Republic of Mauritius

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I. HIGHLIGHTS AND INTRODUCTION

The Republic of Mauritius (RoM) is known to have outperformed other Small Island Developing States (SIDS) in many aspects. The country took lessons from the past disasters such as the cyclone Carol which, back in 1960, killed forty-one and left more than hundred thousand homeless. Nowadays, disaster-proof architecture and up-to-date early warning system make the communities less vulnerable. However, substantial development has been done in risk-prone areas. Continuing in this trend may entail loss of years-long growth due to natural hazards and the country may get off the sustainable path.

Since 2015, with the adoption of the Sendai Framework for Disaster Risk Reduction (SFDRR), Mauritius has introduced a national disaster risk reduction and management institutional structure including a robust emergency and crisis management mechanism. With a national legal framework for disaster risk reduction together with a policy, strategic framework and national action plan aligned with the Sendai Framework, we have laid down the foundation work to progress in mainstreaming disaster risk reduction and management across all sectors.

However, it is noted that being a SIDS country with limited institutional capacity and resources is one among the main challenges encountered for the implementation of the SFDRR. It took us time to understand the concepts and guiding principles advocated by the SFDRR and its linkages with other policies, frameworks and conventions. The approach to seek financial support for specific DRRM projects has remained embryonic as compared to other emerging trends like climate change, gender, disabled etc. The difficulties encountered for sharing of cross-sectoral information has been another major obstacle for appreciating the progress made in DRRM. It is a fact that institutions and agencies are already engaged in DRRM activities to some appreciable extent without really recognising that these were in line with the SFDRR. Furthermore, according to the World Risk Report 2021\(^1\), Mauritius has been classified as a country with a high-risk index. Out of a total of 181 countries, Mauritius is now ranked as the 51st country with the highest disaster risk. The ranking of Mauritius for year 2022\(^2\) is 107th out of 193 countries as most at risk to disasters.

Besides, the collection of information for the preparation of the Mid Term Review (MTR) has been somehow another challenge to us due to little or incomplete information received. In addition, the template for the MTR report was of such structure that it gives rise to duplication of information during the drafting of the report.

Otherwise, our voluntary move to engage in the preparation of the MTR report have been very beneficial as it has more shed light on status on implementation of the SFDRR at institutional level together with steering required for better assess the progress made for future reporting.

II. MTR SF METHODOLOGY AND PROCESS

Being a SIDS having a DRRM institution with limited resources, the UNDRR Africa has extended its support by facilitating a national stakeholder’s workshop on the Mid Term Review in Mauritius on the 29 April 2022. During the workshop, focal points of respective organisations (from the Public Sector and Private Sector, and the Civil Society) were briefed on their required involvement and contribution/inputs for the preparation of a national Mid Term Report on the implementation of the Sendai Framework (MTR SF) by end August 2022 and the final submission of the national report by end September 2022.

During the workshop, a questionnaire comprising of guidelines and probing questions regarding the mid-term implementation of the Sendai Framework 2015-2030 was introduced to participants, and was also used as a Tool for Consultations, Stocktaking, and Review exercise. List of stakeholders who participated in the workshop is at Annex 1.

Over and above face to face discussions during the workshop, individual questionnaires with explanatory notes on Sendai Framework were sent to various stakeholders in order to better understand the extent to which they have conducted important disaster risk reduction activities. Out of the 80 questionnaires sent to stakeholders, only around 50% of the responses were received and much time was devoted into analysing all the information to be included in the Mid Term Review Report.

Information gathered during the stakeholders workshop as well as information collected through questionnaires, and the literature review, constitute the content of this report. Due to limited resources, face to face consultations with stakeholders could not be carried out.

This report looks at how initial DRR activities conducted between 2015 to 2020 led to the adoption of the National Disaster Risk Reduction and Management Policy, Strategic Framework, and Action Plan for 2020-2030. It will then describe highlights and main achievements between 2015 and 2022, and the challenges faced during this period. The report will then lay out prospective views on the implementation of the Sendai framework in Mauritius from now until 2030, and beyond. Given the complexity of the actions in the National Action Plan which is quite broad in nature, many stakeholders are getting difficulties for its implementation. For the purpose of having a better understanding and practical approach to the implementation of the Action Plan 2020-2030\(^3\), the 189 actions have been presented into:

a. 5-year Action Plan (2020-2025); and

b. Beyond 5-year action plan 2026-2030

\(^3\) National Disaster Risk Reduction and Management Policy, Strategic Framework and Action Plan 2020-2030.
Our Parent Ministry has been requested to inform agencies to formally engage in the understanding followed by implementation of these actions contained in the 5-year plan (2020-2025) as a start with necessary budgetary provisions.

However, in view of the number of actions to be implemented, it is proposed that implementing agencies prioritise actions to be implemented in the period 2020-2025 and the remaining in period 2026 and up and also submit a status as at date for actions already under process.

**System in place to measure the 7 targets of Sendai Framework.**

The MauDIMS put in place with the support of UNDP will allow for analyzing disaster data for Disaster Risk Reduction, development planning, or monitoring global progress in line with Sendai Framework Monitor (SFM), established at the level of the UNDRR. MauDIMS will enable the Mauritian Government to measure progress towards the achievement of the global targets of the Sendai Framework for Disaster Risk Reduction and to integrate these indicators into the monitoring framework for the Sustainable Development Goals. As the MauDIMS is operational since Year 2021 only, at present, we are not in possession of official statistics with respect to Sendai Indicators. However, many activities as mentioned above have been worked out in line with the Sendai Framework.

**III. RETROSPECTIVE REVIEW**

A. **Highlights - Progress towards the Outcome and Goal**

Since 2015, there have been considerable progress in the implementation of DRRM measures. Most progress were made in the fields of Mitigation, ‘Prevention and Preparedness’ and Response. Different mechanisms were set up in terms of Governance, Investment in Disaster Risk Reduction and Management measures as well as disseminating the understanding of Disaster Risks among the different layers of society. However, we have to reckon the fact that Recovery and Reconstruction phase remain an area where we have to expand with clear institutional mandates. Nevertheless, we have to acknowledge that despite all the efforts being made in the field of DRRM since the setting up of the centre in year 2013, we do not have statistical data as evidence and it is only as from year 2022 that the NDRRMC is getting the support from Statistic Mauritius for the setting up of a statistic unit.
B. Progress in Risk Assessment, Information and Understanding

In order to enhance the country’s capacity in terms of disaster risk assessment, understanding of risk and risk information, the following activities are being undertaken at the level of several organisations.

- **Water Resources Unit (WRU) – Dams Break Analysis**

The Water Resources Unit (WRU) has completed a Dams Break Analysis from Year 2018 to 2020 and the findings of the study will be made available once it has been validated and approved by concerned stakeholders.

- **The Central Electricity Board (CEB)**

The Central Electricity Board (CEB) identified its vulnerabilities to cyclones through past experiences and yearly preparedness plans which are in place much ahead of the cyclonic season. These are reviewed to assess risk and required actions.

- **The National Land Drainage Master Plan.**

  - The Land Drainage Master Plan completed in May 2022 includes the following:
  - Detailed Flood Risk map,
  - Mapping of historical flood prone areas for the whole island.
  - To derive and map potential flood prone areas based on projected new land use development changes
  - To formulate action plans to improve drainage infrastructures implementation for the short term and middle term.
  - Vulnerability of different zones.
  - Action plans for future investment

- **Vulnerability of the Republic of Mauritius to Seismic Hazards and Tsunami**

The UN Development Programme (UNDP)/Bureau de Recherches Géologiques et Minières (BRGM) conducted a study in 2019 on the Vulnerability of the Republic of Mauritius to Seismic Hazards and Tsunami. One of the recommendations of the study was to conduct an ‘Operational Study of the Coastal Risks for the Islands of the Republic of Mauritius (Coastal Erosion and Marine Flooding)’. Same is ongoing under the lead of the Ministry of Environment, Solid Waste Management and Climate Change.
- **Audit of Rivers**

The Ministry of Environment, Solid Waste Management and Climate Change has conducted an Audit of Rivers in January 2022. The overall study provides a comprehensive audit of rivers and watercourses to assess their carrying capacity with a view of taking remedial measures, using a catchment-based approach and taking into account the impacts of climate change. The study aims to (i) identify the stretches of rivers and watercourses that cause recurrent flooding; (ii) investigate the causes of flooding of the identified rivers and watercourses; and (iii) recommend appropriate remedial measures to mitigate flooding in identified rivers. The report has been handed over to the Land Drainage Authority so that recommendations could be aligned with the Land Drainage Master Plan 2022.

- **Disaster Risk Profile for Mauritius**

The World Bank has prepared a Disaster Risk Profile for Mauritius in November 2016 in the advent of cyclones, floods and earthquakes. The Southwest Indian Ocean Risk Assessment and Financing Initiative (SWIO RAFI) seeks to provide a solid basis for the future implementation of disaster risk financing through the improved understanding of disaster risks. The SWIO RAFI aims to reduce vulnerability to natural disasters and offers support to long term, core economic and social development initiatives.

