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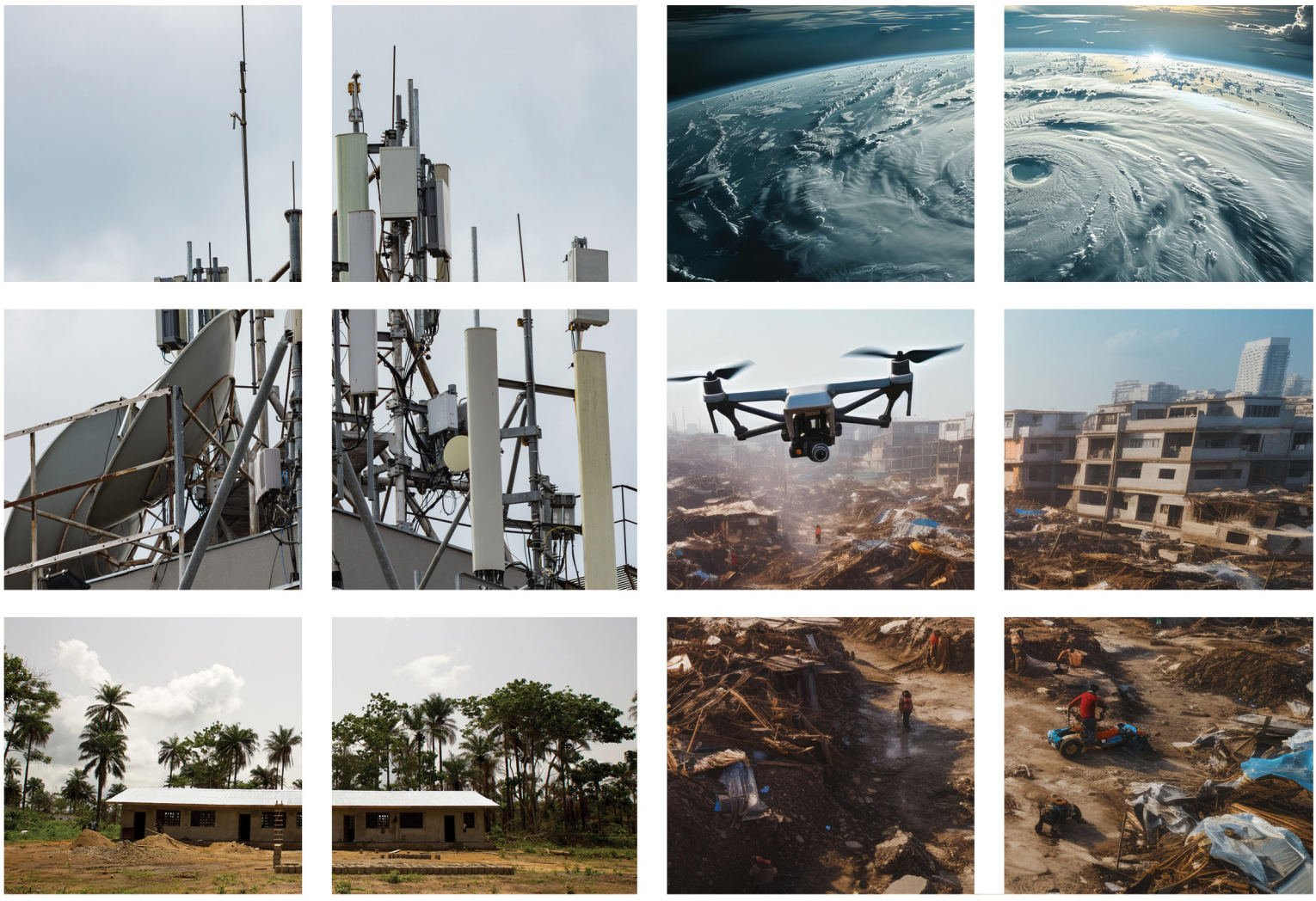
SADC model – national emergency telecommunication plan (NETP)

March 2024



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ISBN

978-92-61-38821-8 (Electronic version)
978-92-61-38831-7 (EPUB version)
978-92-61-38841-6 (MOBI version)

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Foreword

The 16 Member States of the Southern African Development Community (SADC) are vulnerable to a variety of disasters and natural hazards, including floods, droughts, tropical cyclones, epidemics, landslides, earthquakes, and volcanic eruptions. In a region prone to such catastrophic events, the effective use of information and communication technologies (ICTs) to deliver a fast and coordinated response will undoubtedly save lives and increase economic resilience.

