



# MAINSTREAMING DISASTER RISK REDUCTION IN THE INFRASTRUCTURE SECTOR

March 2021



---

## DOCUMENT INDEX

This document was developed in support of the program “Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities”, which is financed by the co-operation between the African, Caribbean, Pacific Group of States, and European Union through the 10th European Development Fund Program which was launched in 2015. It is implemented along five result areas by several partners, including the African Development Bank, African Union Commission, the United Nations International Strategy for Disaster Reduction (UNISDR) and Global Facility for Disaster Reduction and Recovery / World Bank.

The SADC reports in this series are:

## SECTOR MAINSTREAMING DOCUMENTS

SADC Mainstreaming Disaster Risk Reduction Guidelines

SADC Mainstreaming Disaster Risk Reduction in the Agricultural, Food Security and Nutrition Guidelines

SADC Mainstreaming Disaster Risk Reduction in Gender Guidelines

SADC Mainstreaming Disaster Risk Reduction in Education Guidelines

**SADC Mainstreaming Disaster Risk Reduction in Infrastructure – Energy, Transport and Water Resources Management Guidelines**

SADC Mainstreaming Disaster Risk Reduction in the Water and Sanitation Hygiene (WASH) Guidelines

**Additional copies of this report, or other reports in this series, may be ordered from:**

**Executive Secretary Assistant: A. Banda  
SOUTH AFRICAN DEVELOPMENT COMMUNITY SECRETARIAT  
SADC HOUSE  
PLOT 54385  
CENTRAL BUSINESS DISTRICT  
GABORONE  
REPUBLIC OF BOTSWANA  
0001**

---

## ACKNOWLEDGEMENTS

The inputs from of all the contributors to the development of the Disaster Risk Reduction (DRR) Mainstreaming in the Infrastructure Sectors are gratefully acknowledged. Special mention is made to the the Secretariat Disaster Risk Reduction Unit, the World Bank and the South African Development Community Member States (SADC):

- Angola
- Botswana
- Comoros
- Democratic Republic of Congo
- Eswatini
- Lesotho
- Madagascar
- Malawi
- Mauritius
- Mozambique
- Namibia
- Seychelles
- South Africa
- Tanzania
- Zambia
- Zimbabwe

---

## TABLE OF CONTENTS

<b>DOCUMENT INDEX</b>	<b>2</b>
<b>SECTOR MAINSTREAMING DOCUMENTS</b>	<b>2</b>
<b>ACKNOWLEDGEMENTS</b>	<b>3</b>
<b>TABLE OF CONTENTS</b>	<b>4</b>
<b>LIST OF TABLES</b>	<b>4</b>
<b>LIST OF FIGURES</b>	<b>4</b>
<b>DISCLAIMER</b>	<b>5</b>
<b>ACRONYMS</b>	<b>6</b>
<b>GLOSSARY OF TERMS</b>	<b>7</b>
<b>1 INTRODUCTION - GENERAL</b>	<b>9</b>
1.1 OBJECTIVES	10
1.2 MAINSTREAMING DRR IN SADC	10
1.3 DISASTER RISK MANAGEMENT AND REGIONAL INFRASTRUCTURE	11
<b>2 GUIDING FRAMEWORKS FOR MAINSTREAMING DRR</b>	<b>12</b>
2.1 SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015 – 2030	12
2.2 SADC REGIONAL RESILIENCE FRAMEWORK 2020-2030	12
2.3 SUSTAINABLE DEVELOPMENT GOALS	13
<b>3 GAP ANALYSIS, POLICY AND PRACTICE, AND GUIDELINES</b>	<b>14</b>
<b>3.1 WATER SECTOR</b>	<b>14</b>
3.1.1 POLICY AND PRACTICE	15
3.1.2 RISKS POSED BY THE WATER RESOURCE AND WATER INFRASTRUCTURE SECTORS	15
3.1.3 GUIDELINES FOR MAINSTREAMING DRR IN THE SADC WATER RESOURCE AND WATER INFRASTRUCTURE SECTORS	16
<b>3.2 ENERGY SECTOR</b>	<b>17</b>
3.2.1 POLICY AND PRACTICE	17
3.2.2 RISKS POSED BY THE ENERGY SECTOR AND ENERGY INFRASTRUCTURE	20
3.2.3 GUIDELINES TO MAINSTREAM DRR IN THE SADC ENERGY SECTOR	20
<b>3.3 TRANSPORT SECTOR</b>	<b>22</b>
3.3.1 POLICY AND PRACTICE	22
3.3.2 RISKS IN THE TRANSPORT SECTOR	24
3.3.3 GUIDELINES FOR MAINSTREAMING DRR IN THE SADC TRANSPORT INFRASTRUCTURE SECTOR	26
<b>4 MONITORING AND EVALUATION</b>	<b>27</b>
<b>5 REFERENCES</b>	<b>29</b>
<b>ANNEX 1: DRR MAINSTREAMING IN THE INFRASTRUCTURE SECTOR – WATER RESOURCES, ENERGY AND TRANSPORT MONITORING EVALUATION SYSTEM</b>	<b>32</b>

## LIST OF TABLES

<b>TABLE 1: SUSTAINABLE DEVELOPMENT GOALS RELEVANT TO INFRASTRUCTURE ....</b>	<b>13</b>
---	-----------

## LIST OF FIGURES

<b>FIGURE 1: THE SADC INFRASTRUCTURE VISION 2027 .....</b>	<b>9</b>
--	----------

---

## DISCLAIMER

The opinions expressed in this Document have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by the Southern African Development Community (SADC). The opinions in this Document are provided in response to a specific request from SADC to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this document apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this document, about which SRK had no prior knowledge nor had the opportunity to evaluate.

---

## ACRONYMS

AU	African Union
ART	Anti-retro viral treatment
COVID19	Novel Coronavirus
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EAC	East African Community
ESIA	Environmental and Social Impact Assessment
RIDMP	Regional Infrastructure Development Master Plan
ESP	Energy Sector Plan
GHS	Global Harmonised System for the classification and labelling of chemicals
ICAO	International Civil Aviation Organization
I&S	Infrastructure and Services Directorate
ICT	Information and Communication Technologies
MCBRTA	Multilateral Cross Border Road Transport Agreement
PDNA	Post Disaster Needs Assessment
PPRM	Directorate of Policy, Planning and Resources Mobilisation
RIDMP.	Regional Infrastructure Development Master Plan
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SARP	Standards and Recommended Practices
SFDRR	Sendai Framework for Disaster Risk Reduction 2015 – 2030
SDG	Sustainable Development Goals
SWCI's	Shared Watercourse Institutions
RISDP	Regional Infrastructure Development Master Plan
TSP	Transport Sector Plan
WSP	Regional Infrastructure Development Master Plan Water Sector Plan

---

## GLOSSARY OF TERMS

**Adaptation** means the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2015);

**Climate change** means a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forces such as modulations of solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or land use" (IPCC, 2015);

**Disaster risk** means the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (United Nations, 2016);

**Disaster risk assessment** means a qualitative or quantitative approach to determine the nature and extent of disaster risk by analysing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend (United Nations, 2016);

**Disaster risk reduction** means the policy objective aimed at preventing new, reducing existing disaster risk, and managing residual risk, all of which contribute to strengthening resilience. Concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNDRR, 2017);

**Ecosystem** means a functional unit consisting of living organisms, their non-living environment, and the interactions within and between them. The components included in a given ecosystem and its spatial boundaries depend on the purpose for which the ecosystem is defined: in some cases they are relatively sharp, while in others they are diffuse (IPCC, 2015);

**Early Warning System** means an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events (United Nations, 2016);

**Exposure** means the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas (United Nations, 2016);

**Hazard** means a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. There are hazards of natural origin and those related to environmental and technical risks (UNDRR, 2016);

**Mitigation** means the lessening or minimizing of the adverse impacts of a hazardous event (UNDRR, 2017);

---

**Post-Disaster Phase** means the period, following the emergency phase, during which actions are taken to enable victims to resume normal lives and means of livelihood, and to restore infrastructure, services and the economy in a sustainable manner appropriate to long-term needs and defined development objectives;

**Preparedness** means the knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to and recover from, the impacts of likely, imminent or current disasters (hazard events or conditions) (SADC, 2017);

**Prevention** means the activities and measures to avoid existing and new disaster risks (United Nations, 2016);

**Reconstruction** means the actions taken to re-establish a community after a period of rehabilitation following a disaster. Actions might include the construction of permanent housing, the full restoration of all services, and the complete resumption of the operations of the pre-disaster state (UNDRR, 2017);

**Recovery** means decisions and actions aimed at improving livelihoods, health, as well as economic, physical, social, cultural and environmental assets, systems and activities, (the restoration, and improvement where appropriate, of facilities, livelihoods and living conditions) of disaster-affected community or society, aligning with the principles of sustainable development, including build back better to avoid or reduce future disaster risk. (efforts to reduce disaster risk factors) (SADC, 2017);

**Rehabilitation** means operations and decisions taken after a disaster with a view to restoring an affected community to its former living conditions, while encouraging and facilitating the necessary adjustments to changes caused by the disaster (UNDRR, 2017);

**Risk** means the combination of the probability of a hazardous event and its consequences which result from interaction(s) between natural or man-made hazard(s), vulnerability, exposure, and capacity (negative consequences) (SADC, 2017);

**SADC** means the Southern African Development Community comprising of 16 Member States (Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, The United Republic of Tanzania, Zambia and Zimbabwe);

**Sustainable development** means development that meets the needs of the present without compromising the ability of future generations to meet their own needs (IPCC, 2015);

**Water resource infrastructure sector** refers to both the physical infrastructure used to manage water resources as well as the institutional arrangements that govern its use.