- **Climate change vulnerability and adaptation assessment**

The Ministry of Environment, Solid Waste Management and Climate Change/Agence Francaise de Developpement (AFD) carried out a study in 2020 with a focus on 6 priority sites on mainland Mauritius using a multi-stakeholder capacity-building approach. The selected sites are: Port-Louis, Flic-en-Flac and Tamarin, Bel Ombre and Riambel, Belle Mare, Pereybere and Grand Baie, Nouvelle France.

- **Vulnerability assessment for the port**

A full-fledge vulnerability assessment has been carried out for the port of Port-Louis under a CTCN/GCF assistance from Year 2018 to January 2021 to the tune of around $325,000. The aim was to enhance the port’s resilience to the adverse impacts of climate. As the main adaptation measure, the study has recommended the construction of a break water of about 1.2 km long by 2025 to increase the resilience of Port Louis by decreasing the number of days/hours in terms of stoppage of port operations due to adverse weather conditions.

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4 World Bank, Disaster Risk Profile, 2016
- **Study causes of flood/flash flood due to surface runoff from agricultural land**

A study was carried out on the causes of flood/flash flood due to surface runoff from agricultural land was prepared on 30 April 2021 under a report “Technical Support for the UNDP Climate Promise in the Republic of Mauritius”.

- **Capacity for Risk Assessment**

The Land Drainage Authority which has been set up in 2017 is responsible for carrying out flood risk assessment whereas the Ministry of National Infrastructure and Community Development is responsible for the conduct of risk assessment in landslide prone areas through a newly set up Geotechnical Unit.

For any developmental project, promoters have to obtain an Environmental Impact Assessment (EIA) license which falls under the purview of the Ministry of Environment, Solid Waste Management and Climate Change. Promoters will have to ensure that appropriate risk assessment has been carried out for all perceived risks together with appropriate remedial measures as recommended by concerned authorities.

However, there is still a need to establish adequate capacity to carry out risk assessment with respect to the 41 hazards identified in the Strategic Framework. A review of existing laws and legislations and alignment would be required together with sharing of risk information among different sectors.

- **Coastal Protection works**

Mauritius has a continuous coastal rehabilitation programme for priority eroded sites which are undertaken in an integrated manner to safeguard our natural assets for the benefits our citizens and for the tourism industry. During the last 10 years, substantial resources have been injected for the rehabilitation of eroded coastlines with some 10 km rehabilitated in approximately 23 coastal regions. Many coastal protection works are still ongoing. In addition to coastal rehabilitation works, the Ministry has, taken other measures to address beach erosion. There is an imposition of a minimum setback of 30 metres from the high-water mark for the construction of structures on the shoreline as per the Planning Policy Guidance and through the Environment Impact Assessment and Preliminary Environmental Report mechanisms.

- **Coral Restoration Project (UNDP AFD)**

The aim of the project is to reduce the impact of climate change on local communities and coral reef-dependent economic sectors in Mauritius, Rodrigues and Seychelles by implementing coral reef restoration with thermal tolerant corals as adaptation to climate change.
The Ministry of Fisheries has identified several areas where exposure to risks could be minimised and have improved building standards of fisheries infrastructure to withstand extreme weather events. EIA conditions are being included in high-risk projects and are requiring contingency plans in some cases.

Since 2018, the Ministry has set up 7 coral nurseries as follows: 5 in the Blue Bay Marine Park, 1 in the Balaclava Marine Park and 1 in Trou aux Biches. The cultured corals have been transplanted to 5 sites in the Blue Bay Marine Park, 1 site in Balaclava Marine Park and 2 sites in Trou aux Biches on 2 occasions in 2019 and 2021. Currently, the coral nurseries have been populated with new coral fragments.

- Coral farming and fish breeding and restoring marine Ecosystem

The Ministry of Fisheries is implementing as from April 2022 the "Assistance Scheme for Coral Farming and Fish Breeding" funded under the National Environment and Climate Change Fund. The project aims at training 300 fishermen and applicant fishermen in coral farming techniques, management and maintenance of coral nurseries, creation and maintenance of coral gardens.

The Ministry is also an implementing partner of the UNDP/AFB funded “Restoring Marine Ecosystem Services by Restoring Coral Reefs to Meet a Future Climate Change" project since 2021. Activities earmarked to be carried out by the Ministry include setting up of land based coral nurseries at the AFRC and the MOI, restoration of 2.5 hectares of coral reefs in the Blue Bay Marine Park and 0.5 hectares in South East Marine Protected Area, Rodrigues, training of community members in coral farming in Mauritius and Rodrigues amongst others.

- Tourism Sector

The Tourism sector, which accounted for 8.5 per cent of the GDP in 2018, is one of the main drivers of growth. The GDP growth was negatively impacted by the far reaching consequences of the global COVID-19 pandemic on the sector. The sector is also highly vulnerable to the impact of climate change, extreme weather events, as well as environmental accidents such as the 2020 oil spill into a wildlife sanctuary after the ship MV Wakashio struck a coral reef. The physical assets of the sector are primarily located in coastal zones (90 percent of hotels in Mauritius are on the beachfront), where they are directly exposed to storm surges and floods, coastal erosion and the loss of biodiversity (especially coral bleaching).

- Agriculture Sector

The agriculture sector of Mauritius is regularly affected by disasters caused by natural hazards including hydro-meteorological (cyclones, torrential rains, flash floods, storm surges, water scarcity), biological (animal disease, crop pest and disease, invasive species), and geological (landslide, tsunami). The sector is also affected by man-made disasters (fire), and financial crises (price volatility). Based on the data available, hydro-meteorological hazards such as
cyclones and flash floods incur the highest economic losses across the sector (e.g. Cyclone Dina in 2002 caused ≈ 50 million EUR losses in sugarcane production).

The agriculture sector policy and planning documents recognize the risks caused by changing climate and natural hazards. Even though not titled as adaptation, disaster risk reduction and management, many relevant measures are mainstreamed in the national policy and planning documents.

In Mauritius we do not have indigenous people but local knowledge of communities do exist, some examples pertaining to the community of small planters includes:

Small planters located in the coastal region of Grand-Sables are impacted by sea water intrusion and droughts. In response to this they used to rely on the presence of frogs which is dependent on the salinity of the water to decide when to cultivate. Based on this experience salinity meters were provided to them. They have also move to vegetables varieties which are drought resistant. They also constructed small water ponds on their fields to capture water for irrigation. These ponds were later consolidated with concrete.

Some small planters also propagate a particular type of plant which attracts bees for pollination. A scheme for enhancing pollination was later introduced by the Ministry of Agro-Industry and Food Security

- Trade and food security

The country has positioned itself as a trade hub (re-export, logistics and distribution). It also imports most of its national food requirements. This makes Port Louis harbour vitally important to the economy. A disaster affecting Port Louis would disrupt the supply chain and jeopardize the import of vital goods for the population. Port Louis is exposed to multiple risks, including rising sea levels, storm surges and swells and technological hazards related to the management of hazardous materials. In 2018, the port was closed for 40 days due to swells with winds above 70 km/h, directly affecting the economy.

C. Progress in Risk Governance and Management

Historically, disaster management in Mauritius were mainly about response operations by First Responders such as the Police and the Fire and Rescue Service amongst others under the Cyclones and Other Natural Disaster Committee and the National Disaster Operation and Coordination Centre (NDOCC).

Past events as well as future threats have for long demonstrated the need for a multi-hazard approach to disaster management in the Republic of Mauritius. However, after the 2013’s flash flood in Port Louis where 11 people lost their lives, the Government recognised the need to establish a permanent disaster management structure in Mauritius, which resulted in the creation of the National Disaster Risk Reduction and Management Centre (NDRRMC) in October 2013, under the Prime Minister’s Office, with a handful of officers with composite
background. Since its creation, the NDRRMC has adopted a comprehensive and integrated approach to disaster risk reduction and disaster risk management through prevention, preparedness, response as well as recovery and reconstruction measures.

Since 2015, Mauritius was committed to work towards achieving the goals of the Sendai Framework in terms of governance and building national ownership for DRR, the following bold measures have been taken:


The National Disaster Risk Reduction and Management Policy, Strategic Framework and Action Plan (NDRRMPSPFAP) 2020-2030 for the Republic of Mauritius was completed in January 2021. It charts the way on DRR actions to be taken for the next 10 years and comprises of 189 actions which are grouped under four strategic objectives, namely:

- 1. Disaster Risk Governance - To ensure risk governance systems are enabled to face current and future disaster risks,
- 2. Disaster Risk Reduction - To progressively reduce disaster risk during the decade to 2030,
- 4. Preparedness, Response and Recovery - To reduce the overall impact of disaster through better preparation, more efficient and rapid response and recovery.

A Steering Committee has been set up for a harmonised implementation of these actions.

