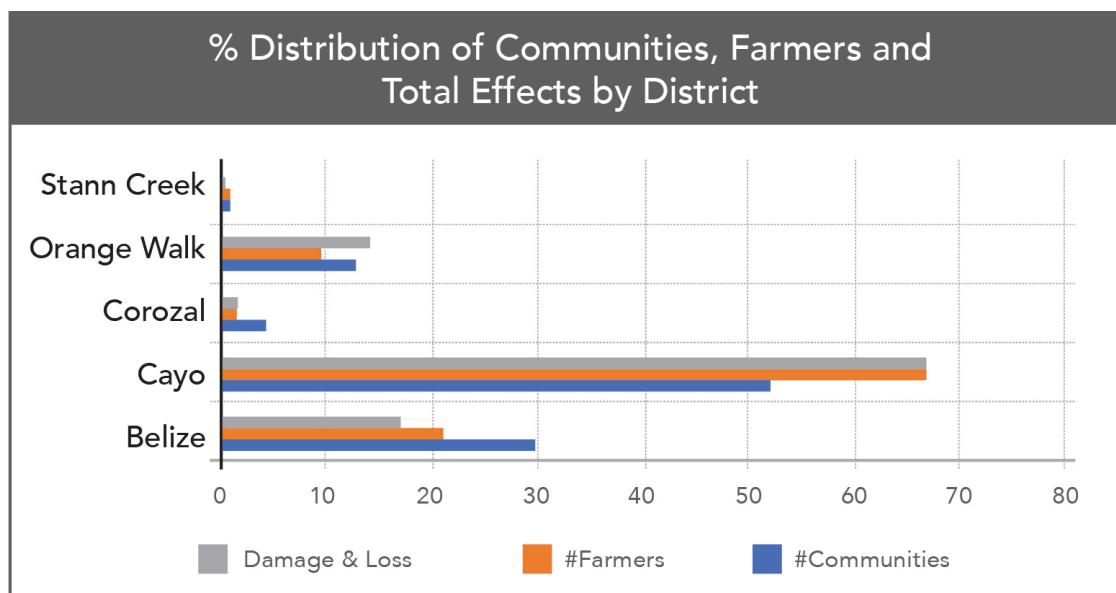
AGRICULTURE

The impacts on the agriculture sector were isolated to a few areas along the path of Hurricane Lisa. The commodities mostly affected include fruits and vegetables, fruit trees, sugarcane, grains, livestock, and fisheries. Damage was also reported on storage facilities, farm equipment, farmhouses (barns), fencing, greenhouse, and cover structures. The sugar cane sub-sector reported that the effects of wind damage were more prevalent in the southern portions of the Orange Walk District. The assessment of the effects of Hurricane Lisa on the Forestry sub-sector is incomplete, although a preliminary estimate was made available.

The total effect of Hurricane Lisa on the agricultural sector, including crops, livestock, fisheries, and Forestry was estimated at approximately **BZ\$ 64.804 million (Table 1.1)**, with damage accounting for **BZ\$31.434** (48.5%) and loss put at **BZ\$ 33.370 million** (51.5%). The effect by sector is presented graphically below. The Figure shows the crops and fisheries sub-sectors accounted for the highest levels of total effects within the agricultural sector, reporting 44.6% and 34.4%, respectively. Total recovery needs are estimated at **BZ\$ 78.704 million**.

<u>Description Sub-Sector</u>	<u>Total Damage (BZ \$ '000')</u>	<u>Total Loss (BZ \$ '000')</u>	<u>Total Effects</u>	
			<u>(BZ \$ '000')</u>	<u>%</u>
Crops	8,258.03	17,677.07	<u>25,935.11</u>	<u>40.0</u>
Livestock	550.730	148.264	<u>698.994</u>	<u>1.1</u>
Fisheries	6,825.000	13,175.000	<u>20,000.000</u>	<u>30.9</u>
Forestry	15,800.00	2,370.00	<u>18,170.00</u>	<u>28.0</u>
Total	<u>31,433.76</u>	<u>33,370.33</u>	<u>64,804.10</u>	<u>100.10</u>

Approximately 900 farmers spread over 93 communities were impacted by Hurricane Lisa. The distribution of the affected crops and livestock farmers across the districts impacted and the estimation of total effects by the districts is presented on the next page.