# 1 INTRODUCTION - GENERAL

The Southern African Development Community (SADC) region continues to face multiple disasters that have enormous impacts on various sectors of development like agriculture, housing, health, education and infrastructure and the livelihoods of especially the poor in Southern Africa. These disasters including droughts, cyclones and floods also result in serious social and economic setbacks on the development and poverty reduction priorities of affected countries and poses a threat for achieving the sustainable development goals. Development activities inherently reduce vulnerability to disasters by addressing poverty and Disaster Risk Reduction (DRR) measures, aimed at increasing resilience and reducing the risk and impacts of disasters. These two interlinked concepts both aim to improve the livelihoods of communities.

Regional infrastructure development creates opportunities for access to larger markets, increased trade and economic opportunities, integration of communities and nations, while benefitting communities through employment prospects and improved social conditions. However, the process of development in itself, and the nature of development choices made in many countries, could create disaster risks through increased runoff, pollution, strain on water resources and other secondary impacts. If DRR considerations are not implemented in Water, Energy and Transport Infrastructure policy and programme design and development activities, the risk of disaster could potentially increase, thus increasing the cumulative negative impacts of the disasters on the socio-economic development of the region or country.

Mainstreaming DRR into development policy, planning and implementation therefore achieves both the objective of development strategies. This guideline focuses on the mainstreaming of DRR in the infrastructure sector and specifically water, energy and transport subsectors.

The SADC Infrastructure Vision 2027 is anchored on six pillars consisting of energy, transport, Information and Communication Technologies (ICT), meteorology, trans-boundary water resources and tourism (trans-frontier conservation areas), which constitute the SADC Regional Infrastructure Development Programme as shown in Figure 1 below.

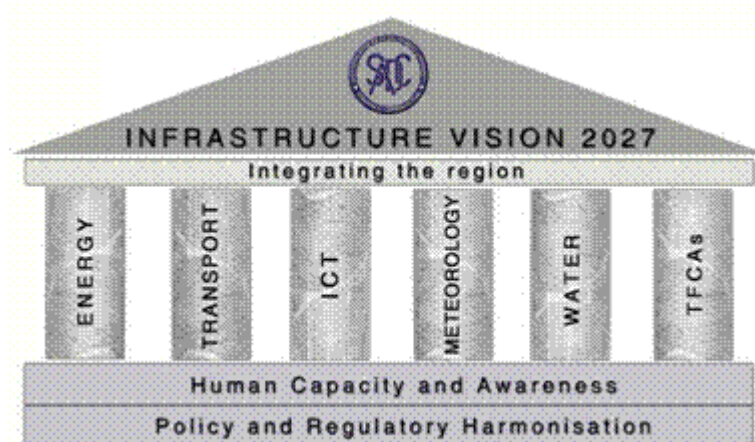


Figure 1: The SADC Infrastructure Vision 2027

---

However, each subsector of the infrastructure has a specific mandate of engagement as guided by the Regional Infrastructure Development Master Plan (RIDMP) 2020-2027 and unique sector-based structures within Member States.

This guideline is intended to provide a framework for mainstreaming DRR in the Infrastructure sector. It focuses on Water, Energy and Transport. In order to provide clear guidance, the DRR mainstreaming guideline for the infrastructure sector is divided into five sections. Section 1 is a general introduction; Section 2 provides the guiding principles for mainstreaming DRR, Section 3 provides sector-specific guidelines for the Water Resources sector, while Sections 4 and 5 outlines sector-specific guideline for the Energy and Transport sectors respectively.

## 1.1 Objectives

Mainstreaming serves two purposes the first, is ensuring that development is protected from existing, and future disaster risk through DRR elements, and secondly to ensure that development does not increase existing, and future levels of disaster risks. This mainstreaming guideline aims to support the mitigation of the possible impacts of identified regional disaster risks through amongst others, the review of strategies/policies/protocols and programmes, and facilitate mainstreaming of DRR in existing, and future policies, strategies, plans and programmes.

The overall objective of this guideline is to provide the region, Member States and key stakeholders with measures and actions that will promote the DRR mainstreaming in infrastructure development and service provision in the water resources, energy and transport sub-sectors.

The specific objectives of the guideline are to:

- (i) foster adoption of disaster risk reduction considerations in the infrastructure development namely water resources, energy and transport development through the adoption of DRR considerations in the infrastructure sector Strategies, Policies, Protocols, Projects, and Programmes; and
- (ii) Support the strengthening of measures to monitor and evaluate DRR mainstreaming in Infrastructure Strategies, Policies, Protocols, Projects, and Programmes.

## 1.2 Mainstreaming DRR in SADC

Mainstreaming is a process of institutionalisation of a concept, which is supported by organisational structures, cultures, and incorporated within all policies, programmes, activities and interventions that contribute towards development.

“Mainstreaming DRR into the development planning process essentially means looking critically at each programme, activity, and project that is being planned, not only from the perspective of reducing the existing risks of disasters, but also from the perspective of minimising its potential contribution to creation of new risks of disasters.” (UNISDR, 2017)

DRR is important for sustainable development in SADC, and for reducing the vulnerabilities of communities and increasing their capacities to cope with existing disaster risks. Mainstreaming DRR is a key component for building resilience and facilitating sustainable

---

development. It is a critical priority when developing or reviewing new policies and programmes. To ensure effective mainstreaming, the disaster risk and management function of SADC Secretariat needs to play a prominent role by providing guidelines, and a compliance and monitoring and evaluation mechanism to track the mainstreaming of DRR in sector policies and programmes, as well as when undertaking sectoral activities.

Enabling conditions have been created through the decision to locate the DRR Unit in the SADC Secretariat, and to charge it with management of mainstreaming DRR in SADC. The DRR mainstreaming guideline for the Infrastructure Sector will focus on mitigating the possible impacts of the identified regional disaster risks through:

- Application of the mainstreaming methodology to determine the interventions required of the SADC Secretariat to ensure that DRR is mainstreamed within the infrastructure sector;
- Establishment of a process to monitor and evaluate the impact and outcomes of DRR mainstreaming in the infrastructure sector;
- Training and capacity building at regional and key national institutions at Member State level; and
- DRR Communication and visibility in order to raise awareness.

Considering that the SADC Secretariat, does not directly implement development projects or manage operational activities, mainstreaming DRR within SADC is to focus on the institutionalisation of DRR in policies and protocols that guide their activities, as well as to provide advice, training and technical support to guide the activities of its Member States and to monitor and evaluate their activities to ensure that they institutionalise DRR approaches. This will include the adoption and domestication of the priorities of the Sendai Framework for Disaster Risk Reduction 2015 – 2030 (SFDRR) in sectoral policies, strategies and programmes, as well as, in the implementation of regional and national development programmes and projects.

### 1.3 Disaster Risk Management and Regional Infrastructure

According to the Africa Report on DRR 2015-2018, droughts, floods, and storms are the disasters that cause the greatest damage to critical development infrastructure and have the largest impact on countries' economies. All SADC Member States have been affected by some form of disaster that has challenged the resilience of the infrastructure and has led to the disruption of service provision to communities.

The Republic of Mozambique Post Disaster Needs Assessment (PDNA) for the Tropical Cyclone Idai revealed total damage of 240,000 houses and 10,216 km of power transmission lines, 2 generators, 30 power sub-stations and 4,000 transformers. Additionally, 3,490 km, which is about 29% of the national road network and 2,044 fishing vessels were also destroyed. In total infrastructure loss costed \$1,39 Million, 43% of the total recovery needs. In Malawi the losses incurred from damages to infrastructure accounted for 23% of the total recovery needs costs. These mainly included 288,371 houses, which were either partially or totally destroyed together with livelihood equipment such as the 287 boats, and 129 bridges that were destroyed. On the other hand, Zimbabwe

---

had 200 km of power line, 44 sub-stations, 155,000 hectares of irrigated farmland and a total of 18,000 houses completely destroyed.

The overall destruction by the Tropical Cyclone Idai led to losses in electricity supply, disruption in transport systems such as roads and bridges that were washed away, leading to loss of access to production resources and markets and impairment of relief and rehabilitation efforts as affected communities and zones were unreachable. While the destruction of schools led to losses in education investments, the damages to the clinics and hospitals led to disruption in health care services such as provision of anti-retroviral treatment (ART) and immunisation programmes for thousands of the most-at-risk people and communities.

In this regard, DRR is critical and can play an important role in sustainable development in Southern Africa. In particular, the impact of hazards on livelihoods, sustainable economic development, and the environment can be lessened through DRR, thus reducing the disruption caused by a disaster and the resources required to address its impacts. It is therefore important to ensure that DRR approaches are mainstreamed in all policies, projects and development activities and in this case, those that relate to infrastructure development.