To better understand where we stand in DRRM, Mauritius has also benefitted from the support of the CADRI Partnership (a global UN led partnership) in 2020 to conduct a national capacity assessment for DRR and from AFD from 2018 to 2020 to develop the National Disaster Risk Reduction and Management Policy, the Strategic Framework, and the Action Plan 2020-2030. The 200+ recommendations in the CADRI Report have been instrumental in the development of the National Action Plan for Mauritius, with the aim of guiding disaster reduction and management activities in the country up to 2030, in line with the Sendai Framework.
(i) **The National Disaster Risk Reduction and Management Act 2016 (NDRRM Act 2016)**

The National Disaster Risk Reduction and Management Act 2016 provide the legal mandate for the coordination at the executive level and establishment of the institutional framework for disaster management. The Act also enabled the setting up of a National Disaster Risk Reduction and Management Council, which, inter alia, oversees the DRRM activities in the Republic of Mauritius and lays down national guidelines for disaster risk reduction and management at all levels.

The main objectives of the NDRRM Act 2016 are to provide for: –

(a) prevention and reduction of the risk of disasters;
(b) mitigation of the adverse impacts of disasters;
(c) disaster preparedness;
(d) rapid and effective response to disasters; and
(e) management of post-disaster activities, including post-disaster recovery and rehabilitation.

The NDRRM Act 2016 also ensures that every local authority has a Local Disaster Risk Reduction and Management Committee which collaborates with the NDRRMC for any disaster risk reduction and management activity in areas under its jurisdiction.

In Mauritius, all funding for Disaster Risk Reduction and Management activities is derived from the Yearly National Budget and as per the Act.

(ii) **Land Drainage Authority (LDA) Act 2017**

The Land Drainage Authority (LDA) Act 2017 has been proclaimed and came into effect on 01 June 2018 and the organisation became operational as from January 2018.

The LDA is responsible for-

(a) The development and implementation of a land drainage master plan;
(b) Coordinating the construction of drainage infrastructure by the local authorities, the NDU, the RDA and any other relevant stakeholder; and

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5 The National Disaster Risk Reduction and Management Act 2016 (NDRRM Act 2016)
(c) Ensuring that there is a routine and periodic upgrading and maintenance of the drainage infrastructure

(iii) **Local Government (Amendment) Act (2018)**

The Local Government (Amendment) Act (2018) makes provision pertaining to illegal constructions and development and giving more powers to local authorities. It also provides for the increase of penalties for illegal constructions and development; and mandatory pulling down orders by District Courts for illegal constructions and development. This measure deterred people from engaging in illegal construction.

(iv) **Climate Change Act 2020 (no 11/2020)**

This document is Mauritius' framework climate law. It makes mention of the Inter-Ministerial Council on Climate Change, which is in charge of setting national objectives, goals and targets with a view to making Mauritius a climate change-resilient and low emission country and the Climate Change Committee and charges it with a range of coordination and recommendation missions.

The Act also stipulates the creation of the Department of Climate Change within the Ministry responsible for climate matters. The Department's attributions encompass broad policymaking duties, including the following: 1) promoting adaptation and mitigation measures in all sectors, 2) establishing mitigation procedures and reporting mechanisms, 3) establishing and maintaining a climate change database, 4) promoting the implementation of Article 6 of UNFCCC on education, training and public awareness on climate change and related matters, 5) monitoring the implementation of mitigation and adaptation policies, and 6) annually publish the National Inventory Report on greenhouse gas emission by sources and removal by sinks.

(v) **National Disaster Scheme 2015 (NDS 2015)**

National Disasters’ Scheme 2015 - The ‘Cyclone and Other Natural Disasters Scheme’ which was an annual publication has been replaced by the National Disasters Scheme (2015) following Cabinet Approval. The user-friendly document is the primary source of information at national level for stakeholders, agencies and individuals working in preparation and response to identify threats and is intended to aid users in quickly identifying, understanding and implementing their respective roles. This has helped stakeholders to take timely actions prior, during and after a disaster. The document is dynamic and is expected to be reviewed soon.

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6 Climate Change Act 2020
7 National Disaster Scheme 2015 (NDS 2015)
Schemes outlined in the NDS 2015:

- Cyclone Emergency Scheme
- Heavy Rainfall/Torrential Rain/Flooding Emergency Scheme
- Landslide Emergency Scheme
- Tsunami Emergency Scheme
- High Waves Emergency Scheme
- Water Crisis Emergency Scheme
- Earthquake Emergency Scheme
- Port-Louis Flood Response Plan

(vi) The National Development Strategy

The National Development Strategy which regulates Land Use across the islands took into account DRR and same being strengthened with the coming of the new national Land Development Strategy. With the NDRRM Policy, Strategic Framework and Action Plan 2020-2030, all sectors are being called upon to consider DRR in their policies and actions.

In addition, there exist DRRM provisions of cross cutting nature in a number of other legislations as per Annex 2.

Provisions made in National Disaster Risk Reduction and Management Act 2016:

- Setting up of the National Disaster Risk Reduction and Management Centre

Keeping in line with the Government’s vision to enhance the safety of citizens in Mauritius, the National Disaster Risk Reduction and Management Centre (NDRRMC), set up in 2013, represents the institutional instrument to integrate disaster risk reduction and management across all sectors.

- National Disaster Risk Reduction and Management Council

The NDRRM Act also enabled the setting up of a National Disaster Risk Reduction and Management Council, which, inter alia, oversees the DRRM activities in the Republic of Mauritius and lays down national guidelines for disaster risk reduction and management at all levels. The National Council meeting is held under the Chairmanship of the minister responsible for Disaster Management. So far since year 2016, 38 Council meetings have been held. The NDRRMC acts as the operating arm of the Council.

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8 Source: Ministry of Housing and Land Use Planning
- National Crisis Committee

The National Crisis Committee consists of the Minister responsible for Disaster Management as the chairperson and other heads of Departments responsible for Crisis and Disaster Management. The National Crisis Committee has all the functions and powers of the National Council and takes decisive and timely actions through then NEOC. From 2018 to mid 2022, The NCC met 14 times for cyclone and heavy rainfall event and 35 times for Wakashio oil spill event in 2020.

- Local Disaster Risk Reduction and Management Committee

A Local Disaster Risk Reduction and Management Committee is held at least once in every three months in each Local Authority to look in all DRR issues at local level with the participation of actors from both National and Local Levels. This has been very effective with respect to coordination for implementation of DRR measures. Tree and branches cutting along the road, maintenance and construction of drains, simulation exercises etc. are among the main agenda of the committee.

- Coordinated Response Approach for Emergency and Crisis Management

In crisis situation, depending upon the extent, magnitude and severity of the threat, the multi-agencied National Emergency Operations Command (NEOC) is activated to coordinate and monitor preparedness, response, relief and recovery activities associated to the event. The management of crises/emergencies/disasters operates on a three-tiers system involving the National Crisis Committee at the Minister’s level, the NEOC at national level, and the Local Emergency Operations Command (LEOC) at municipal/district council levels. NEOC has been activated 174 times since Year 2015 to June 2022 and has lasted for several days. Similar to NEOC, there is a Local Emergency Operations Command (LEOC) in all Municipal/District Councils at Local Level, and a Rodrigues Emergency Operations Command (REOC) in Rodrigues.

There are also Disaster Management Coordinators responsible for the management of disaster situations in the outer islands of Agalega and St Brandon (Cargados Carajos).

The activation of the crisis cells allowed for a better agency coordinated approach and avoid duplicity in actions while ensuring timely response on ground with the effective use of resources. This has helped in saving life and property to a very large extent over the years.

- Decentralization of DRRM

The NDRRMC has strived to develop innovative approaches to disaster risk management for the country, as well as seeking improvements within existing systems.

The NDRRMC has been working closely with stakeholders in disaster risk management throughout the years. Local Disaster Risk Reduction & Management Committees (LDRRMC) has been established within all Municipal and District Councils followed by the appointment
of Local Disaster Management Coordinators in the year 2018. With the support of the NDRRMC, simulation exercises conducted at Municipal and District Councils levels as per an annual simulation calendar are significantly contributing to strengthen their arrangements in support of identifying, mitigating and responding to identified threats. With these arrangements DRRM is being tackled at grassroots level within the local authority.

A Rodrigues Disaster Risk Reduction & Management Centre was established in Rodrigues on 28 May 2017. Disaster Management Coordinators have been introduced for our outer islands St Brandon and Agalega, and are working closely with the NDRRMC. The Centre coordinates all DRR related activities within the island and activates their emergency operations command for a timely coordinated response.

D. Progress in Investment in Risk Reduction and Resilience

- **The National Environment and Climate Change Fund (NECCF)**

A National Environment and Climate Change Fund (NECCF) in place. The fund is used among others, to compensate victims in situations of environmental emergency and spills. The NECCF covers projects, programmes and schemes in the following main areas: rehabilitation, protection and management of beaches, lagoons and coral reefs; management of solid waste; disaster risk reduction; cleaning and embellishment works; landslide management, green economy and environment protection.