This report outlines strategies and frameworks aimed at ensuring coordination across all levels of government, with the engagement of private organization under public and private arrangements, and involvement of communities at risk. It considers existing legislation, emergency telecommunication regulations, organizational structures and coordination mechanisms in SADC Member States and proposes a series of action items to create, enhance and update national emergency plans. Not least, it offers recommendations to improve international cooperation, measures to reduce vulnerabilities, actions to create resilient telecommunication services, and the need to develop early warning systems in each country of the region.

It is my sincere hope that using this report all countries in SADC will be better equipped to prepare and put in place an effective and efficient framework for the deployment of emergency communications under each phase of disaster risk management based on a comprehensive strategy for disaster risk reduction and management proposed in this guide.

Dr Cosmas Luckyson Zavazava
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International Telecommunication Union

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Acronyms

ARTEC	Regulatory Authority of Communication Technologies
BNGRC	National Office of Risk and Disaster Management
BOCRA	Botswana Communication Regulatory Authority
CAP	common alerting protocol
CB	cell broadcast
CB/LB-SMS	cell broadcast and location-based SMS
CMAS	commercial mobile alert system
CPGU	Cellule de prévention et de la gestion des urgences (CPGU)
CRAN	Communications Regulatory Authority of Namibia
DMMU	disaster management and mitigation unit
DRR	disaster risk reduction
EOC	emergency operation centres
EOCC	emergency operational and communication centre
ESCCOM	Eswatini Communications Commission
ETC	emergency telecommunication cluster
EW4A	early warning for all
EWS	early warning system
GIS	geographic information system
GRC	Gestion des risques et catastrophes
HF	high frequency
UHF	ultra high frequency
VHF	very high frequency
ICASA	Independent Communications Authority of South Africa
ICT	information and communications technology
IFCR	International Federation of Red Cross
ITU	International Telecommunication Union
LB SMS	Location-based SMS
MACRA	Malawi Communications Regulatory Authority

(continued)

MHCP	Multi-Hazard Contingency Plan
MHEWS	Multi-Hazard Early Warning System
MNO	Mobile Network Operator
NEOC	National Emergency Operations Centre
NETP	National Emergency Telecommunication Plan
NRA	National regulatory authority
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
POTRAZ	Postal and Telecommunications Regulatory Authority of Zimbabwe
PPDR	Public protection and disaster relief
RF	Radio frequency
SADC	Southern African Development Community
SITA	State Information Technology Agency
SOP	standard operating procedure
TCRA	Tanzania Communications Regulatory Authority
UNISDR	United Nations International Strategy for Disaster Reduction
VSAT	Very small aperture terminal
WEA	Wireless emergency alerts
WFP	World Food Program
ZICTA	Zambia Information and Communications Technology Authority

1 Introduction

The Southern African Development Community (SADC) model national emergency telecommunication plan (NETP) outlines the strategies and frameworks that should be in place to enable and ensure communications in the event of an emergency in SADC Member States, an objective that can only be achieved by promoting coordination across all levels of government, between public and private organizations, and within the communities at risk.

The model NETP considers organizational structure and the definition of policies and emergency telecommunication regulations in SADC Member States, including the methods of coordination among the different actors during mitigation, preparedness, response, and recovery phases of disaster risk management (DRM). It also presents the principles that guide the allocation of resources and responsibilities for the achievement of the proposed objectives, including the expected telecommunication and information and communication technology (ICT) response times, tasks, and processes.