From a SADC perspective, this requires that DRR should always be included as a formal focus in all SADC strategies, policies, protocols and programmes. The purpose of this Infrastructure Sector Guideline is therefore to support the SADC DRR unit and the Infrastructure and Services Directorate (I&S) by providing guidance for the mainstreaming of DRR in each of the three specialised sectors.

## **2 GUIDING FRAMEWORKS FOR MAINSTREAMING DRR**

DRR in SADC is guided by a number of Regional, continental and global frameworks including the SFDRR 2015 – 2030, the African Union Programme of Action for the implementation of the Sendai Framework and the regional strategies and instruments including the Regional DRR Strategy and Fund 2016-2030 and the Regional Resilience Framework 2020-2030.

### **2.1 Sendai Framework for Disaster Risk Reduction 2015 – 2030**

The Sendai Framework identifies four (4) priorities for action; namely understanding risk; strengthening disaster risk governance to manage disaster risk; investing in disaster risk reduction for resilience; and enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation, and reconstruction. These priorities have been used to guide the development of the processes and interventions for mainstreaming DRR at regional and national levels.

### **2.2 SADC Regional Resilience Framework 2020-2030**

The SADC Regional Resilience Framework describes resilience as “the capacity of the system to experience a disturbance or change and still retain its basic function, structure, and identity; the ability to self-organize; and the ability to increase its capacity to learn and adapt”.

The aim of the Regional Resilience Framework is to provide a broad strategic framework for SADC and partner organisations to align their resilience strategies and to understand the complexity of resilience in the region. The Guideline for mainstreaming DRR in the infrastructure sectors will be based on the priorities identified in the SADC Resilience Framework which enlists the integration of DRR in all sectors for both DRM responsive policy and development interventions<sup>1</sup>.

## 2.3 Sustainable Development Goals

The Sustainable Development Goals (SDGs) adopted by the United Nations represent an ambitious and voluntary undertaking by the world's governments to achieve a broad vision of sustainable development by 2030. While mainstreaming DRR in infrastructure would contribute to the attainment of the majority of the 17 SDGs, the relevance to the Infrastructure sector, including Water Resources, Energy, Roads and Road Transport include the following Infrastructure is summarised in Table 1.

**Table 1: Sustainable development goals relevant to infrastructure**

SDB Goal	Water Targets	Energy Targets	Transport Targets
Goal 6. Ensure availability and sustainable management of water and sanitation for all	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.		
Goal 7. Ensure access to affordable, reliable, sustainable & modern energy for all		7.1 By 2030, ensure universal access to affordable, reliable and modern energy services. 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.	

<sup>1</sup> Regional Resilience Framework, 2020-2030, SADC 2020.

SDB Goal	Water Targets	Energy Targets	Transport Targets
		7.3 By 2030, double the global rate of improvement in energy efficiency	
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. 9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.		
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all. (Fuel, electric vehicles perspective). 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality.	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

### 3 GAP ANALYSIS, POLICY AND PRACTICE, AND GUIDELINES

The objective of mainstreaming DRR approaches in the infrastructure sectors is to achieve the regional integration and development goals of SADC Member States through climate and disaster resilient infrastructure. In order to do this, it is necessary to understand how the SADC Secretariat engages with the relevant sectoral activities and to identify gaps that must be addressed for mainstreaming DRR.

#### 3.1 Water Sector

SADC Member States have all committed to the achievement of the SDGs and, in the area of water resource management, this commitment is already largely reflected in SADC protocols, policies and strategies. The strong commitment in the SDGs to build the resilience of communities and societies to natural and other disasters is also reflected in the SADC

---

policies and strategies for the water resource infrastructure sector. However, the formal impact of these instruments is largely limited to water resources that are shared between Member States.

### 3.1.1 Policy and Practice

The water sector is guided by a number of policy frameworks that have a bearing on the performance of the sector and also facilitate the reduction of the contribution of the sector to DRM. These among other include:

#### **SADC Protocol on Shared Watercourses (1995, rev 2000)**

The initial policy framework for the sector is the SADC Protocol on Shared Watercourses, first adopted in 1995 with the objective to give regional institutions direct authority over the management of shared watercourses. The overall objective of this Protocol is to foster closer cooperation for judicious, sustainable and co-ordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation. It focuses primarily on the duties of states to inform each other of 'planned measures' on shared watercourses. While there is recognition of emergency situations that could arise from both natural and human causes such as torrential rains, floods, landslides or earthquakes or from human conduct, there is very little attention to disaster risks or the need to mitigate or manage them.

#### **SADC Regional Water Policy (2005) and Regional Water Strategy (2006)**

The SADC Regional Water Policy (SADC, 2005) and Regional Water Strategy (SADC, 2006), primarily focuses on cooperation between Member States on shared watercourses matters. Its policy objectives focus on the contribution of water to economic integration, peace, inter-sectoral cooperation as well as on the harmonisation of national policy and legislation, conflict management and international cooperation.

However, the policy also addresses key areas of development and poverty reduction as well as environmental sustainability while the Regional Water Strategy dedicates an entire chapter to "security", from water related disasters. The word "security" in this chapter refers to the mitigation of disaster risk and should be read in that context. It also makes specific provision for action to achieve "security" from water-related disasters.

### 3.1.2 Risks posed by the water resource and water infrastructure sectors

While water resources and water resources infrastructure are aimed at increasing economic wellbeing and contribute towards building the resilience of citizens in the SADC region against water related disasters that occur mainly due to the changing climate, these also have potential to contribute to disasters. Risks from the sector include:

- Pollution of water bodies caused by industrial and agricultural activity or even transport accidents involving hazardous material spills that can cause significant damage and interrupt water uses for human consumption and other uses;
- Structural failure of water infrastructure including dams and associated infrastructure which may fail due to aging, design failures or may be overwhelmed due to excessive rains and floods or may be due to natural

---

causes such as earthquakes and landslips or sabotage that may lead to disruption in the provision of services, and thus loss of lives and livelihoods downstream; and

- Inundation and flooding of vast areas that may result in loss of human and animal lives, disease outbreaks, loss of farmland and general loss of livelihoods.

### 3.1.3 Guidelines for mainstreaming DRR in the SADC water resource and water infrastructure sectors

The proposed guidelines for the water sector are in line with the Sendai Framework that identifies four priority areas for disaster risk reduction including understanding disaster risk, strengthening disaster risk governance to manage disaster risk, investing in disaster risk reduction for resilience and enhancing preparedness for effective response and to “Build Back Better”.

The proposed guidelines include:

- (i) Review policies and frameworks to ensure the adoption of the provisions of DRR through the disaster management cycle<sup>2</sup>;
- (ii) Build capacities of the relevant water sector practitioners to ensure that the design of water systems is based on a full understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment;
- (iii) Facilitate enhancements in the mandates and capabilities of national, regional and local operating institutions and sector regulators to identify, document and mitigate potential risks;
- (iv) Undertake periodic climatological and hydrological analyses of the SADC shared watercourses to ensure the safety of structures and downstream communities;
- (v) Identify risks associated with likely catastrophic failure of dams and related infrastructure both at the regional and Member States and prescribe mitigation measures during planning and development;
- (vi) Enhance cross-sector and cross border early warning systems (such as those provided by meteorological and hydrological services);
- (vii) Identify disaster hotspots (geographical areas) with social and economic activities that are vulnerable to disasters, and put in place measures to safeguard the safety and security of such activities;
- (viii) Ensure that risks from local as well as regional disasters including those related to pollution incidents, floods, landslides etc. are well recognised and responded to, as provided for in the SADC Protocol on Shared Watercourses as well as in national legislation;
- (ix) Strengthen the capacities, resilience and effectiveness of national and local disaster management structures for them to deal with local disaster incidents;
- (x) Develop regional building codes and standards to ensure standardisation and harmonisation of water infrastructure;

---

<sup>2</sup> The Disaster Risk Management Cycle includes; mitigation of disasters and risk identification; preparedness; response; and recovery.



- 
- (xi) Promote “building back better” approaches for all water resources infrastructure damaged by disasters to ensure resilience to DRR;
  - (xii) Promote regular monitoring of all water resources infrastructure to facilitate regular maintenance and repair of systems and infrastructure to minimise operational failures and reduce risk from disasters;
  - (xiii) Promote cross-sectoral engagement with the other sectors that are at potential risk to ensure a common understanding of risks to facilitate the development of mitigation and adaption measures to reduce and counter the risks;
  - (xiv) Expedite construction of multi-purpose dams to regulate river water flow, thereby minimising floods that result in loss of lives. This will also contribute towards improving community livelihood;
  - (xv) Increase allocation of technical and financial resources for analysis and forecasting of extreme climatic events in order to reduce risks associated with such events as droughts, floods. This will enable water resources data collection and monitoring which are key for planning and disaster risk management. Over the years, allocation of funds for hydrological and meteorological data collection, analysis and dissemination continues to decrease;
  - (xvi) Facilitate the building of robust facilities in safe areas that can withstand flooding to ensure community safety during extreme events;
  - (xvii) Identify safe areas for construction of facilities to act as evacuation centres during floods and other disaster events; and
  - (xviii) Demarcate vulnerable areas such as flood plains and areas vulnerable to flooding landslides, including riverbanks, low-lying areas and wetlands and prohibit building of permanent structures in such vulnerable areas.