- **Lotto Fund**

The Lotto Fund was created in October 2016 to contribute to the financing of projects, schemes and events including support to victims of natural calamities. DRRM Budget allocations from Year 2015 to 2022 is as per Annex 3.

- **Government grants to different sectors**

Government grants are also available to different sectors (agricultural, victim assistance, flood and cyclone allowance). These are:

- Prime Minister’s Relief Fund
- Provision for evacuee shelters
- Ministry of Social Integration to assist for reconstruction of destroyed houses of vulnerable persons as per specific criterias

- **Grants and assistance regarding Oil Spill of MV Wakashio**

As regard to international resources, assistance are obtained during crisis situation, for instance, USD 2.5 million was received from the United Nations Recovery Fund post the oil spill from MV Wakashio at Pointe D’Esny to support the Government and Local Communities
to minimise the socio-economic and environmental impact of the spill. ADB provided USD 500,000 to support international recovery efforts. Besides regular capacity building on DRR are offered by international agencies.

- **Land Use Planning**

  (i) **National Land Development Strategy (NLDS)**

  A National Land Development Strategy is being worked out and will be part of a comprehensive review and update process of the 2003 National Development Strategy (NDS) undertaken for the Ministry of Housing and Land Use Planning. It will provide the vision, strategy and policies for the Island of Mauritius up to Year 2040. Once finalised and adopted, the new National Land Development Strategy (NLDS) will replace the 2003 NDS (adopted in 2005) as the principal Land Use Planning Strategy for the Island of Mauritius.

  The NDLS will propose new directions for development planning to 2040 consistent with sustainable development principles. The specific objectives of the assignment are to review the various land policies and land management practices of different stakeholders over the last 18 years, and identify and propose corrective measures and changes to the land use planning laws, where appropriate, consistent with the revised NLDS and sustainable principles.

  (ii) **Building and Land Use Permit**

  The Local Government Act, the Building Control Act, the Town and Country Planning Act and the Environment Protection Act as well as guidelines prepared under these Act, provide the basis of self-adherence to planning and building legislation, regulation, norms and guidelines.

- **Landslide Management**

  In year 2015, the Ministry of Public Infrastructure with the support of JICA came up with the project of landslide management in the Republic of Mauritius.

  Following a study on landslide prone areas carried out by JICA, the regions of Quatre Soeurs, Chittrakoot and Vallee Pitot had been depicted as being risky. Relocation procedures have been initiated and in Year 2019 whereby 11 families have been relocated from Quatre Soeurs to Camp Ithier and a compensation package was also given to those families. Similar procedures are ongoing for other critical landslide prone areas.

  The Government of Mauritius requested technical assistance in landslide management to the Government of Japan and a Landslide Management Project was launched in May 2012. The overall goal of the project: ‘To mitigate landslide disasters in Mauritius”. One of the outcome of the project was the setting up of the Landslide Management Unit (LMU) presently known as the Geotechnical Unit.
A steering committee on management of landslide and other slope related disaster has been set up since July 2021. A Technical Committee with relevant stakeholders has been set up to work on the development of the Landslide Management Plan.

The NDRRMC is working with the Ministry of National Infrastructure and Community Development (National Infrastructure Division) to revise the Landslide Emergency Scheme in the National Disaster Scheme 2015. The Landslide Emergency Scheme clarifies necessary actions, the roles and responsibilities of each organization during a Landslide conditions.

- **Investment in infrastructure**

Over the years there has been numerous Constructions/upgrading of bridges /roads /culvert/buildings for the benefits of the citizens of the country. Significant investment in the construction of drains through the National Flood Management Programme, Gabion Nets have been placed in coastal regions where houses are affected by storm surge or high wave.

- **Adaptation of School Curriculum**

Topics on climate change incorporated in School Curriculum for students in Grade 4 up to Grade 6. The Ministry of Education has incorporated disaster risk issues in the Teacher Education Programme and multi-disciplinarian curriculum reinforced by seminars and workshops. New Courses on climate change and disaster management have also been designed at Tertiary level and adaptation of curriculum.

- **Integrated Environmental Monitoring Plan (IEMP)**

Following the technological disaster of the Wakashio oil spill in 2020, an Integrated Environmental Monitoring Plan (IEMP) has been established (Post Disaster management & recovery) to cater for the long-term management of corals, seagrass and mangroves in areas affected by oil and reports on the work of the IEMP are produced on a quarterly basis. The IEMP aims for the recovery of healthier and more resilient coastal ecosystems than the ones before the oil spill incident and has a multistakeholder dimension involving other agencies like the Mauritius Oceanography Institute (MOI), Reef conservation, Representatives Eco-Sud and the University of Mauritius (UoM).

- **Nationally Determined Contributions (NDC)**

The Nationally Determined Contributions for Mauritius has been revised. The key adaptation sectors for Mauritius include Water, Agriculture, Tourism, Fisheries, Blue Economy, Infrastructure, Coastal Zone, Biodiversity, Disaster Risk Reduction and Health. Additionally, Gender, Disaster Risk Reduction, Social Security and Education are considered as cross-cutting sectors.
- **Coastal Flooding and Marine Submersion**

An Operational Study has started since July 2022 and is expected to be completed by 2024 by the Ministry of Environment. The study will identify coastal risks and include the impacts on our coastal areas and exposed assets by storm surges and marine submersion.

- **Forests, Tree cover and initiatives at National Park**

Planting trees e.g. green spaces to mitigate flooding and to reduce soil erosion, rockfall and Land Slide (on slopes)] and restoration of forest in water catchment areas. During the period January 2016 – December 2020, approximately 400 000 plants have been planted or issued under the national tree planting campaign to Schools, socio-cultural organisations, NGOs and public. Other private initiatives for planting trees have not been accounted. The planting sites identified for planting included: State lands (approx. 30 ha), Mountain Reserves (2.5 ha), river reserves (6.5 ha), roadside of Motorway M1 and M2 (approx. 37 600 plants over 22 km) and other roadsides, government compounds, schools, botanical garden (SSRBG), Socio-cultural compounds and NGOs’ compounds.

A policy was developed on the replacement of casuarina trees within the dynamic beach zone, that is 30 metres inland from the high-water mark, by endemic plants which are more adapted to the coastal areas. This initiative aims at restoring the natural coastal vegetation and improve resilience of the coast against the impacts of climate change including sea level rise and coastal erosion.

With respect to Fire, 20 km of Fire breaks have been created and maintained on fire prone and sensitive areas (Forest plantations, Islets such as ile aux Benitiers and Signal Mountain).

At National Park Level, the following initiatives are being taken:

Improving the hiking trail system for Parks visitors in the Parks by providing enhanced signage program that integrates consideration of disaster risk. New visitor facilities have been erected in the National Parks for the safety of visitors in the Park.

The National Park and Conservation Service through the National Ramsar Committee has ensured the conservation and protection of wetlands through the regulatory clearances for any development on or around wetlands. Moreso, restoration of around 800 hectares of forest completed as at date and it planned to restore additional 100 hectares per year. Source: National Biodiversity Strategy and Action Plan 2017-26.

- **Review of Environment Protection Act**

The Ministry of Environment, SWM and CC is currently reviewing the Environment Protection Act which is the main legal instrument for the overall protection and management of the environment.

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9 Environment Protection Act
Other projects implemented

- Preliminary vulnerability assessments have been carried for specific segments of the coastal zone, agriculture and infrastructures.
- Desk study carried out in the context of updating the National Climate Change Adaptation Policy Framework.

- **Urbanization, Sustainable Drainage System, Nature/Eco Based Solutions, Resilient Infrastructures**

The Land Drainage Master Plan 2022\(^{10}\) emphasizes on the Sustainable Drainage Systems which is a relatively new concept to Mauritius. The aim is to deliver a more holistic approach to manage surface water and wherever possible mimic natural drainage. The combination of the traditional drainage systems coupled with nature based solutions could be an opportunity for the island to enhance the efficiency of the existing traditional drainage system and reduce the cost of drainage works while increasing comfort in town and newly built areas. More so, water retention structures, less of concrete, greener spaces mainly in agriculture land wherever possible will be implemented. As from next Financial Year, Local Authorities will require to make provision in their budget for maintenance of such structure at least twice a year. To that effect, the LDA has already met all the Chief Executives of the 12 Local Authorities.

As regard to the Ministry of Environment, a Ridge to reef approach and Nature-based solutions are being promoted such as mangroves propagation, creation of retention ponds and protection of Environmentally Sensitive Areas including wetlands.

The Ministry of Education has all established mechanisms and protocols regarding risk reduction and these are maintained even in the Covid pandemic situation.

Mauritius Red Cross Society - All mechanisms and approaches have had to be adjusted during the Covid19 pandemic.