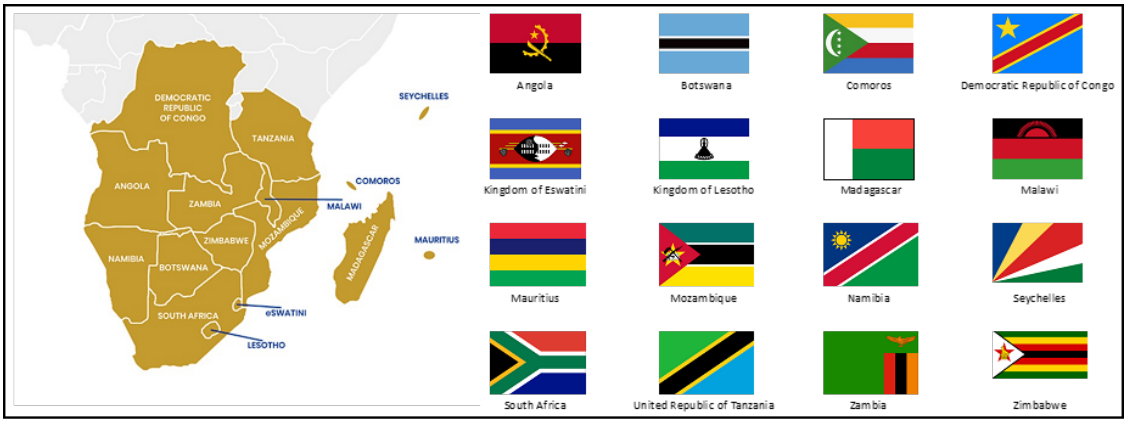
Given the significance of ICTs during a national emergency and the recovery phases, national authorities should take the lead in the NETP coordination in each SADC Member State. As an integral part of DRM, government involvement also implements the nationwide organizational structure and governance model established in each Member State.

The following sections address these points and propose a series of action items to enhance and update the telecommunication and ICT plan for DRM in each SADC Member State.

This report presents a general description of the main elements that should be considered in an NETP for each DRM phase and a number of action items or activities that should be carried out by each Member State in order to obtain an effective and efficient integrated emergency telecommunication system. All action items are broadly presented, and each Member State should evaluate each case according to their current emergency telecommunication and ICT framework, as well as any country-specific characteristics.

The template for the collection of information of the main elements of the NETP for SADC Member States is presented in Annex 1 and the questionnaire that was sent to relevant DRM authorities is presented in Annex 2.

Figure 1: Southern African Development Community (SADC)



Source: SADC
Note: The designations employed and presentation of material in this publication, including maps, do not imply the expression of any opinion whatsoever on the part of ITU concerning the legal status of any country, territory, city or area, or concerning the delimitations of its frontiers or boundaries.

Objective and scope

This report seeks to describe the relevant elements of telecommunication/ICT use in SADC Member States during the four phases of DRM: mitigation, preparedness, response, and recovery. It will guide the actions of all actors involved in DRM, including the telecommunication/ICT sector, to provide support for and improve coordination between the different agents involved. The SADC model NETP also seeks to strengthen telecommunications and ICTs of each SADC Member State so that the relevant actors in this sector can support efforts to mitigate disaster risk as well as to prepare for, respond to, and recover from emergencies.

This SADC model NETP is intended to help all persons and institutions involved in DRM in the SADC region, including authorities at all levels of government, the private sector, and other actors in the telecommunication/ICT and emergency aid sectors to navigate the main lines of action required to achieve an efficient emergency communication system.

This report is divided in 16 chapters. Chapters 2 to 4 describe the existing institutional and normative framework for emergency telecommunications and ICTs.

Chapters 5 to 7 deal with the mitigation phase of DRM and include the vulnerability of the SADC region to natural hazards, the current state of the telecommunication/ICT sector in each Member State, and the establishment of a specific regulatory framework for DRM.

Chapters 8 through 12 correspond to the preparedness phase and include topics related to telecommunication/ICT standard operating procedures (SOPs), contingency planning, and early warning systems (EWS).

Chapters 13 to 15 cover the DRM communication and coordination of the response phase including collection and analysis of information, emergency awareness and updates, as well as the recovery phase.

Chapters 16 and 17 address the assessment of damage and reconstruction of telecommunication/ICT infrastructure and follow-up activities to be carried out after the disaster.

Summary of action items

The following action items are recommended for governments adopting the SADC model NETP.