## 3.2 Energy Sector

Reliable energy is vital for human capital development, healthcare and economic development (Mohammed, 2018), as well as, for the daily needs of communities and critical for the achievement of the Sustainable Development Goals. The Energy Sector therefore is expected to play an increasingly important role in the economic growth and development of the region. The Energy Sector in SADC covers hydropower, renewable resources, petroleum and gas, coal and nuclear energy.

### 3.2.1 Policy and Practice

SADC Member States have all committed to the achievement of the SDGs, as reflected in SADC protocols, policies and strategies and institutions. The strong commitment to build resilient communities and societies to natural disasters in the sustainable development goals is also reflected in the SADC policies and strategies for the energy sector. In the case of electricity, cooperation through the SAPP at the level of bulk generation and transmission is contributing to the harmonisation of approaches between Member States.

#### **SADC Protocol on Energy (1996)**

The SADC Protocol on Energy, adopted in 1996 (under review), “acknowledges the importance of energy in pursuit of the SADC vision of enhanced economic well-being and

---

poverty eradication in Southern Africa". In order to best achieve these goals, the Protocol on Energy invites Member States to cooperate on energy development, and harmonise policies, strategies, and procedures throughout the region. It also provides that SADC should ensure the security, reliability, and sustainability of the energy supply, with Member States cooperating on research and development of low-cost energy sources applicable to Southern Africa" (SADC, 1996).

Article 3 of the Protocol on Energy notes the importance of renewable energy, advising Member States to cooperate on development and usage of new and renewable energy sources in the region and provides guidelines for promoting renewable energy production and usage.

### **SADC Protocol on Shared Watercourses (2000)**

The SADC Protocol on Shared Watercourses (SADC, 2000) has, as its overall objective, "to foster closer cooperation for judicious, sustainable and co-ordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation."

The Protocol on Shared Watercourses provides the institutional framework for this cooperation. It also provides a framework for regional projects which can increase the efficiency of energy generation on some shared rivers. There is, however, little attention to disaster risks associated with hydropower infrastructure on shared rivers or the need to mitigate or manage them. The primary provision simply stated that:

"State Parties shall, without delay, notify other potentially affected States .... of any emergency situation originating within their respective territories and promptly supply the necessary information to such affected States and competent organisations with a view to co-operate in the prevention, mitigation, and elimination, of harmful effects of the emergency."

The Protocol recognises that emergency situations could arise from both natural and human causes and defines "Emergency situation" as a situation that causes or poses an imminent threat of causing serious harm to Watercourse States and which results suddenly from natural causes, such as torrential rains, floods, landslides or earthquakes or from human conduct".

### **The 1996 SADC Protocol on Transport, Communications and Meteorology (SADC, 1996).**

The Protocol aims to establish transport, communications and meteorology systems which provide efficient, cost effective, and fully integrated infrastructure and operations, which best meet the needs of customers and promote economic and social development while being environmentally and economically sustainable.

One of the Strategic Goals that the Protocol aims to promote is the effective management of the environment, with due consideration of international and regional conventions. However, there is no specific reference to the prevention of disasters that would affect infrastructure or the reduction of the contribution of the sector to disasters.

### **Regional Indicative Strategic Development Plan (2020-2030)**

The SADC Regional Indicative Strategic Development Plan (RISDP) 2020-2030 is premised

---

on three interrelated pillars, namely: Industrial Development and Market Integration; Infrastructure Development in support of Regional Integration; and Social and Human Capital Development,”

“Given the pivotal role played by energy in catalysing development, the region set out to enhance the investment enabling environment through the development, domestication and implementation of these frameworks in the energy sector”

The RISDP 2020-2030 recognizes the need for improved regional access to modern energy resources, while making energy infrastructure more resilient and promoting renewable energy and energy efficiency. The impact that energy has on climate change through the emission of greenhouse gases and the vulnerabilities of the energy sector to climate change is highlighted in the RISDP 2020-2030. The impacts that a failure of energy infrastructure systems could have on the region is however not explicitly mentioned.

From a DRR perspective, there is reference to the fact that the energy sector is vulnerable to weather exacerbated by a changing climate. The RISDP dedicates a chapter on Peace Security and Good Governance that includes a responsive and proactive coordination mechanism to address the impact of climate change and natural disasters.

### **SADC RIDMP 2012 Energy Sector Plan**

The priority for the energy sector as outlined in the Regional Infrastructure Development Master Plan: Energy Sector Plan (ESP) (SADC, 2012), is:

“To meet the SADC objectives of ensuring regional integration through collaborative infrastructure development, boosting economic development through establishing energy security, poverty alleviation through increased access to modern energy services, creating an environment conducive to energy investment and achieving environmental sustainability through addressing aspects of climate change.”

The main areas of consideration for the ESP related to the implementation of “hard” infrastructure projects such as electricity generation plants, transmission lines; petroleum and gas refineries, pipelines, storage reserves, etc. and “soft” interventions, which entail the required policies/strategies and regulatory frameworks, institutional frameworks and capacity building, financing and cooperation/collaboration arrangements that enable “hard” projects to be realised.

The only reference to disasters in the document is in relation to nuclear power, despite the extensive experience of the region with electricity supply failures due to drought and damage to transmission lines due to storms and sabotage.

### **SAPP Environmental and Social Management Framework 2018**

In 2018, the Southern African Power Pool (SAPP) produced an Environmental and Social Management Framework for the SAPP which includes a section on the identification, assessment and management of potential environmental and social risks and impacts. While this focuses primarily on environmental and social issues that may arise during the planning, construction and operation of electricity infrastructure, it also recognises risks such as:

” The risk of structural failure of infrastructure due to a seismic event or insufficient water for cooling of a power plant due to severe drought.” (SAPP, 2018).

---

However, as with the ESP, the only formal reference to disaster is in relation to nuclear power and there is no reference to the concept of DRR.

### 3.2.2 Risks Posed by the Energy Sector and Energy Infrastructure

Risks posed by the energy sector include both primary and secondary impacts and these could result in large-scale, long-duration impacts e.g. failures of electricity supply systems and the impacts failures or disruptions in bulk supply may have. These impacts could also lead to slow-onset disasters or worsen the impact of disasters. It could also have major economic impacts affecting significant numbers of people on a regional scale.

Major risks include:

- Failure of Energy infrastructure such as oil refineries, coal mines, power stations, and dams that generate hydropower or supply cooling water as well as impacts on transmission lines that are vulnerable to human/mechanical as well as extreme natural events;
- Drought that can decrease dam levels and disable the production of hydroelectricity;
- Failure of energy supply dams and other infrastructure that could have detrimental impacts on populations and infrastructure downstream;
- Natural hazards and human/mechanical or operational risks to coal, oil and gas infrastructure such as flooding and explosions that could result in deaths and destruction of other infrastructure and property;
- Failure due to poor maintenance of power stations and transmission lines that could cause loss of lives and power disruptions;
- Possible spillages into the oceans from marine Oil tankers transporting bulk oil or its products;
- Accidents and tragedies from road oil tankers that causes spillage of petroleum products to the environment and uncontrollable fires; and
- Emissions of ionizing radiation or particles from radioactive material such as waste from nuclear power plants

### 3.2.3 Guidelines to Mainstream DRR in the SADC Energy Sector

From the analysis above, there are clear gaps in the regional Energy Policy frameworks as they relate to DRR that need to be addressed. These gaps are also evident in the energy sector intervention programmes.

The guidelines to Mainstream DRR in the SADC Energy Sector are guided by the four priorities of the Sendai Framework, as well as other regional DRR frameworks, and these include to:

- (i) Build the capacities of personnel and institutions to increase knowledge and awareness as well capacities for incorporating DRR as part of the mainstream functions of the energy sector;
- (ii) Review of the regional energy frameworks to domesticate disaster risk management based on the full understanding of disaster risks in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment in the energy sector;

- 
- (iii) Identify and document risk related to the energy sector including those associated with global warming and climate change catastrophic disasters as a result of failure of the energy production facilities e.g. Dams, nuclear power plants, bulk fuel facilities and those that may lead to disastrous interruptions in energy supply;
  - (iv) Develop clear recovery strategies for high risk areas and vulnerable geographical areas that may be impacted upon by a disastrous failure of energy supply or related disasters;
  - (v) Promote energy diversity including solar power and other renewables and small-scale hydropower plants to cater for interruptions during disasters, as well as, to increase energy access and connectivity in the region;
  - (vi) Promote low carbon energy development plans that takes into consideration climate change adaptation and mitigation;
  - (vii) Assess the mandate and capabilities of national and regional sector regulators to identify and mitigate potential risks to energy infrastructure and make recommendations to improve capacity for early warning and risk mitigation in the sector;
  - (viii) Analyse and document efficiency and effectiveness of cross-sectoral early warning systems (such as those provided by meteorological services) to determine the need for or improvement of cross-sector early warning systems and preparedness specific to the energy infrastructure sector failure;
  - (ix) Develop regional building codes and standards to ensure standardisation and harmonisation of energy infrastructure;
  - (x) Promote “building back better” employing higher standards than originally used for all energy infrastructure damaged by disasters to ensure increased resilience to disasters;
  - (xi) Promote regular and periodic monitoring of all energy infrastructure to identify increased or changing vulnerabilities of existing infrastructure and to facilitate regular maintenance and repairs of systems to minimise operational failures and reduce risk from disasters;
  - (xii) Promote cross-sectoral engagement with the other sectors that are at potential risk to ensure a common understanding of risks to facilitate the development of mitigation and adaption measures to reduce and counter the impacts of energy system failures;
  - (xiii) strengthen disaster preparedness of the various energy sectors to ensure that capacities are in place for effective response and recovery to be planned ahead of a disaster incorporating opportunities for “Build Back Better”;
  - (xiv) Develop clear communication strategies and channels with relevant stakeholders in high risk areas in order to ensure that they are timeously informed of the potential risks and encouraged to develop appropriate response plans;
  - (xv) Undertake post disaster assessments to identify most affected sectors with a view to enhance resilience of such sectors, as well as, to promote

- 
- lessons learning to reduce future risks;
- (xvi) Undertake periodic upgrades to systems and structures to ensure improvements and avoid unnecessary failures;
  - (xvii) Migrate to cleaner fuels with low sulphur content and lead free to reduce local air pollution;
  - (xviii) Mainstream DRR in the technical designs and preparations of the energy infrastructure projects as part of the Environmental and Social Impact Assessment (ESIA) Reports; and
  - (xix) development and selection of routes for regional power transmission interconnector projects and transmission corridors should consider DRR issues such as cyclones, landmines.