**E. Progress in Disaster Preparedness, Response and ‘Build Back Better’**

- **Early Warning System**

The country has a functional warning system which covers multiple hazards namely cyclones, heavy rain, heavy swells, strong wind, storm surges, mini tornado, lightning, heat waves, earthquake, tsunamis and landslide amongst others. The Mauritius Meteorological Services does issue Heavy Rain or Torrential Rain Warnings whereby they give an indication about where flooding may occur and the current system has recently been enhanced through the setting up of the Doppler Radar which is a weather now casting system. However, significant

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\(^{10}\) Source: Land Drainage Authority
effort is required to improve the risk identification, information management system and investment is needed to improve the early warning system for flooding and flash floods.

There has been an increase in the number of automatic weather stations installation around the island to the number of 33 to date.

Extensometers have been installed in Landslide prone areas of Chitrakoot and Vallee Pitot for measuring of ground movement and alerting the inhabitants about impending dangers linked to landslides.

- **Storm Surge Early-Warning System**

Since August 2015, with the participation of the NDRRMC, the Republic of Mauritius is the first Small Island Developing States (SIDS) to have its own storm surge Early-Warning System for improving preparedness and resilience to events like cyclones. It includes the islands of Mauritius, Rodrigues and Agalega. The Early Warning System (EWS) is installed at the Mauritius Meteorological Service (MMS) in Vacoas and provides 3-days forecast for every 6 hours. The project was implemented in the context of the Climate Change Adaptation Programme and funded by the Adaptation Fund Project.

- **Coordination during emergency (NEOC, LEOC, REOC)**

A National Emergency Operations Command (NEOC) is established within the NDRRMC and is activated whenever a disaster or any other major crisis becomes imminent. The NEOC is multi-agency, comprising representatives from Ministries/Departments, other emergency services, NGO’s and Private Sectors. It is the main coordinating body during the preparedness, response and recovery phases of any disaster or for any other major crisis falling within its purview. The Commissioner of Police, in the event of a disaster, leads disaster response operations jointly with the Ministry of Local Government and Disaster Risk Management and such other agencies as may be appropriate in the circumstances. The NEOC adopted the incident Command System in the year 2017 so as to avoid unnecessary duplication of resources. Depending upon the magnitude and severity or potential magnitude or severity of a crisis/disaster situation, the NEOC is activated at three levels namely level 1, level 2 and level 3 with the latter being the highest level. Similarly for the island of Rodrigues, there is the Rodrigues Emergency Operations Command (REOC) which has similar functions as NEOC.

At the level of Municipal/District Councils, a Local Emergency Operations Command (LEOC) has been established and is activated whenever a disaster or any other crisis becomes imminent within the area of jurisdiction and reports to the NEOC. The LEOC is multi-agency and is headed by the Mayor/President of District Council. The LEOC is activated solely for the purpose of coordinating all activities during a disaster and makes use of the well-established command, control, co-ordination and communication system so as to avoid unnecessary duplication of resources, as far as practicable.
- **Mobile Command Post Vehicle (MCPV)**

The NDRRMC has procured a MCPV with a view of strengthening Command, control, coordination and communication on site during multi-agency intervention during trainings, simulation exercises and as well as during real situation. Communication facilities include: VHF Radio Systems (1 Desktop +10 Handheld, coverage 3kms), Telephone lines (2 lines), Internet/WIFI, Satellite Communication, Built-in Public Address System: Backup Generator (8 hours), GPS Navigation system, Observation Point/Drone platform, Laptop (Situation report, Chronology of Event, GIS), HD Television (MBC, Internet News), Printer/Scanner, Air conditioning, First Aid Kit, Front Winch (4.5 ton), Protective grill (against hostile situation), Roof hatch (to minimise energy consumption), Whiteboard. The vehicle has been used on several occasions, both in simulation exercises and during site visits during real time disaster events. The MCPV has also been used as an Incident Command Post on several occasions. It is to be noted that following the MV Wakashio Oil Spill in 2020, the vehicle was used for coordination purposes with various stakeholders.

- **Communication during crisis situation**

The NDRRMC arranged for the procurement of Satellite Phones which were then issued to First Responders and Senior Officials for use during emergencies in case of terrestrial communication failure. There was also the Ratification for waiving of License Fees by the ICTA/MTCI. However, broadened distribution in other key sectors remains a challenge due to the exorbitant costs involved. Several tests have been conducted and were found to be successful. This will be of help during crisis events in case there are power outages.

- **Blast SMS by Tourism Authority**

Several stakeholders have developed Emergency Alert tools which are used for dissemination of information. One such tool is the Blast SMS sent by Tourism Authority to concerned stakeholders such as licensed pleasure craft operators, hotel operators and tourist operators amongst others during disaster events instructing them to take necessary precautions to ensure the safety and security of tourists. Around 17,000 sms are sent to licensed operators (holders of tourist enterprise licences, pleasure craft licences (commercial and private), skippers. They are also advised to consult the official bulletin of the MMS for updated information. However, upon updates of the main weather bulletin, the Tourism Authority sends another SMS to the operators.

- **Emergency Alert app**

Another Emergency Alert tool developed for the dissemination of information to the public is the Emergency Alert app which allows users to receive timely information and updates generated by the National Disaster Risk Reduction and Management Centre (NDRRMC). The mobile App was implemented as a channel of communication between the NDRRMC and
members of the general public to send warning/alert notifications through smart phones before and during disasters.

- **The MyT Weather**

Another tool is the MyT Weather App which includes Alerts, Communiques, vital information, daily weather forecast and hotline at one click dial for all responders with maps.

- **Communique by NDRRMC**

Upon receipt of weather bulletin from Mauritius Meteorological Services (MMs) in respect of bad weather conditions, such as cyclones, heavy swells, etc., the National Disaster Risk Reduction Management Centre (NDRRMC) issues a detailed communiqué by email on the severity of the calamity and directs the concerned stakeholders to strengthen vigilance and be ready to activate emergency plans and initiate appropriate actions.

- **Quatre Soeurs Refuge Centre**

As part of the Adaptation Fund Project, a dedicated Refuge Centre, first in its kind of an approximate area of 1000 m² resilient to flooding and coastal inundation has been constructed in the village of Quatre Soeurs. The hi tech, user-friendly, eco-friendly and sustainable building will serve as an emergency escape haven from coastal inundation, storm surges and other natural calamities to demonstrate infrastructure alternatives to minimize flooding risk in the future. The objective is to increase climate resilience of communities and livelihoods in coastal areas around Quatre Soeurs region through the application of adaptation measures to protect vulnerable coastal ecosystem and community features. The building shall also serve as a multi-purpose complex under normal circumstances.

- **Contingency/Emergency/Business Continuity Plans**

Institutional Preparedness in terms of DRRM is also in place. Many organisations already have Contingency/Emergency/Business Continuity Plans. Contingency Plans are in place for some 65 vulnerable flood prone areas. A major Flood Response Evacuation Plan for the Capital City Centre of Port Louis is nearing completion. More so, Emergency Plan for Residential Care Homes (RCHs) have been developed.

- **The School Emergency Response Plan**

The School Emergency Response Plan identifies measures to be adopted to prevent an incident from escalating and also establishes the means in manpower and equipment required for a rapid and timely response to such emergency. All schools are expected to develop their own plan and to customise it as per their requirements. In this context, the NDRRMC in collaboration with the Ministry of Education, Tertiary Education, Science and Technology organised sensitisation campaigns with heads of Government and Private Primary
Schools in Mauritius and Rodrigues. In many cases, the School Emergency Response Plan has been tested during simulation exercises whereby the students are well familiarised on what to expect and how to act in real time situations.

- **Hospitals Flood Emergency Plan**

All Regional Hospitals have a Hospital Emergency Preparedness, Response, Communication and Recovery Guidelines. According to DRR Report 2013, Dr A.G.Jeetoo hospital is located in a flood prone area and as such, a Flood Emergency Plan has been prepared to define actions that should be taken by hospital staff and other stakeholders in the event of flooding and to enable normal work to continue with minimum disruption. All details have been considered in the Plan in order to protect the lives of the patients with minimal disturbance to them.

- **Emergency Action Plan for Bagatelle Dam**

The Emergency Action Plan for Bagatelle Dam has been Prepared in consultation with the Water Resources Unit for the definition of roles and responsibilities of stakeholders in ensuring public safety downstream of the dam. Plan for Phase 1 completed since June 2018. Several wet test programmes have been carried out in the past years so as to test the plan in place.

- **The Rock fall Emergency Scheme**

The Rock fall Emergency Scheme has been finalized since December 2017 as an annex to the NDS 2015 whereby all the role and responsibilities of all concerned stakeholders have been listed in the event of a rock fall. The Health Track of Signal Mountain is closed since January 2018 in view of public safety.