Action item 1: Laws and regulations for disaster risk management and national disaster management plans

Where not in place, it is recommended that high-level laws and regulations should be established for DRM. A comprehensive legal, policy, and institutional framework should be based on existing DRM policy and national disaster management plans and should indicate the agencies accountable for developing emergency sector regulations. For instance, the national regulatory authority (NRA) for telecommunications should lead and implement emergency telecommunication elements in the DRM framework, including reviewing and updating the NETP. The NRA should be mandated to establish specific regulations for the telecommunication/ICT sector for DRM that encourage network and service providers to actively participate in each phase of disaster management.

Action item 2: National disaster and emergency telecommunication plans

Each Member State should develop or update legislation for DRM. It should include country-specific and up-to-date information on the roles and responsibilities of the different stakeholders (relevant actors) involved in DRM processes, including public and private organizations, humanitarian entities, and non-government organizations (NGOs), among others, as well as the emergency response communications network and the necessary telecommunication equipment, among other elements. Disaster management agency policies regarding communications could be considered as part of this integrated and comprehensive plan based on the SADC model NETP.

Action item 3: Provision for emergency telecommunications and ICTs

Based on the mandate of a high-level DRM law or policy, the regulatory agency responsible for developing emergency telecommunication/ICT regulations should make provisions for all phases of DRM (mitigation, preparedness, responses, and recovery).

Action item 4: Responsibilities of the ministry and regulator for telecommunications and ICTs

Legislation that covers disaster management in each SADC Member State should establish the responsibilities and activities of the ministry and NRA responsible for telecommunications and ICTs. These should include the specific roles that the ministry and national regulatory authorities must play within the general DRM system, and the roles and representation they have within the sector committees or sub-committees for DRM.

Each SADC Member State should establish or enhance communication mechanisms between the various public sector stakeholders (such as the ministry and regulatory authority responsible for telecommunications and ICTs, disaster management agency, customs etc.), and between the government and other actors during emergency situations. If possible, a dedicated communications network should be developed to facilitate communication between these actors.

The ministry and regulatory authorities responsible for telecommunications and ICTs in each SADC Member State should establish a directory of all key persons responsible for the NETP, including phone numbers and email addresses. This information will constitute the SADC emergency telecommunication directory and shall be kept up to date and shared with the SADC disaster risk reduction unit for cross-border preparedness and response programmes for transboundary hazards and disasters

Action item 5: The Tampere Convention and coordination with international agencies

It is recommended that the ministry and regulatory authority responsible for telecommunications and ICTs of each Member State, as well as other relevant agencies such as the ministry of foreign affairs and the customs authority take the necessary steps for the ratification of the Tampere Convention and, subsequently, make the necessary legislative and regulatory adjustments for its effective implementation.

The regulatory authority should also establish specific regulations for the effective implementation of the Tampere Convention, as well as coordinate and collaborate with international agencies, such as the Emergency Telecommunications Cluster (ETC) and International Telecommunication Union (ITU) on issues of preparedness and response to eventual disasters or emergencies is

imperative and must continue to be strengthened. This process will avoid duplication and overlapping of efforts.

Action item 6: Updated vulnerability maps

Each SADC Member State should maintain updated vulnerability maps in the NETP for the different types of hazards and especially those related to droughts, floods, and epidemics. This Information must be detailed at the municipal level and should be available to telecommunication/ICT operators. These should also include information on the most vulnerable communities, specifying the types of hazard they are prone to as well as the communication resources available. This vulnerability analysis should also include precise coverage maps of the telecommunication/ICT networks.

Action item 7: Critical infrastructure and network inventory

In conjunction with the ministry or NRA, all telecommunication/ICT service operators, radio and television broadcasting operators, as well as government networks, should develop or update and present for approval by the disaster management coordinating authority or other designated agency, a vulnerability analysis of network critical infrastructure reflecting the different types of hazards to which the country is prone. This should include an inventory of the infrastructure, power, maintenance, and connectivity evaluations. This vulnerability analysis should also include precise coverage maps of the telecommunication/ICT networks.