### 3.3 Transport Sector

The Transport Sector comprises the road, rail, ports, maritime and inland waterways, and air transport. The RIDMP highlights the need for well maintained and operated infrastructure and for the expansion of the regional transportation network to facilitate expected increased demand due to increased trade projections in the region.

In general, the RIDMP concluded that the SADC region currently does not have sufficient regional infrastructure to realise the goals of regional economic development and increased community resilience. This is significant for DRR in the region as a lack of infrastructure contributes to economic vulnerability in the region, but large-scale infrastructure development as required could also pose disaster risks.

As part of the Tripartite Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC) and SADC) SADC has developed and adopted the Vehicle Load Management Strategy, Regional Weighbridge Location Plan Tripartite Vehicle Load Management Agreement, draft model laws, regulations and standards, which are aimed at protecting the road infrastructure investment from poor designs and load management practices.

Furthermore, the Multilateral Cross Border Road Transport Agreement, (MCBRTA) draft model laws, regulations, standards and systems have been developed. These aim to harmonise driver, vehicle, loads, road transport facilities in East and Southern Africa. The model laws and standards include laws and standards on the movement of dangerous goods, abnormal loads.

#### 3.3.1 Policy and Practice

SADC Member States have all committed to the achievement of the SDGs. However, this commitment is not explicitly reflected in SADC protocols, policies and strategies considering that these instruments were adopted before the adoption of the SDGs by the United Nations, as such the strong commitment in the SDG Declaration to build the resilience of communities and societies to natural and other disasters is also not yet very evident. The primary focus in SADC's policies, plans and strategies is on the strengthening of primary regional transport linkages (including development corridors) and the establishment of institutional arrangements for the sector.

---

In the Roads Sector SADC adopted construction and design standards for construction and maintenance of the regional trunk road network. It is recommended that these standards should be revised to address DRR issues.

In the Railway Sector, SADC adopted harmonised standards on construction and maintenance of the regional rail network and is currently developing a Regional Railway Master Plan. There is need to ensure that the Railway Master Plan should consider and incorporate DRR issues.

In terms of transport infrastructure, the following policies and strategies guide the region in the transport sector:

### **SADC Protocol on Transport, Communications and Meteorology**

The 1996 SADC Protocol on Transport, Communications and Meteorology presents the objectives of integrated transport in the region as follows:

“Member States shall promote economically viable, integrated transport service provision in the region, characterised by high performance standards and consistent levels of efficiency and reliability of all individual components of the transport chain; on the basis of complementarities and cooperation between modes, modal choice optimisation, seaport hinterland optimisation and with due regard to modal advantages; bearing in mind the need to preserve the region's transportation infrastructure by encouraging the development of multi-modal service provision and compatible with responsible environmental management to support the development of major regional development corridors and facilitate travel between their territories.”

The protocol also provides for the harmonisation of regulations and standards between Member States regarding disaster risk related issues such as safety standards, vehicle loads, driving licenses, permits and hazardous material transportation.

### **Regional Transport Policy & Strategy**

A 2009 presentation (Bingandadi, 2009) set out the objectives of a SADC regional transport sector strategy as to: -

- Increase efficiency and reduce the costs of operations;
- promote sustainable sources of funding for the provision & maintenance of infrastructure;
- promote public-private partnerships in the provision of infrastructure & services;
- liberalize markets in road transport, air transport services, coastal shipping, & railway services to ensure competitiveness and efficiency;
- promote harmonization of policies, rules & regulations to improve the level of safety and facilitate the cross border transportation of people, goods & information (Bingandadi, 2009)

It will be critical that for the purposes of mainstreaming DRR in the Transport sector, the Protocol is reviewed to include considerations for DRR elements.

### **SADC Regional Infrastructure Development Master Plan (RIDMP)**

---

The objectives of the 1996 Protocol encompass the priority goals for each individual transport mode, and directly aligns with the integration of the transport modes and systems in the 2012 Transport Sector Plan (TSP) of the RIDMP.

The focus of the TSP is on transport's economic dimension. While the environmental costs and benefits of the different modes are considered, social dimensions are addressed primarily through the assumption that social benefits will derive from the economic activities supported by transport. The Transport Division of the Directorate Infrastructure and Services currently sets out its objectives:

“To identify key hubs and gateways for rehabilitation and development, in order to ensure that the passenger and goods markets are adequately catered for. In this way the region can position itself as a competitive hub and market. In response to demands for transport services, there is a need to develop appropriate, integrated, safe, secure and efficient infrastructure capacity along strategic transport and development corridors with regards to road and railway networks, and the TSP is crucial in this regard.”

While the Master Plan outlines elements of safe and secure infrastructure, the focus is not necessarily safety from disasters.

In this context, disaster risk reduction activities are hardly mentioned in regional frameworks. Resilience of regional (cross-border) road transport to natural disasters is implicitly addressed through a focus on key corridors where there are “missing road links, disabling road transport along vital corridors.” (SADC Transport, n.d.) This is mostly in response to economic development initiatives in the region but has a DRR significance through increased community resilience as a result of increased access to road infrastructure and transport.

### **SADC Guidelines on Harmonisation and Facilitation of Cross Border Transport Operation across the Region during COVID-19**

The impact of the novel corona virus (COVID-19) compelled governments in the region to impose stringent measures and lockdown of borders and therefore economies. The guidelines were to facilitate domestic, interstate and international travel and prevent the spread of COVID-19 in and through the transport corridors, while promoting the movement of essential goods and services across borders. SADC is also party to Draft Tripartite Guidelines on the movement of persons. These will help in regulating and facilitating the movement of persons in the case of future disasters and pandemics.

#### **3.3.2 Risks in the Transport sector**

Given the constrained institutional mandate and paucity of policy with respect to transport, the scope for SADC to address DRR in the transport sub- sector is limited but necessary. An important starting point is to recognise that disaster risks in the transport sector fall into three categories:

#### **Risks to the Transport sector**

Transport infrastructure is vulnerable to a number of identifiable risks. There are obvious risks that may lead to the structural failure of a road or an associated structure (such as



---

bridges) which may impede or completely halt road transport. In the Southern African region, the immediate cause of these is most often climatic, related to floods; in a few places in the region, earthquakes and landslides may also damage road infrastructure. Other risks and threats include corrupt law enforcement and regulatory officials especially at border posts and checkpoints as well as growing threat to road transport from organised gangs who hijack vehicles and attack foreign drivers/vehicles.

Vehicle overloading has also been observed as a present and growing risk to road infrastructure mostly due to the modal imbalance between road and rail with cargo that ought to move by rail shifting to road due to the collapse of the rail transport due to poor governance.

In conflict zones, sabotage of road and rail infrastructure and attacks on road vehicles, has similar impacts. Road transport is also often disrupted by problems relating to fuel supply. Furthermore, problems have been caused by infrastructure failures due to poor or lack of construction and/or maintenance.

### **Risks to other sectors caused by failures in transport systems**

The dependence of many countries and communities on road transport means that any failure in a road transport system can lead to the isolation of substantial communities, while interruptions in road traffic can also be economically damaging. In the immediate post disaster situations, the availability of viable roads and road transport is often a critical factor in the delivery of relief supplies. Tropical Cyclone Idai provided a good case study for this.

Other risks relate to the carriage of hazardous materials, such as flammable fuels and toxic chemicals. SADC has a robust chemicals industry with high volumes of cross border transport of chemicals (SADC, 2012). Fuel tanker accidents often result in dozens of deaths, particularly in secondary incidents where poor people seek to scavenge fuel from an immobilised vehicle. These have resulted in accidents claiming the lives of many people. Accidents also release toxic chemicals and other materials that threaten human water supplies as well as causing environmental damage.

The SADC Global Harmonised System (GHS) for the classification and labelling of chemicals indicate that most Member States have some form of regulatory requirement for the safe use and transport of chemicals, but the approaches are not harmonised across the region and where they exist, they are not effectively implemented and can pose challenges in undertaking hazardous material response actions.