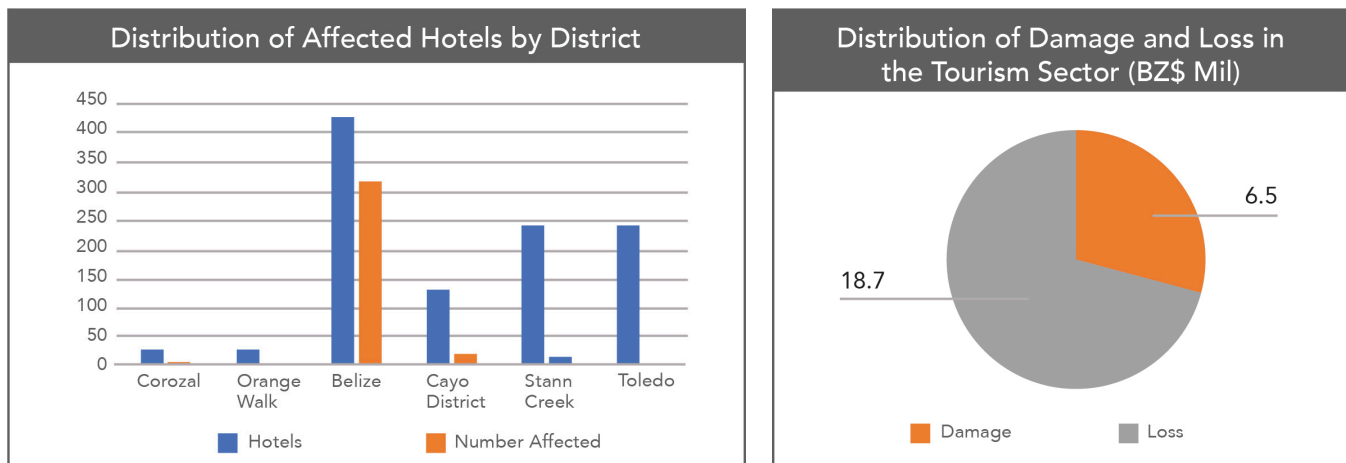
%age distribution of Communities, Farmers and Total Effects by District

Farmers and fishers in the affected areas bore significant damage and loss. The gender and age groupings of those affected by their disruption of the source of income and livelihood vary due to geographic location and socio-economic circumstances. Moreover, there is a heightened risk of food vulnerability and reduced quality of nutritional intake among those affected and practiced subsistence farming and artisan fishing, given the high poverty levels of the country of 52%.

The recovery needs of the agriculture sector are based on six (6) main factors, including the need to restore service delivery and production capacity and to ensure access to services and goods, the priority needs to build back better (BBB) service delivery and production capacity and to ensure access to services and goods, and the restoration and strengthening of governance capacity, including DRM. . The Recovery Strategy will be aligned to the recently launched Belize Medium-Term Development Strategy (MTDS) 2022-2026 with a focus on four (4) of the Six (6) Strategic Objectives.

TOURISM

Although the disruption to the sector seemed brief, it was sufficient to incur significant loss and damage to the infrastructure in the sector. Figures 1 and 2 illustrate the distribution of the affected hotels by district pointing to the effects to Belize, Stann Creek and Cayo. Figure 2 illustrates the significant loss to the sector, estimated at BZ\$18.7 million, resulting from forgone income to both the overnight and cruise ship sub- sectors of the tourism sector. Damage estimated at BZ\$6.5 million was significantly less.



The recovery needs in the sector indicate not only repair to damaged infrastructure, but also stress on needed structural improvements. Also, soft term loans to those who cannot meet the necessary loan criteria needed to rebuild may need to be offered. In addition, capacity development in risk management and vulnerability analysis is needed in the sector if greater resilience to climate related hazards is expected.

The needs for recovery amount to some BZ\$11.5 million dollars.

A critical component of recovery is rebuilding for resilience so that when a similar hazard is encountered, the affected party may be able to respond differently and hopefully better. Recovery seeks to not only reduce harm but possible negative impacts. To address rebuilding for resilience, the Government and Tourism sector may seek to develop and implement a "Disaster Risk Management Strategy for the Tourism Sector", with the intent to reduce the vulnerability of the tourism sector to natural hazards by integrating/mainstreaming comprehensive disaster management.