- **Protocol for Heavy Rainfall for Public sector**

The NDRRMC was involved in the preparation of the Protocol for Heavy Rainfall for Public sector which is in place and has obtained Cabinet approval since April 2017. Following the Protocol for Heavy Rainfall for the Public Sector, it was noted that a similar protocol should be devised for the Private Sector while taking into consideration the different specificities between the private and the public sector. Relevant amendments have been made in the ‘THE WORKERS’ RIGHTS ACT 2019’ as at Section C.32 of the ‘Annex to Budget Speech 2020-2021’. The necessary amendments to the Workers’ Rights Act will facilitate the implementation Protocol of Heavy Rainfall for the Private Sector as regards the remuneration to be paid to workers of the private sector where work has been stopped as a result of climatic condition, including heavy rainfalls and general preparedness for cyclone. The protocol has been activated in many instances and the staggered release of employees has proved to effectively ensure the smooth running of the plan.
- **Off-airport aviation emergency plan**

An off-airport aviation emergency plan has also been devised and sets out the key pillars for response in an emergency situation. The purpose of the emergency plan is to set out the responsibilities and required actions/roles of the various organisations/agencies involved in dealing with emergencies. Off-airport crash simulation exercises are also carried out to test whether we have in place a coordinated preparatory arrangement for the timely response to an aviation emergency within the territorial area of Mauritius but outside the jurisdiction of the airport operator. In case the incident occurs within the Airport premises, it is the Civil Aviation Department’s responsibility to manage the incident with all key stakeholders concerned.

- **Community Disaster Response Programme (CDRP)**

The CDRP helps to build the capacity of the community to respond to disasters and to inculcate a culture of risk reduction within the population. The training is based on the principle of self-help and mutual help and it consists of empowering a group of volunteers in a particular vulnerable area to the basic techniques of Fire Safety; Rope Handling; First Aids; Water Rescue Activities; Basic Camp Management; Team Building; Sand Bagging; and other basic techniques applied in an emergency situation. When emergencies happen, CDRT members can provide immediate assistance to victim; give critical support to responding authorities; and organise spontaneous volunteers at a disaster site. A Vulnerability and capacity assessment are undertaken by local volunteers during the CDRP and same incorporated in the contingency plan at local level. Same is being done since the first Community Disaster Response Programme conducted in year 2013.

At least 3 new CDRPs are carried out yearly and Refresher courses for existing Community Disaster Response Teams are conducted mostly every year. From 2015 to 2022, 53 CDRP and from 2018 – 2022, 17 Refresher Courses were conducted with an average of 25 to 30 participants.

In the past, as long as it was safe for them to do so, trained Community Disaster Response Team members have provided support to First Responders during crisis situations. They also provide on ground information to NEOC and LEOC which contributes to ensure better coordination and decision making. They have also been instrumental in sensitising the general public on precautions to be taken during disaster events.

- **Setting up of a Disaster Response Unit (D.R.U)**

The Disaster Response Unit (DRU) comprising of officers from the Special Mobile Forces has been set up on 16.01.2017 as per the NDRRM Act 2016. The aim of the setting of the DRU is to achieve highly skilled Rescue & Relief Operations within the least possible delay to minimise the impacts of disasters. The objectives of the DRU are to: (a) Provide specialised response during disasters; (b) Deploy proactively during impending disaster situations; (c)
Impart basic and operational level training to other stakeholders; (d) Organise Community Capacity Building Programme with other local authorities and stakeholders. (CDRP); (e) Carry out public awareness campaigns and train Local Community as first responders; (f) A unit having air and water borne swift water rescue response capabilities and (g) Support the Local Authorities in the conduct of SIMEX/Workshops.

Major interventions by DRU till date comprise of search and rescue operations during flooding & flash floods, collapsed structures, major road accident, landslides, high waves, heavy swells, storm surge & tsunami, cyclones, heavy/torrential rainfalls, aircraft crash, combat oil spill inland and along coastline, assist Mauritius Fire & Rescue Service for search and rescue operations during major fire incidents, assist Ministry of Health in health hazards/epidemics.

During the last years, DRU has been very active in attending to cases of fallen trees amongst others in the yard of critical infrastructures such as schools and hospitals especially after the passage of cyclones, which has sped up the post cyclone rehabilitation phase and returned the situation back to normal.

- Simulation Exercises, Sensitization/awareness programmes, training programmes, lectures and workshops

Sensitization/awareness programmes, training programmes, lectures and workshops in critical areas as well as other areas prone to be affected by hazards such as cyclones, flooding and storm surge amongst others, aiming at educating vulnerable groups on disaster risks and disaster risk measures, including school children, Women, Person with disabilities and the elderly.

From 2015 – 2022, 228 simulations exercises were conducted with at least 3 exercises carried out by the 12 Local Authorities every year and at least 1 by other key stakeholders. As regard to sensitization campaigns from 2017 – 2022, 73 campaigns conducted with an average of around 30 participants per campaign. In a few cases participants exceeded more than 100, example in socio cultural groups and educational institutions. The various sensitisation/awareness campaigns have help to shed light on the various risks which hazards represent for our population.

During the International Day for Disaster Risk Reduction which is celebrated annually on the 13th of October, the community at large are additionally sensitised on disaster risk reduction, through the media and local authorities.

F. Collaboration, Partnership and Cooperation
- National Level

Partnership with some local NGOs and private sector organisations in the education of vulnerable communities on disaster risks exist in certain local authorities but still remains limited. An all-inclusiveness approach, targeting all segments of society is being adopted in
the field of Disaster Risk Reduction and Management so as to ensure that the opinion of all is taken into account.

Partnership with some local NGOs and private sector organisation in education of vulnerable communities on disaster risks exist in certain local authorities but still remains limited

- **Regional Level**

At Regional Level, Mauritius collaborates with many international institutions such as SADC, AU, IORA, PIROI, UNDRR AFRICA World Bank, CDRI, WMO, UNESCO, UNDRR, UNDAC, CDRI and EU amongst others, in the field of Disaster Risk Reduction and Management.

Our country has also benefitted from several training programmes from those international agencies and capacity building that has been obtained from several regional and international organization are as per Annex 4.

G. **Progress in achieving the Targets of the Sendai Framework**

- **Statistics Unit at the NDRRMC**

In order for the NDRRMC to address the need for the compilation of disaster related information and for reporting to the Sendai Framework Monitor (SFM), there was a need to set up a Statistics Unit within the NDRRMC. The NDRRMC is working with Statistics Mauritius to standardize the preparation, collection, processing, validation and reporting of disaster statistics for the Mauritius Disaster Information Management System, Sendai Framework Monitor, Sustainable Development Goals, African Union and Desinventar Sendai. Currently, the NDRRMC is benefiting from the services of a Statistician from Statistics Mauritius on a part-time basis, since January 2022, to assist in putting in place the required inter-institutional mechanisms.

As the MAUDIMS is operational only since year 2021 and has not got much response from key stakeholders reporting to DESINVENTAR and SENDAI Framework Monitoring has been very minimal. It is expected that the reporting will be harmonised once the proper setting up of the Statistics unit has been done.

- **Working towards meeting the 7 Targets of the Sendai Framework**

  (A) **Substantially reduce global disaster mortality by 2030**

The core aim of National Disaster Risk Reduction and Management activities in the Republic in Mauritius is to save and protect life. Since year 2013, the multi-agency National Emergency Operations Command has been activated as and when a crisis became imminent through the coordination of First Responders and other key stakeholders and has facilitated to a large extent timely operations on ground in saving lives and property. Furthermore, the highly trained personnel from First Responders have conducted quick and effective interventions during past disaster events. The Mauritius Red Cross Society as well has been of great help in
providing support in terms of logistics for humanitarian aid such as camp beds, food supplies and first aid interventions.

The Covid19 Pandemic has been a major eye opener for the Ministry of Health and Wellness in terms of the need to have medicines in stock and as well to prepare for mass casualties. With the level of preparedness put in place, Covid19 cases have considerably reduced.

(B)  **Substantially reduce the number of affected people by 2030**

Over the years, drainage infrastructures in flood prone areas have been implemented across the island so as to reduce the impact of flooding. Same were implemented by different entities such as the Road Development Authority, Local Authorities and the National Development Unit. It has been noted that the drainage infrastructures have greatly contributed in reducing the number of families affected by flooding.

Much emphasis has also been laid on disaster preparedness and reduction measures through sensitization campaigns, simulation exercises and the conduct of Community Disaster Response Programmes. Several Contingency/Emergency Action Plans are in place in vulnerable areas and have been devised with the support of community leaders from vulnerable areas. These measures have greatly contributed in enhancing the knowledge of communities on precautions to be taken before, during and after a disaster event.

In order to ensure the safety of all inhabitants, timely warnings and alerts are issued by concerned authorities. The country has in the recent past, with the help of the Government of Japan, has acquired a Doppler Radar equipped with the latest technology. This is expected to show in real time, the areas prone to or experiencing heavy rainfall. This radar further enables tracking of Tropical Cyclones within a radius of 450km.