The disaster management coordinating authority or other designated agency should update the network inventory and coverage of mobile, fixed, terrestrial and satellite telecommunication/ICT networks and service providers as well as radio and television broadcasting service providers relevant for use during all phases of disaster management. In addition, this designated authority should maintain an up to date database with the focal points in charge of technical aspects as well as with those in charge of communication of alerts and relevant information regarding the disaster. In addition, the inventory should include other types of telecommunication/ICT networks relevant for disaster relief, such as radio-amateur and first responder networks.

Other options to terrestrial telecommunication/ICT infrastructure, such as satellite services, including satellite devices for voice/broadband communications, should be assessed to strengthen the emergency response and recovery activities.

Radio networks (HF, VHF and UHF), as well as other frequencies for other radio-communication services related to disaster management such as maritime communications should be adopted, or in case they already exist, maintained for effective continuous operation. In case they are not available, dedicated networks (e.g. public protection and disaster relief (PPDR) network) should be developed and installed for the use by government entities involved in disaster management. User and operational training should also be implemented.

Consideration should be given to the creation of protocols and deployment of equipment to gather and analyse relevant data and information (including geospatial information) on the immediate needs of the population after a disaster and to manage the safe delivery of the response.

Action item 8: Early warning systems and common alerting protocols

SADC Member States should assess, develop and/or enhance existing emergency alert and early warning systems, including surveillance and monitoring systems for probable threats,

emergencies and solutions for warning and alerting the public. The common alerting protocol is one of the most efficient mechanisms to alert the population of a hazard and provide information and communicate relevant facts to the population at risk. With the cooperation of the telecommunication/ICT service providers, solutions to warn and alert the public should be implemented, such as the use of radio and TV broadcasting networks and cell broadcast technology and considering the relatively high mobile phone penetration in the SADC Member States, plans for the development and implementation of this technology should be initiated and implemented. Cell broadcast or cell broadcast complemented with location-based SMS is an efficient mechanism for emergency authorities to send one-touch notifications to cell phones in disaster affected areas.

Action item 9: Training and drills

Telecommunication trainings and drills for emergencies should be regularly carried out to improve emergency responder capacity with communications equipment as well as to enhance their ability to execute policies, plans, and procedures governing the use of communication networks. The telecommunication/ICT sector should actively participate in these drills and exercises as well as develop and carry out their own drills and exercises to effectively implement telecommunication/ICT elements of the NETP. In coordination with telecommunications operators, national regulatory authorities should review and update the plans and scope related to emergency telecommunication drills and trainings.

Action item 10: Accessibility

The disaster management coordinating authority or designated agency, such as the ministry or national regulatory authority responsible for telecommunications and ICTs, should work together with network operators and service providers, to develop mechanisms to understand the accessibility requirements needed to guarantee that vital digital communication technologies are inclusive and accessible to vulnerable groups, such as persons with disabilities, older adults, women and girls, and refugees and immigrants. Where available, this response should be linked to existing early warning systems, so everyone can receive and understand the alerts and the early actions that need to be taken.

Action item 11: Contingency and business continuity plans

Public and private satellite and terrestrial networks, including mobile, fixed, and broadcasting operators should each keep their contingency and business continuity plans for emergencies up to date. Based on hazard maps, risk assessment and network vulnerability analyses, contingency measures for elements such as network redundancy, mobile (portable) base stations, flyaway VSAT, mobile satellite terminals, secondary energy sources, should be included in the network design. Safely stored satellite equipment, and satellite network connectivity plans for use during the response phase of a disaster, should also be part of the contingency plans.

Action item 12: Standard operating procedures

Develop, update, and strengthen standard operating procedures (SOPs) within and among agencies for emergency and disaster response related to communications and the technical means for communication (voice/data), including interoperability. Operating procedures should be updated regularly for all relevant hazards and by all actors involved in effective emergency

telecommunication/ICT risk management, and should include, if possible, the following elements:

- An updated list of relevant entities and the contact points (including key decision makers) within these entities that must maintain ongoing communication during all phases of DRM.
- An updated database with the identified focal points of every agency that is involved in disaster risk management.
- Analysis of the possible interoperability between the equipment (wireless) and the communication networks of the entities involved in DRM.
- A defined set of radio frequencies that can be used for the communications of the contact points (key decision makers) compatible with the radiocommunication equipment being used.
- Alternative methods of communications, if necessary, for example, through existing communication operators.
- Connectivity plans for the satellite equipment that is available to be used during the response phase as well as procedures for their use as primary or alternative communications between all relevant stakeholders involved in a disaster response.