COMMERCE

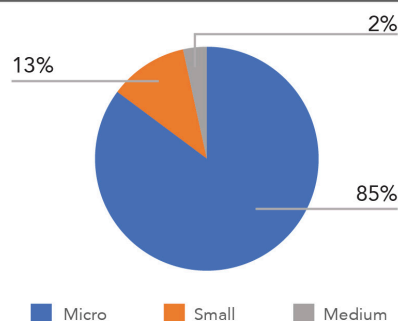
Belize has a wide array of businesses in its commercial landscape¹. It has been estimated that approximately 93% of businesses are Micro, Small or Medium Enterprises (MSMEs).² In trying to understand how these MSMEs have been affected, the BELTRAIDE data base of registered MSMEs was used as the basis of estimation. The analysis found that thirty-nine (39%) or 935 of the 2,367 registered MSMEs were estimated to have been affected by Hurricane Lisa. Of those that were affected approximately 90% or 838 could be found in the District of Belize. Another 8% or 73 MSMEs were found to be affected in the Cayo District. The remaining 2% were scattered throughout the other Districts.

Of the three groups, Micro, Small and Medium sized enterprises, the category of micro enterprises was found to be the group most affected. It was estimated that micro enterprises suffered 85% of the effects, followed by small enterprises who suffered 13% and medium enterprises 2%.

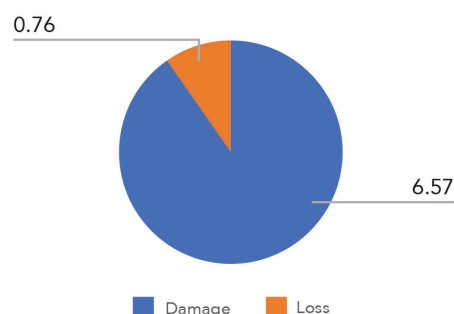
The value of the damage to physical infrastructure and assets amounted to BZ \$6.6 million dollars, while the losses were valued at BZ\$764 thousand dollars, as illustrated in figure 2.

The 2018 Poverty Study by the Belize Institute of Statistics indicated that 52% of the population was living in poverty.³

Distribution of Affected MSMEs by Classification of Enterprise



Commerce: Damage and Loss (Mil BZ\$)



The effects on the sector which has a predominant base of women many of whom would already have been low wage earners, would suffer from reduced income due to the disruption caused by Hurricane Lisa, resulting in the increased vulnerability of themselves and their children. About 11% of the population were classified as vulnerable to poverty in the event of a shock such as a disaster and would have had little savings to fall back on as a result of this crisis. Some may fall into debt and be unable to invest in necessary inputs to kick start their business.

The recovery needs for MSMEs engaged in the sector have been categorized into three main areas: the repair and reconstruction of

¹ At the end of 2020, the Belize Companies and Corporate Affairs Registry (BCCAR) held registration records for some 18, 720 companies. <https://bccar.bz/bccar-business-transformation-case-overview/>

² UNDP 2020 COVID-19 Socioeconomic Impact Assessment

³ Institute of Statistics, Belize. Poverty Study 2018. <http://sib.org.bz/wp-content/uploads/PovertyStudy2018.pdf>

the physical infrastructure and assets of the MSMEs, the support for livelihoods inputs to the most vulnerable which would be the micro entrepreneurs; and capacity building for all affected MSMEs over a three-year period.

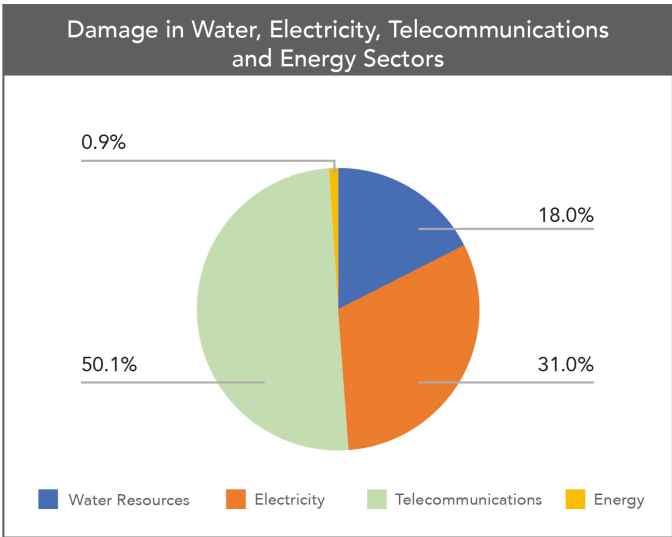
C. INFRASTRUCTURE SECTOR

Public Utilities (Water, Energy and Telecommunications)