The Ministry of Housing and land Use Planning has contributed to ensure the safety of citizens by devising schemes which have enabled many families who used to reside in Corrugated Iron Sheet Housing units to shift to concrete housing units. In order to protect lives during landslides, many affected families have been relocated from landslide prone areas.

(C)  **Reduce direct disaster economic loss in relation to gross domestic product (GDP) by 2030**

Statistics on DRRM is now being out in shape at the level of the NDRRMC with the support of Statistics Mauritius. Therefore, at present, it is difficult to provide a true picture of direct disaster economic loss.

(D)  **Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030**

There is a collaboration with CDRI India to assess our Infrastructure to make it more resilient. Massive investment in drainage infrastructure is proposed by the Land Drainage Authority
with priority in high risk flood prone areas. All Land Drainage issues are now under the umbrella of the Land Drainage Authority for a more holistic approach. Over the years, there have also been construction of resilient road networks connecting the whole island, thus facilitating Emergency Services during times of crisis. With regard to our power infrastructure, the Central Electricity Board is planning to have all its cables underground in the future. In the telecommunication sector, Telecom operators are also upgrading their networks. For instance, Mauritius Telecom has redesigned its network and increased internet speeds of up to 100 Mbps resulted in an increase in the use of ICT services. With deployment of fibre to home, Mauritius Telecom has placed Mauritius as the Eighth most fibred country in the world in terms of connectivity and the first in Africa. More than 300,000 households now have access to the fibre-based services.

Additionally, in order to ensure non-disruption of basic services, Business Continuity Plans are being developed in several public institutions. Heavy Rainfall protocols are also in place for both public and private sectors. At the level of Port and Airport Contingency plans in place.

(E) **Substantially increase the number of national and local disaster risk reduction strategies by 2020**

The National Disaster Risk reduction and Management Policy, Strategic Framework and Action Plan 2020-2030 in place since early 2021. As a small island, the national Plan covers local strategies as well. However, an action plan at Local Level is being looked into. A development of a first one is in progress for one Municipal Council using the Disaster Resilience Score Card Techniques.

(F) **Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030**

Mauritius received assistance from Regional and International organisations.

- At Regional Level, Mauritius collaborates with many international institutions such as SADC, AU, IORA, PIROI, UNDRR AFRICA World Bank, CDRI, WMO, UNESCO, UNDRR, UNDAC, CDRI and EU amongst others, in the field of Disaster Risk Reduction and Management.

- Our country has also benefitted from several training programmes from those international agencies and capacity building that has been obtained from several regional and international organization are as per **Annex 4**.

(G) **Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030**

Mauritius Meteorological services already has early warning system for cyclones, heavy rain, heavy swells, strong wind, storm surges, mini tornado, lightning, heat waves, earthquake and tsunamis amongst others. Geotechnical Unit have its early warning system for landslide.
of the key actions proposed by the LDMP is impact based Early Warning Systems and putting in place Evacuation Plans. At the level of National Disaster Risk Reduction and Management centre, a National Multi Hazards Emergency Alerting system is in place since August 2022. During a workshop held by UNDRR in Mauritius in April 2022, the Importance of MHEWS, Custom indicators were introduced which can help to evaluate the effectiveness of the Early Warning System, provide a way to structure the monitoring, evaluation and learning to continuously improve and identify gaps and priorities to improve strategies, plans, financing.

IV. CONTEXTUAL SHIFTS, NEW AND EMERGING ISSUES AND CHALLENGES

   - Impact monitoring of early warning

Impact monitoring of early warning is lacking to assess the efficiency of the system. The EWS is relatively weak for flood risk and forest fire, pest and epizooties. One possible solution would be to introduce an automated flood monitoring system in flood prone areas, rivers, canals integrated with the Doppler Weather Radar. This set up would provide timely warning and alert to first responders and the general public against hydro-meteorological events. In the medium and long term, out of the 41 identified hazards, early warning mechanisms need to be developed for the remaining ones.

   - Information Management and Communication

There is an absence of a Central Information System where risk data could be shared and there is also limited capacity in data collection and analysis to inform response and preparedness efforts.

   - Emergency Management at Local level

Local Emergency Operations Command (LEOC) which operates at local level still lack appropriate resources be it in terms of human and material to operate appropriately.

   - WASH

There are no preparedness protocols for WASH related emergencies. During cyclones and flash floods, water filters at the main potable water treatment plants get blocked with mud, and water distribution service is usually interrupted for 2-3 days before the filters are cleaned.
- **Build back better**

There is a highly limited knowledge and understanding of the concept of post impact recovery and reconstruction “Building Back Better” at both national and local level.

- **Relocation of vulnerable inhabitants**

Relocation of families in vulnerable areas prone to landslides and major flooding has increased. Relocation is a very complex process, is costly, time consuming and largely depends upon availability of suitable locations for relocation which is very limited.

**Lessons learnt from disaster response.**

Lessons learnt are not always documented and applied. Feedback loop is important to improve processes

**Ownership of Hazards**

From the Strategic Framework, 41 hazards have been identified. The challenge would be for institutions to own hazards under their respective mandate and undertake proper risk assessment.. All the assessment would require major expertise and resources.

**B. Emerging Issues and Future Contexts – Prospective**

- **War and Pandemics**

One of the major challenges facing the world is the increase in the price of fuel which is being exacerbated by the Ukraine/Russia. On the other hand, pandemics are also having major economic impacts on the world and would require special attention in DRR. These external shocks are having a major impact on our economy, most particularly affecting the price of transport and basic food commodities, hence affecting food security. Poor families become more vulnerable during times of crisis and disasters.
V. PROSPECTIVE REVIEW AND RECOMMENDATIONS

A. Recommendations for realising the Outcome and Goal of the Sendai Framework

- Perception of risk across the island

In Mauritius, we have a relatively disaster-risk informed population with respect to our main hazards, namely cyclones and flooding. But given that we have not experienced strong cyclones for the last 30 years, the younger generation of the Republic of Mauritius is not familiar with the level of prevention, preparedness and risks associated with strong and destructive cyclones similar to Hollanda (1994) and Gervaise (1975). However, in depth risk assessment and studies will be required for most of the hazards identified in the NDRRM Strategic Framework, to which the population are not sufficiently acquainted with.

Covid19 is a striking example to illustrate the level of perception of risks of our local population. In the midst of the pandemic, in addition of not being prepared for such situation, there was a tendency by our local people to underestimate the impact of the pandemic on public health. Resistance to abide to sanitary restrictions was observed. However, with time, upon being exposed to the disastrous impact of the pandemic worldwide and at local level, people started to adopt a different perception regarding Covid19.

- Implementation of the National Action Plan 2020-2030

Most of the tasks in the NDRRM Action Plan are broad and require a detailed individual implementation strategy, multiple technical competencies and/or the cooperation/contribution of multiple government agencies. The inter-linkage between multiple tasks/recommendations makes the exercise for defining a national Implementation Strategy a complex one. A consultancy firm having diverse competencies as DRRM practitioners would be required.

- Allocation of budget for financing of DRRM activities

More coordinated approach is required to implement the NDRRM Action Plan which sets out 189 actions grouped under four strategic objectives, namely: Disaster Risk Governance, Disaster Risk Reduction, Warning and Alert, Preparedness, Response and Recovery which are in line with Sendai Framework for DRR 2015-2030. Key stakeholders are being called upon to start by putting into place 5 years’ realistic and pragmatic DRRM plans for both sector wise and focus thematic areas. There is a need for dedicated budgets on an annual basis for the financing of DRRM activities for all sectors at both national and local level. It is also important to make provision for fixed contingency funds in case of a disaster.
- **Measures against Flooding**

It is expected that the 62 high risk areas identified in the Land Drainage Master Plan will be reduced to 30 during Financial Year 2022/23 through the implementation of flood mitigation measures and the high risk areas are expected to reduce further during the next financial years. As regards to 305 flood prone areas identified, same are expected to reduce by 100 by FY 2023/24. In that respect, funds have been earmarked for the next 3 financial years to include these projects amongst others.

- **Mass Evacuation Plan**

Mauritius is a small island and in the case of very intense tropical cyclone making landfall, the whole island will be seriously impacted. A Mass Evacuation Plan will be required for a large percentage of the population residing in the vulnerable areas for situations of very intense tropical cyclone and storm surge.

- **Risk Transfer Mechanism and Financing**

Mauritius is currently in consultation with the World Bank and the Ministry of Finance, Economic Planning and Development so as to be included in the Development Policy Financing with a Catastrophe Deferred Drawdown Option (Cat DDO) which is a contingent financing line that supports a government to make systemic improvements in a country’s climate and disaster risk management, and provides immediate liquidity to address shocks related to natural disasters and/or public health emergencies.

- **Review of existing policies and legislations**

Review of existing policies and legislations to take on board the multi hazard risks being faced by the country. There is also a need for stakeholders’ engagement to define a coordinated multi hazard risk assessment maps.