A recent example has been the delays experienced in the transport of urgent supplies required to manage the COVID-19 pandemic and maintain essential services due to administrative problems at the respective border posts. These incidents highlight the importance of ensuring not just physically resilient road structures on critical links but also the need to ensure that institutional and regulatory arrangements are in place to facilitate safe and efficient traffic flow.

### **Risks posed by the transport sector**

Risks posed by the transport sector were well illustrated during the COVID-19 pandemic of 2020. Although a pandemic would not directly damage transportation infrastructure, recent events have shown that transportation is intractably linked with disasters such as pandemics, as it will act as a vector for its diffusion (particularly road transportation via

---

drivers and passengers air transportation) and shutting down transportation services in the wake of a pandemic would compromise supply chains (food, energy, medical supplies) (Rodrigue, 2020). COVID19 also demonstrated that streamlined and harmonised cross border transport laws, regulations, standards, and procedures are essential to ensure transport efficiency and security. SADC faced the longest queues at border as these were neither harmonised, streamlined nor synchronised.

Major infrastructure expansion projects are required in SADC to cater for the predicted increase in disasters. Ports, roads and air traffic infrastructure are often located in areas that are already densely populated and therefore increases exposure to the risks associated with the transport of hazardous goods, rail and aircraft accidents as well as pandemics. Land borders are often congested as well with unplanned settlements and informal commercial activities that encroach into the border operational zones.

Spatial planning and rezoning needs to be undertaken through a DRR prism. Mechanisms need to be put in place well before disasters occur to control and manage transboundary infections and disease transmission.

### 3.3.3 Guidelines for mainstreaming DRR in the SADC transport infrastructure sector

The Transport Sector comprising of the road, rail, ports, maritime and inland waterways and air transport is very critical for the sustainable social economic development of the region. These are also prone to disasters and need to be resilient while also ensuring that the nature of their construction and location does not contribute to disasters.

These guidelines aim to facilitate mainstreaming of DRR in all the above-mentioned transport sectors and are guided by the four priorities of the Sendai Framework, as well as other regional DRR frameworks, and these include the need to:

- (i) Undertake regular and period physical assessments of the condition of all infrastructural elements and systems in order to gauge their vulnerability (and thus that of the system) to different risks and institute mitigation or corrective measures;
- (ii) Make DRR mandatory to be a component of the Environment Impact Assessments for all transport (road, rail, ports, maritime and inland waterways and air transport) infrastructure projects;
- (iii) Review policies, regulatory frameworks, and disaster risk management practice to ensure that they are based on an understanding of disaster risk in all its dimensions and aimed at preventing and mitigation of disasters and takes into consideration emerging issues such the Paris Agreement, the Sendai Framework, and UN Agenda 2030 and the Sustainable Development Goals;
- (iv) Develop alternative routes and/or modes of transportation to minimise the impact of failure of a specific component in the transport system in the event of a disaster;
- (v) Provide contingency plans to ensure continuity of essential services during a period in which an infrastructure link is not functioning or needs to be closed due to a disaster;
- (vi) Assess and identify measures for the management of haulage of hazardous

- 
- materials that ensure vehicle safety and management of inherent risks and develop harmonized regional regulatory frameworks to back up the measures;
- (vii) Identify through infrastructure planning records and system mapping where dependency on single links or structures are, in order to plan alternative routes and contingencies;
  - (viii) Evaluate and document the mandate and capability of national, regional and local operating institutions and sector regulators (where they exist) to identify and mitigate potential risks and make recommendations to improve capacity for early warning and disaster risk mitigation in the sectors;
  - (ix) Evaluate existence, operational processes and effectiveness of cross-sector early warning systems (such as those provided by meteorological and hydrological services), taking into consideration the interdependencies that exist with the transport sector;
  - (x) Update and review all construction standards for transport infrastructure to ensure construction of high quality and disaster-resilient and disaster-proof infrastructure;
  - (xi) Ensure that repairs and maintenance is undertaken to a higher standard than originally used (promoting building back better);
  - (xii) Foster strong collaboration and partnership across mechanisms and between public and private sector institutions in Member States in the implementation, construction and management of cross border infrastructure in relation to disaster risk reduction and management;
  - (xiii) Facilitate regular monitoring and evaluation of the transport sector to ensure that DRR is part of the transport infrastructure sector planning and implementation;
  - (xiv) Facilitate the development of national DRR mainstreaming guidelines for all national level road, rail, ports, maritime and inland waterways and air transport infrastructure institutions to contribute to increased resilience of the sector plans and project and infrastructure;
  - (xv) Promote cross-sectoral engagement to facilitate information sharing and exchange of knowledge and experience to enable the development of appropriate plans, strategies and programmes;
  - (xvi) Training and capacity building to ensure that curricula for civil engineering technicians and engineers include DRR; and
  - (xvii) Ensure compliance and domestication of regulations, standards, guidelines on transportation of dangerous/ hazardous goods.

## 4 MONITORING AND EVALUATION

Monitoring, and Evaluation (M&E) of the mainstreaming DRR includes the determination of criteria that constitutes the successful mainstreaming of DRR and how to adapt and improve on measures already in place. M&E of mainstreaming DRR is essential to track the success of the implementation of mainstreaming DRR.

A critical success factor in ensuring the implementation of mainstreaming of DRR relies on

---

the identification of an official that will be accountable for mainstreaming DRR across sectors. Facilitation of the mainstreaming of DRR and M&E of its implementation must be part of the person's key performance areas. This individual must have the responsibility to ensure successful DRR mainstreaming in SADC with a clear mandate, authority, and resources.

Annex 1 provides a matrix that will be used to monitor the process of mainstreaming DRR in Infrastructure:

---

## 5 REFERENCES

- BCPR. (2011). Methodological guide for post-disaster recovery planning processes. Guidelines and actions for national, regional and local governments. Retrieved from UNDP - BCPR: [https://www.preventionweb.net/files/32306\\_32306guametodolgicaparaprocessosdepl.pdf](https://www.preventionweb.net/files/32306_32306guametodolgicaparaprocessosdepl.pdf)
- African Union. (2016). Programme of Action for the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 in Africa. African Union Commission.
- African Union. (2019). Africa Report on Disaster Risk Reduction 2015-2018. .
- Bajar, S. (2018, July). *un.org/development*. Retrieved from United Nations: <https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2018/07/1-2.pdf>
- Benson, C; Twigg, J; & Rossetto, T. (2007). Tools for mainstreaming disaster risk reduction: guidance notes for development organisations. ProVention Consortium.
- Bingandadi, L. (2009). Southern African Development Community Infrastructure and Trade Facilitation Initiatives. (presentation).
- Davis, I., & La Trobe, S. (2005). Mainstreaming disaster risk reduction: a tool for development organisations. Tearfund.
- Eskom. (2014). Eskom Holdings SOC Limited - Integrated Report 2014. Eskom.
- GFDRR . (2019). *Mozambique Post Disaster Needs Assessments (PDNA) Report, Global Facility for Disaster Risk Reduction and Recovery* . Retrieved from <https://www.gfdr.org/en/publication/mozambique-cyclone-idai-post-disaster-needs-assessment-full-report-2019>
- Grey, D., & Sadoff, C. (2007). Sink or Swim? Water Security for Growth and Development. *Water Policy* 9. 545 - 571.
- Hill, M. (2019). *Businesslive*. Retrieved from <https://www.businesslive.co.za/bd/world/africa/2019-12-18-blackouts-hit-zambia-and-zimbabwe-as-hydropower-dams-drain-over-drought/>.
- IFRC. (n.d.). Retrieved from What is a Disaster? International Federation of the Red Cross.: <https://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/>
- IPCC. (2015). Summary for Policymakers. In: *Climate Change 2014: Mitigation of Climate Change Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. New York: Cambridge University Press.
- ISO. (2009). *Risk management — Risk assessment*. Retrieved from ISO 31010: [https://www.academia.edu/27106466/ISO\\_31010\\_FDIS](https://www.academia.edu/27106466/ISO_31010_FDIS)
- ISO. (2018). *International Standards Organisation*. Retrieved from ISO 31000: <https://www.praxiom.com/iso-31000-terms.htm>
- M & E Studies. (n.d.). *What is Performance Monitoring Plan (PMP)?* Retrieved from M & E Studies: <http://www.mnestudies.com/monitoring/what-performance-monitoring-plan-pmp>
- Mohammed, I. (2018). <https://www.renewableenergyworld.com/2018/09/28/energy-poverty-amidst-abundant-generation-capacity-africa-in-perspective/#gref>. Retrieved from <https://www.renewableenergyworld.com/>: <https://www.renewableenergyworld.com/2018/09/28/energy-poverty-amidst-abundant-generation-capacity-africa-in-perspective/#gref>