Total damage to the public services sectors was BZ\$ 5.56 million, the greatest damage was to the telecommunications subsector for BZ\$ 2.79 million (50.1%), followed by damage to the electricity subsector in the amount of BZ\$ 1.7 million (31.0%), followed by damage to water subsector for BZ\$ 1.0 million (18.0%).

Damage was minor at the energy subsector BZ\$ 0.05 million (0.9%). The total damage amounts correspond to private sector property.

In terms of losses in this sector, there was a reduction in electricity revenue of BZ\$ 0.92 million, and an additional cost in telecommunications of BZ\$ 0.048 million. The water resources sector had disruptions but there is no data reported related to income reduction.



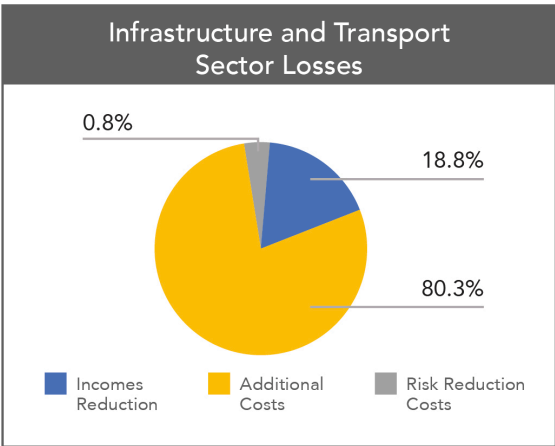
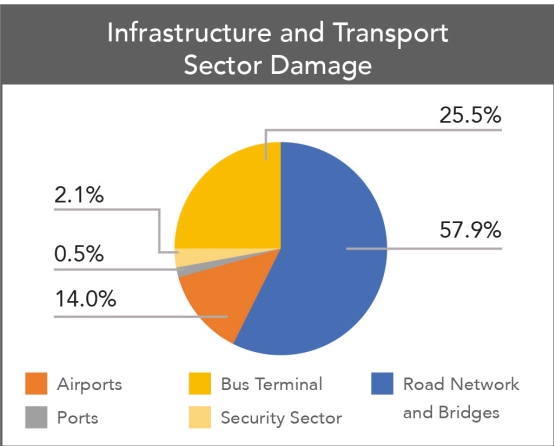
The recovery needs of the sector are linked to processes of major rebuilding and the need to improve the infrastructure of the public utilities to maintain service. There is also the need to develop policies for comprehensive disaster risk management in Infrastructure.

Infrastructure and Transport

Total damage to the infrastructure and roads sector was BZ\$ 13.9; the greatest damage was to the road network for BZ\$ 8.1 million (57.9%), followed by damage to facilities in the security subsector in the amount of BZ\$ 3.5 million (25.5%) and damage to airports for BZ\$ 1.9 million (14.0%). Damage was minor at the Belize City bus terminal at BZ\$ 0.3 million (2.1%), and at ports BZ\$0.066 million (0.5%). The total damage amounts correspond to public sector property.

In terms of losses in this sector, there was a reduction in airport revenue, water taxi revenue, and cargo, cruises, and vessels of BZ\$ 0.78 million (18.8%). Additional costs were recorded for demolition and debris removal, as well as the cleaning of road surfaces for a total amount of BZ\$ 3.3 million (80.3%). The risk reduction cost was BZ\$ 0.004 million (0.8%).

The recovery strategy for each sub-sector must take into account the reconstruction of affected assets to better serve users in a resilient approach. It is essential to take advantage of the opportunity to carry out a process that provides better results, with a longer lifespan of investments. The investments to be developed should be inserted within the Belize Plan 2022-2026 Medium Term Development Strategy, which opens opportunities for each sub-sector, especially about housing and urban development.