- **Improvement of Early Warning System**

To improve the early warning system, strengthening of ocean, climate and weather forecasting and communication is important for informed decision-making and emergency planning. Emphasis should also be made on impact based early warning system mainly for flooding.

- **Climate-proof critical infrastructures**

Building codes should be reviewed to ensure that infrastructures are resilient to extreme weather events. Infrastructures should also cater for facilities with respect to persons with disabilities.
- **Appropriate development and implementation of Local Disaster Risk Reduction Strategies**

There is a need to enhance the DRRM capacity and knowledge of local stakeholders to ensure appropriate development and implementation of local disaster risk reduction strategies and action plans in line with national frameworks and legislations. More so, Disaster risk reduction should be wholly integrated in the developmental agenda at both national and local levels. Closer cooperation and technological transfer at regional and international level is required to better monitor DRR activities.

- **Capacity Building**

Massive capacity building in line with the 4 priority actions of the Sendai Framework should be provided to all concerned stakeholders to build resilience. Additionally, Train the Trainer courses in disaster management would be crucial to have more local trainers to cater for continuous capacity building needs. Capacity Building needs include Crisis Management, Community Preparedness, Resilience to Climate Change, Build Back Better/Resilience/Recovery/Rehabilitation, Data Collection for Disaster loss and GIS amongst others.

In addition to the consideration for the inclusion of DRR in school curriculum of young children, there is also a need to integrate DRR in tertiary education in the fields of finance, agriculture, science, engineering and socio-economics amongst others.

- **Involve public opinion in decision making process**

There is a need to incorporate public opinion in decision making regarding Disaster Risk Reduction and Management measures as they have the appropriate local knowledge. Empowerment of religious leaders regarding DRRM for effective dissemination of important messages is important. Aggressive awareness campaign is required for a change in mentality. Sensitising business and industry sectors on risks and hazards in their regions would be a plus towards encouraging them to implement measures so that they are least affected.

**B. Progress in Risk Assessment, Information and Understanding**

The main challenge is that there is limited risk information sharing between sectors and there is no central risk information system to depict the collective impact of disasters and the trend/patterns on disaster losses for decision makers and investors. There is a high need to establish a central database to centralize and enable open access information on disaster risk and as well develop a National Spatial Data Infrastructure and investment in GIS to as to ensure availability of geospatial and digitalized data.

Comprehensive risk assessment should be in line with the requirements of government, economic and civil society actors. There is also a need for a more inclusive approach, taking
into consideration the gender, disability and income disparity aspects in facing disaster events when carrying out vulnerability assessment.

In order to achieve further progress in DRRM, it is also of primordial importance to lay emphasis on the Coastal Risks which are threatened by sea level rise and storm surges through increased capacity in climate modelling and observation.

Regarding progress in DRRM in the Infrastructure sector, it has been noted that it is only recently that Mauritius has started to make some progress. The country has been privileged in being one among the selected member states as a SIDS to benefit from the CDRI technical support for the conduct of the following studies:

- National Risk and Resilience Assessments (NRRA) for our transportation sector including Roads, Bridges, and Light Rail System, Airport and Harbour;
- Enhancing disaster resilience of our power infrastructure;
- Risk and resilience assessment and roadmap for the telecommunication sector;
- The Fiscal risk assessment due to disaster-induced loss and damage; and
- Strengthening the capability of our Academic Institutions and Infrastructure Professionals in Disaster Resilient Infrastructures.

Tourism is an important pillar for our economy and there is a need to map all tourism accommodation sites and their exposure to disaster and climate risk so as develop preparedness plans for mass evacuation of tourists.

C. Progress in Risk Governance and Management

There is lack of clarity on accountability lines and clear obligations for sector ministries in all cycles of disaster management, especially regarding disaster events which need to be tackled on a multi-agency level. In that respect, there is a need to ensure coherence in the legal and policy framework across sectors. The 41 Hazards identified in the NDRRM Strategic Framework should also be aligned in the relevant legislations and fit in appropriate institutions.

It is also important to strengthen DRRM organizational structure across all sectors and establish a national multi-stakeholder DRR platform. The NDRRMC being the main coordinating agency for DRRM, needs to have a full-fledged team of DRR/M professionals.

D. Progress in Investment in Risk Reduction and Resilience

Coordinated and ongoing efforts at all levels will remain an important factor towards disaster risk reduction and resilience. It will be important to have a proper risk assessment for all the hazards identified followed by appropriate preventive and preparedness and adequate investment in resilience.
Introduce the insurance scheme for the livestock sector to compensate farmers in case of biosecurity or other risks occur.

Strengthen GIS expertise across sector to allow for hazards profile, risk maps and analysis. The Ministry of Housing and Land Use Planning, which holds GIS expertise could provide inhouse training for other relevant ministries.

Through trainings, enhance capacity to conduct disaster impact assessments to enhance national understanding of disaster impacts on the environment to guide preparedness for environmental emergencies.

Mauritius Ports Authority : Ensuring replacement/sufficiency of Oil Spill Combat Equipment with procurement exercise.

Central Electricity Board: Increasing the funds allocated for risk reduction and resilience and target to reach at least 50% undergrounding of overhead networks by 2025. Enhancement of Transmission & Distribution network, preventative actions.

E. Priority 4 Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction

It has been observed that often after the passage of a cyclone, when the Termination Bulletin is issued, people tend to go out when there are still other risks persisting outdoor, such as heavy rains, local floods, strong winds exceeding 110 km/h, broken electric live wire and other debris, especially after the passage of an intense tropical cyclone. The MMS therefore, proposed to introduce a fifth level for the new bulletin, that is the “Safety Bulletin” in English or in French “Avis de Sécurité” in the cyclone early warning system that will inform the population of the persistent risks that still exist and strengthen the safety measures that have been in place, even though the cyclone is moving away. The safety Bulletin defines a period of time during which the responders may start the first preliminary outdoor actions. Subsequently, a termination Bulletin will be issued when there is no longer any risk of strong winds and potentially dangerous severe weather associated with the cyclone.

Increase the number of automatic weather stations, river gauges and sea level monitoring stations as well as budget allocation for maintenance and monitoring. This will largely improve early warning for rainfall across a wider region.

Improve legislation and tools to anticipate facilitation of the entrance of emergency aid.

Currently there is no cyclone safe shelter on both Agalega (South Island) and St Brandon. In view of the threat faced by the inhabitants of Agalega (South Island) and St Brandon during the passage of cyclones, there is an urgent need to construct concrete cyclone bunkers on each of these islands. The residents and stakeholders operating at St Brandon have been found to be vulnerable to severe weather-related events such as super cyclones, storm surge, heavy swells and as well as tsunamis.
F. Collaboration, Partnership and Cooperation

There is a need for more collaborative partnership with the private sector - e.g logistics available in terms of equipment which can be used during disaster events.

Capacity Building at all levels in collaboration with regional and international organisations including favouring access and transfer of technology in DRR for ecosystem resilience. It is also important to have more sectorial and thematic experts to guide on different projects. Capacities required with regard to development of local disaster risk reduction strategies and action plans in line with Sendai Framework, Paris Agreement, and the Sustainable Development Goals.

Funding and grant from donor countries will be an additional support in the implementation of DRRM measures and Creating a risk pooling mechanisms for DRRM financing both at National and Local levels with World Bank Groups, and GFDRR (risk transfer mechanisms). Public private partnership as well as adopting an all-inclusiveness approach by considering all the segments of society is also primordial in the successful implementation of DRRM measures.

VI. Conclusion

No country is spared from the fury of extreme hydro-meteorological hazards. Even the most developed nations with the most advanced technology are being overwhelmed with disaster impacts. As per the United Nations University ‘Interconnectedness Disaster Risks Report 2021-2022’ 11, the world yet again witnessed catastrophic disasters happening around the globe, from record-breaking heat to floods, extreme droughts, wildfires and earthquakes. In the past year alone, disasters took around 10,000 human lives and cost over $280 billion in damage worldwide.

As a SIDS, Mauritius is not an exception and is historically more exposed to different hydro-meteorological and geological hazards as compared to developed countries. Our country also faces a lot of challenges in terms of inadequate resources and funding. In order to ensure flawless Disaster Risk Reduction Management & Operational effectiveness, there is a need to foster partnership, collaboration, and capacity building across all sectors.

A lot of work remains to be done in terms of risk assessment with adequate funding and expertise in respect to the 41 hazards mentioned in the NDRRM Strategic Framework 2020-2030. There is a need to harmonise the different legislations across sectors to allow incorporation and consideration of the different hazards identified.

In terms of institutions, same needs to be further strengthened in terms of reinforcement of personnel, logistics and capacity building at all level. Mauritius will continue to require the

support and technical assistance of both regional and international organisation in order to advance in the field of Disaster Risk Reduction and Management.

Furthermore, in order to improve the reporting of Mauritius in instances such as Desinventar and Sendai Framework Monitoring, there is a need to strengthen the DRR Statistical structure across all sectors.