- 
- Pacific, U. N. . (2017). Mainstreaming Disaster Risk Reduction for Sustainable Development: A Guidebook for the Asia-Pacific. . United Nations Economic, and Social Commission for Asia, and the Pacific.
- Ritchie, H. (2017). <https://ourworldindata.org/fossil-fuels>. Retrieved from <https://ourworldindata.org>.
- Rodrigue, J.-P. (2020). *The Geography of Transport Systems*. New York: Routledge.
- S Mwale, I. D. (2013). Security Analysis of Electric power supply in SADC region. *IEEE Africon Conference*.
- SADC. (1996). Protocol on Energy in the Southern African Development Community (SADC) Region. Windhoek, Republic of Namibia: SADC.
- SADC. (1996). SADC Protocol on Transport, Communications and Meteorology . Gaborone: SADC.
- SADC. (2000). Revised Protocol on Shared Watercourses in the Southern African Development Community. Gaborone: SADC.
- SADC. (2005). *Regional Water Policy*. Gaborone: SADC.
- SADC. (2006). SADC Regional Water Strategy, Final Draft. Gaborone: SADC.
- SADC. (2012). Regional Infrastructure Development Master Plan Executive Summary. Gaborone: SADC.
- SADC. (2012). Regional Infrastructure Development Plan. Energy Sector Plan. SADC.
- SADC. (2012). *SADC GHS Policy*. SADC.
- SADC. (2012). SADC Regional Infrastructure Development Master Plan – Transport Sector Plan. Gaborone: SADC.
- SADC. (2012). SADC Regional Infrastructure Development Master Plan – Water Sector Plan. Gaborone: SADC.
- SADC. (2015). Assessment report on mainstreaming and implementing disaster risk reduction measures in Southern Africa. Gaborone, Botswana : SADC.
- SADC. (2017). SADC Disaster Preparedness and Response Strategy and Fund 2016-2030. Gaborone: SADC.
- SADC. (2020). Draft SADC Resilience Framework 2020- 2030. Gaborone: SADC.
- SADC Roads and Transport. (n.d.). *Roads and Transport*. Retrieved from <https://www.sadc.int/themes/infrastructure/transport/roads-road-transport/>
- SADC Transport. (n.d.). Retrieved from SADC Transport: <https://www.sadc.int/themes/infrastructure/transport/>
- Sadoff and Muller. (2008). Water Management, Water Security and Climate Change Adaptation: EArly Impacts and Essential Responses. Sweden, Stockholm: GWP.
- SAPP. (2018). An Environmental and Social Management Framework for the Southern African Power Pool. Harare: Southern African Power Pool.
- Twigg. (2004). Disaster risk reduction: mitigation and preparedness in development and emergency programming. Overseas Development Institute (ODI).
- Twigg. (2015). *Disaster Risk Reduction, Good Practice Review 9*. London: Overseas Development Institute.
- UNDP. (2010). Guidelines for Mainstreaming Disaster Risk Reduction. Pakistan.
- UNDRR. (n.d.). Retrieved from UNDRR Terminology: <https://www.undrr.org/terminology/>

---

UNDRR. (2017, May 22). *Terminology*. Retrieved from UNDRR: <https://www.preventionweb.net/terminology>

UNDRR. (2017). *UNDRR Terminology*. Retrieved from UNDRR: <https://www.preventionweb.net/terminology>

UNESCO Myanmar Education Recovery Programme. (2010). *Disaster Risk Reduction in Education*. (UNESCO, Editor) Retrieved April 02, 2020, from UNESDOC Digital Services: <https://unesdoc.unesco.org/search/0fc327a6-a1ee-4982-bba5-d4d1ca6fbace>

UNISDR. (2009). *UNISDR Terminology*. Switzerland: United Nations International Strategy on Disaster Risk Reduction.

UNISDR. (2015). *Monitoring and Evaluation Framework*. Retrieved from United Nations Office for Disaster Risk Reduction: [https://www.preventionweb.net/files/49324\\_unisdrmeframeworkver1.0.pdf](https://www.preventionweb.net/files/49324_unisdrmeframeworkver1.0.pdf)

UNISDR. (2018). Sendai Framework for Disaster Risk Reduction 2015 - 2030. Geneva: United Nations.

United Nations. (2015). Sendai Framework for Disaster Risk Reduction 2015-2030. Sendai, Japan.

United Nations. (2016). Report of the open ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction.

United Nations Knowledge Platform. (2015, June). *Sustainable Development Goals*. Retrieved from Sustainable Development Goals Knowledge Platform: <https://sustainabledevelopment.un.org/?menu=1300>

Wisetjindawata, W. (2016). *Science Direct*. Retrieved from Science Direct: <https://pdf.sciencedirectassets.com/308315/1-s2.0-S2352146517X00070/1-s2.0-S2352146517304295/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEE0aCXVzLWVhc3QtMSJHMEUCIBcohjb4Yiaj51MxnB%2FL2OLX0B0YO5Rs3k%2FUh90KpADsAiEA4cbTp70rFUyYJkjjDoU64kDsjiUfzGM0wNFXVP>

World Bank. (2015). Disaster Risk Management in the Transport Sector - A Review of Concepts and International Case Studies. Washington.

## Annex 1: DRR Mainstreaming in the Infrastructure Sector – Water Resources, Energy and Transport Monitoring Evaluation System

Priority Area	Targets	Indicators	Responsibility	Timelines
DRR Mainstreaming in the Water Resources Infrastructure	(i) Review policies and frameworks to ensure the adoption of the provisions of DRR through the disaster management cycle.	Reviewed Policies and Frameworks	MS I&S /DRR Unit	2026
	(ii) Build capacities of the relevant water sector practitioners to ensure that the design of water systems is based on a full understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment.	Number of water sector people trained in DRR issues	I&S /DRR Unit	2025
	(iii) Undertake periodic climatological and hydrological analyses of the SADC shared watercourses to ensure the safety of structures and downstream communities.	Number of assessments undertaken	MS	2025
	(iv) Identify risks associated with likely catastrophic failure of dams and related infrastructure both at the regional and Member States and prescribe mitigation measures.	Number of Water Infrastructures assessed and risks identified	MS	2025
	(v) Ensure that risks from local as well as regional disasters including those related to pollution incidents, floods, landslides etc. are well recognised and responses to them are provided for in the SADC Protocol on Shared Watercourses as well as in national legislation.	Number of local and regional risks identified and mitigation measures put in place	I&S /DRR Unit	2024



Priority Area	Targets	Indicators	Responsibility	Timelines
	(vi) Facilitate enhancements in the mandates and capabilities of national, regional and local operating institutions and sector regulators to identify, document and mitigate potential risks.	Number of Institutions identified and mandates clarified for risk identification and mitigation	I&S /DRR Unit	2026
	(vii) Enhance cross-sector and cross border early warning systems (such as those provided by meteorological and hydrological services).	Number of cross sectoral and cross border signs per MS	MS	2026
	(viii) Identify disaster hotspots (geographical areas) with social and economic activities that are vulnerable to disasters and put in place measures to safety to safety and security of such activities.	Assessment reports identifying hotspot areas with recommendations	I&S /DRR Unit	2025
	(ix) Strengthen the capacities and effectiveness of national and local disaster management structures build resilience and be able to deal with local disaster incidents.	Number of institutions strengthened	I&S/DRR Unit	2025
	(x) Develop regional building codes and standards to ensure standardisation and harmonization of water infrastructure.	Regional building codes	I&S/DRR Unit MS	2025
	(xi) Promote “building back better” approaches for all water resources infrastructure damaged by disasters to ensure resilience to DRR.	Adoption of Regional Building Codes for the water infrastructure	I&S/DRR Unit MS	2025
	(xii) Promote regular monitor monitoring of all water resources infrastructure to facilitate regular maintenance and repair of	Monitoring reports	I&S/DRR Unit	2025

Priority Area	Targets	Indicators	Responsibility	Timelines
	systems and infrastructure to minimise operational failures and reduce risk from disasters.			
	(xiii) Promote cross-sectoral engagement with the other sectors that are at potential risk to ensure a common understanding of risks to facilitate the development of mitigation and adaption measures to reduce and counter the risks.	Number of Sectors Identified	MS	2025
	(xiv) Strengthen the capacities and effectiveness of national and local disaster management structures to build resilience and be able to deal with local disaster incidents.	Number of local institutions identified and trained	MS	2025
	(xv) Expedite construction of multi-purpose dams to regulate catchment and river water flow, thereby minimising floods that result in loss of lives. This will also contribute towards improving community livelihood;	Number of multi-purpose dams by Member States constructed to regulate catchment and river water flow	MS	2030
	(xvi) Increase allocation of technical and financial resources for analysis and forecasting of extreme climatic events in order to reduce risks associated with such events as droughts, floods. This will enable water resources data collection and monitoring which are key for planning and disaster risk management. Over the years, allocation of funds for hydrological and meteorological data collection, analysis and dissemination continues to decrease.	Proof of financial resources allocated specifically for early warning and forecasting of climatic events	MS	2025
	(xvii) Facilitate the building of robust facilities in safe areas that can withstand flooding to ensure community safety during extreme events.	Number of disaster proof and weather facilities	MS	2030