D. DISASTER RISK REDUCTION

Belize must ensure that build back better is properly integrated on the recovery planning. The critical link between disaster management and sustainable development is recognized as a holistic approach to managing multiple risks from all hazards. This is necessary to achieve resilient development. DRR should be a critical component of development planning, as well as sectoral strategies, programs and work plans and although the damage and losses in some sectors are more visible than others, the recent increasing scale and frequency of hazards in the region has further shown that all sectors should develop an effective approach to reducing disaster risk and BBB in the post disaster recovery realm. In order to achieve this, the country must review its National Hazard Management Plan with the view to revise it in line with the CDEMA Comprehensive Disaster Management (CDM) approach.

This will require a comprehensive review the existing legislations, policies, disaster plans, development documents, including the draft Country Work Program and other requisite documents that set out disaster issues and programs.

The country must ensure that risk information is properly incorporated in recovery planning in the short medium-term. In order to achieve this, it is necessary to perform a complete review of all existing SOPs, processes and procedures of NEMO's functional units including committee to determine effectiveness and efficiency in the disaster management cycle as articulated in the CDM assessment tool.

In order to ensure that the PDNA is implemented, the current NEMO structure must be examined and strengthened so that it can lead the process.

8

LIST OF CONTRIBUTORS

Sector		Government	Name
Productive	Agriculture, Livestock, Fisheries, Forestry	Minister of Agriculture Food Security & Enterprise	Victoriano Pascual Acting, Chief Agricultural Officer
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		Fisheries	Vivian Ramnarace
		Environment MSDCCDRM	Judene Tingling Linares
		Environment & Solid Waste	Kenrick Gordon
		Environment MSDCCDRM	Daniel Mendez
		Forestry	Raul Chun
		Statistical Institute of Belize SIB	Diana Trejo
		MIDH (Infrastructure: bridges, culverts, roads)	Irving Thimbriel
		MIDH	Derick Calles
		Department of Environment	Celi Cho
		Mins Natural Resources: DANA	Francis Arzu
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		CEMO	Eluride Miller
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		Belize City Council	Chelsea Perera
		CEMO Vice Chair DANA	Troy Smith
	Health	Ministry of Health & Wellness	John Bodden Public Health Inspector

Sector		Government	Name
Productive	Education	Ministry of Education, Culture, Science and Technology	Namrita Balani
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	Culture	National Institute of Culture and Heritage	Kim Vasquez
		National Institute of Culture and Heritage	Rolando Cocom
		National Institute of Culture and Heritage	Rumari Ku
	Transport	MIDH	Irving Thimbriel
	Energy	Energy Unit	*Geon Hanson
		Fortis Belize	Rogelio Guerra
		Speednet Wireless (SMART)	Sean Duncan
		Sol Belize Limited	Sanjeev Poornananda
		Digi	Justin Palomo
		Uno Belize	Nicole Carballo
		Belize Port Authority	Michael Jenkins
		Ministry of Rural Transformation	Elsa Cardinez
		Public Utilities Commission	Claudio Leal
		Puma Energy	Verla Medina
	Water	Belize Water Services Limited	Hugo Rancharan

<u>Sector</u>		<u>Government</u>	<u>Name</u>
Cross-Cutting and Human Impact	Living Conditions, Food Security, Employment and Livelihoods, Gender Equality, Social Inclusion	Ministry of Human Development, Families and Indigenous Peoples Affairs	Tanya Santos-Neal (CEO), Starla Bradley Shawn Vargas
		Statistical Institute of Belize SIB	Diana Trejo
		Ministry of Human Development, Families and Indigenous Peoples Affairs	Glenda Valdez Administrative Officer & NEMO Liaison Officer
		Ministry of Human Development, Families and Indigenous Peoples Affairs	Shawn Vargas, Director Human Services Department
			Starla Bradley Director Community Rehabilitation Dept.
			Onando St. Bernard, Community Rehabilitation Dept.
			Ganesha Smith Human Services Department
			Cynthia Williams
		Environment MSDCCDRM	Kenrick Williams
		Environment MSDCCDRM	Judene Tingling Linares
		Environment MSDCCDRM	Daniel Mendez