Priority Area	Targets	Indicators	Responsibility	Timelines
	(xviii) Identify safe areas for construction of facilities to act as evacuation centres during floods and other disaster events.	Number of resilient and disaster proof centres	MS	2024
Measures for Mainstreaming DRR in the Energy Sector	(xix) Build the capacities of personnel and institutions to increase knowledge and awareness as well capacities for incorporating DRR as part of the mainstream functions of the energy sector.	Reports on evidence based DRR approaches in education	MS	2025
	(xx) Review of the regional energy frameworks to domesticate disaster risk management based on the full understanding of disaster risks in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment in the energy sector.	Reviewed regional frameworks	I&S/DRR Unit MS	2025
	(xxi) Identify and document risk related to the energy sector including those associated with global warming and climate change catastrophic disasters as a result of failure of the energy production facilitates e.g. Dams, nuclear power plants, bulk fuel facilities and those that may lead to disastrous interruptions in energy supply.	Risk reports Number of risks identified	MS I&S/DRR Unit	2026
	(xxii) Develop clear recovery strategies for high risk areas and vulnerable geographical areas that may be impacted upon by a disastrous failure of energy supply or related disasters.	Recovery Strategies	MS I&S/DRR Unit	2024
	(xxiii) Promote energy diversity including solar power and other renewables and small-scale hydropower plants to cater for interruptions during disasters as well as to increase energy access and connectivity in the region.	Diversified energy sources	MS	2028

Priority Area	Targets	Indicators	Responsibility	Timelines
	(xxiv) Promote low carbon energy development plans that takes into consideration climate change adaptation and mitigation.	Number of green and renewable energy technologies identified	I&S/DRR Unit MS	2026
	(xxv) Assess the mandate and capabilities of national and regional sector regulators to identify and mitigate potential risks to energy infrastructure and make recommendations to improve capacity for early warning and risk mitigation in the sector.	Assessment reports with recommendations to improve early warning	MS I&S/DRR Unit	2025
	(xxvi) Analyse and document efficiency and effectiveness of cross-sectoral early warning systems (such as those provided by meteorological services) to determine the need for or improvement of cross-sector early warning systems and preparedness specific to the energy infrastructure sector failure.	Assessment reports on efficiency of cross-sectoral early warning systems	I&S /DRR Unit MS	2024
	(xxvii) Develop regional building codes and standards to ensure standardization and harmonization of energy infrastructure.	Building codes for the energy sector	I&S/DRR Unit MS	2025
	(xxviii) Promote “building back better” employing higher standards than originally used for all energy infrastructure damaged by disasters to ensure increased resilience to disasters.	Number of energy infrastructure damaged by disasters and re-built to higher standards	MS	2030
	(xxix) Promote regular and periodic checks on all major energy infrastructure to identify any vulnerabilities and to facilitate regular maintenance and repairs of systems to minimise operational failures and reduce risk from disasters.	Assessment reports	MS I&S/DRR Unit	2025
	(xxx) Promote cross-sectoral engagement with the other sectors that are at potential risk to ensure a common understanding of risks to facilitate the development of mitigation	Minutes of engagement meetings	MS	2024

Priority Area	Targets	Indicators	Responsibility	Timelines
	and adaption measures to reduce and counter the impacts of energy system failures.			
	(xxxix) strengthen disaster preparedness of the various energy sectors to ensure that capacities are in place for effective response and recovery to be planned ahead of a disaster incorporating opportunities for “Build Back Better”.	Number of preparedness activities undertaken	MS	2025
	(xxxix) Develop clear communication strategies and channels with relevant stakeholders in high risk areas in order to ensure that they are timeously informed of the potential risks and encouraged to develop appropriate response plans.	Communication strategies	MS	2024
	(xxxix) Undertake post disaster assessments to identify most affected sectors with a view to enhance resilience of such sectors as well as to promote lessons learning to reduce future risks.	Post Disaster Needs Assessments Reports	MS	2025
	(xxxix) Migrate to cleaner fuels with low sulphur content and lead free to reduce local air pollution.	Number of MS fully adopting the low sulphur content and lead free fuel	MS	2025
	(xxxix) Mainstream DRR in the technical designs and preparations of the energy infrastructure projects as part of the Environmental and Social Impact Assessment (ESIA) Reports; and	Number feasibility studies with EIA and ESIA that incorporates DRR issues.	SADC MS	2025
	(xxxix) Development and selection of routes for regional power transmission interconnector projects and transmission corridors should consider DRR issues such as cyclones, landmines.	Number of resilient regional power transmission interconnector projects and transmission corridors	MS	2025

Priority Area	Targets	Indicators	Responsibility	Timelines
Measures for Mainstreaming DRR in the transport Sector	(i) Undertake regular and period physical assessments of the condition of all regional infrastructural elements and systems in order to gauge their vulnerability (and thus that of the system) to different risks and institute mitigation or corrective measures;	Assessment reports	MS	2025
	(ii) Make DRR mandatory to be a component of the Environment Impact Assessments for all transport (road, rail, ports, maritime and inland waterways and air transport) infrastructure projects and for all regional projects being included in regional masterplans;	EIA reports incorporating DRR as a requirement	MS	2025
	(iii) Review policies, regulatory frameworks, and disaster risk management practice to ensure that they are based on an understanding of disaster risk in all its dimensions and aimed at preventing and mitigation of disasters and takes into consideration emerging issues such the Paris Agreement, the Sendai Framework, and UN Agenda 2030 and the Sustainable Development Goals;	Number of Transport Policies reviewed	MS I&S/DRR Unit	2028
	(iv) Ensure that available alternative routes and/or modes of transportation to minimise the impact of failure of a specific component in the transport system in the event of a disaster are functional at all times;	Regional and national roads maps showing transport routes with provisions for alternative routes provided in the event of disasters	MS I&S/DRR Unit	2027
	(v) Provide contingency plans to ensure continuity of essential services during a period in which an infrastructure link is not functioning or needs to be closed due to a disaster;	Transport sector DRR contingency plans	MS I&S/DRR Unit	2027
	(vi) Encourage Member States to domesticate the standard and draft model law on International Carriage of Dangerous Goods by Road (ADR) that has already been adopted to facilitate the management of haulage of hazardous materials and ensure vehicle safety and management of inherent in the transboundary movement of dangerous goods;	Guidelines for the management of hazardous wastes in transit  Regulations for the management of hazardous wastes	MS  I&S /DRR Unit	2026

Priority Area	Targets	Indicators	Responsibility	Timelines
	(vii) Evaluate and document the mandate and capability of national, regional and local operating institutions and sector regulators (where they exist) to identify and mitigate potential risks and make recommendations to improve capacity for early warning and disaster risk mitigation in the sectors.	Assessment and data base of national and regional transport sector regulators	I&S /DRR Unit MS	2030
	(viii) Evaluate existence, operational processes and effectiveness of cross-sector early warning systems (such as those provided by meteorological and hydrological services), taking into consideration the interdependencies that exist with the transport sector.	Assessment reports for cross sectoral early warning linkages	MS	2030
	(ix) Update and review all construction standards for transport infrastructure to ensure construction of high quality and disaster-resilient and disaster-proof infrastructure;	Updated construction standards for transport infrastructure	I\$S, DRR Unit MS	2030
	(x) Ensure that repairs and maintenance is undertaken to a higher standard than originally used (promoting building back	Number of transport infrastructure constructed to higher standards	MS	2024
	(xi) Foster strong collaboration and partnership across mechanisms and between public and private sector institutions in Member States in the implementation, construction and management of cross border infrastructure in relation to disaster risk reduction and management; and	MoUs, Agreements and Minutes of Joint cross border operational meetings	I\$S, DRR Unit MS	2026
	(xii) Facilitate regular monitoring and evaluation of the transport sector to ensure that DRR is part of the transport infrastructure sector planning and implementation.	Monitoring reports with recommendations'	MS	2025

Priority Area	Targets	Indicators	Responsibility	Timelines
	(xiii) Facilitate the development of national DRR mainstreaming guidelines for all national level road, rail, ports, maritime and inland waterways and air transport infrastructure institutions to contribute to increased resilience of the sector plans and project and infrastructure.	National DRR mainstreaming guidelines for all national level road, rail, ports, maritime and inland waterways and air transport infrastructure institutions	MS	2022
	(xiv) Promote cross-sectoral engagement to facilitate information sharing and exchange of knowledge and experience to enable the development of appropriate plans, strategies and programmes;	Cross sectoral strategies and implementation reports	MS	2023
	(xv) Undertake regular and period physical assessments of the condition of all infrastructural elements and systems in order to gauge their vulnerability (and thus that of the system) to different risks and institute mitigative or corrective measures;	Assessment reports	MS	2025
	(xvi) Review policies, regulatory frameworks disaster risk management practice to ensure that they are based on an understanding of disaster risk in all its dimensions and aimed at preventing and mitigation of disasters.	Number of revised policies and regulatory frameworks	MS	2030
	(xvii) Develop alternative routes and/or modes of transportation to minimise the impact of failure of a specific component in the transport system in the event of a disaster.	Reports transport networks on improved regional	MS	2025
	(xviii) Develop Regional and national DRR Communication and visibility strategies and plans	Strategy and Plan Developed on Communication and Visibility	Secretariat-DRR and MS	2023



Priority Area	Targets	Indicators	Responsibility	Timelines
	(xix) Training and capacity building to ensure that curricula for civil engineering technicians and engineers include DRR; and	Curriculum and Training Program developed and implemented	Secretariat and MS	2022
	(xx) Ensure compliance and domestication of regulations, standards, guidelines on transportation of dangerous/ hazardous goods.	Number of National instruments adopting regional regulations, standards, guidelines on transportation of dangerous/ hazardous goods.	MS	2025



Implemented by/Mis en oeuvre par:



**GFDRR**



**WORLD BANK GROUP**