Action item 13: Emergency operation centres

Consider planning for the development of emergency operation centres or communication and coordination command posts to provide critical communications to users in each organization involved during the response phase of a disaster. These positions can be fixed or mobile, local or remote, and be located in a vehicle or shelter, among other possibilities. Maintaining interoperable and continuous communications between command posts and stakeholders is vital for an effective response to the emergency.

Action item 14: Call centres

Call centres should be established during the response phase to warn the affected population of new risks, disseminate updates about the emergency situation, and help affected populations connect with relatives. Generally, these call centres can be located in shelters and should use means of communication that do not congest the networks, such as text messages. To establish the required telecommunication/ICT infrastructure connectivity for these call centres, SADC Member States may employ satellite networks, which can be easily installed through collaboration with telecommunication/ICT operators or international organizations.

Action item 15: Restoration and reconstruction of telecommunication/ICT infrastructure

Restoration and reconstruction of the telecommunication/ICT infrastructure should be based on lessons learned and the principle of building back better. These activities should also involve the active participation of the private sector, including fixed, mobile, and satellite network and service providers.

Action item 16: Emergency telecommunication plan updates

Based on events during the disaster, a report should be prepared after the DRM response and recovery phases. This should identify lessons learned and include necessary modifications and improvements to the NETP and should reflect the input of relevant actors involved in emergency telecommunications. The NETP should be updated every two or three years.

2 Description of the four phases of disaster management

Disaster risk management (DRM) has two distinct stages: risk management and crisis management. In the first stage, measures are taken in advance to predict and warn of a disaster in advance as well as to prevent and/or mitigate its damage. These efforts occur under normal or non-emergency circumstances and correspond to the mitigation and preparedness phases. In the second stage, crisis management takes place during emergencies and includes actions such as search and rescue, response coordination, damage assessment, the activation of a policy response, and the mitigation of a secondary disaster. This second stage of DRM corresponds to the response and recovery phases.

Mitigation

The mitigation phase seeks to carry out actions that aim to prevent an emergency, reduce the probability of its occurrence, and limit the negative effects of unavoidable threats. This phase includes activities such as identifying existing hazards and risks, conducting vulnerability assessments, constructing and/or maintaining critical telecommunication infrastructure, and developing written plans and procedures, such as national emergency telecommunication plans (NETP).

During this phase, the role of telecommunications and ICTs is to help analyse the risk of potential disasters, disseminate information about impending hazards and on how to mitigate their impact so that hazards do not lead to disasters, identify communities at risk, and help implement strategies, technologies, and processes that can reduce those negative effects. Activities carried out during the mitigation phase include establishing legal and regulatory frameworks that support the use of emergency telecommunications and ICTs, conducting risk analyses of critical telecommunication/ICT infrastructure, taking steps to reduce the vulnerability of telecommunication networks and improve their capacity of recovery, and assess vulnerabilities in order to develop multi-hazard early warning systems (EWS) with the appropriate technology for each case. These strategies should be implemented before and after the emergency[1].

Preparedness

The preparedness phase includes the planning and preparations necessary to respond to an emergency event. These include the establishment of multi-hazard EWS, training, operational processes, and the implementation of those written plans and procedures developed during the mitigation phase.

Telecommunications and ICTs in this phase are essential to facilitate the dissemination of information and alerts so that the public is aware of the actions they must take during an emergency. Likewise, they must facilitate the coordination and communication of those involved in disaster management.

During this phase, it is important to make and implement plans that reduce the likelihood of communications interruptions, continuously carry out telecommunication/ICT training and drills, and regularly carry out activities designed to create awareness about impending hazards among those involved, including campaigns in different formats accessible to the entire population regarding potential hazards and the activities that people must carry out during the response phase.

[1] Federal Emergency Management Agency (FEMA). *The Four Phases of Emergency Management.*

Response

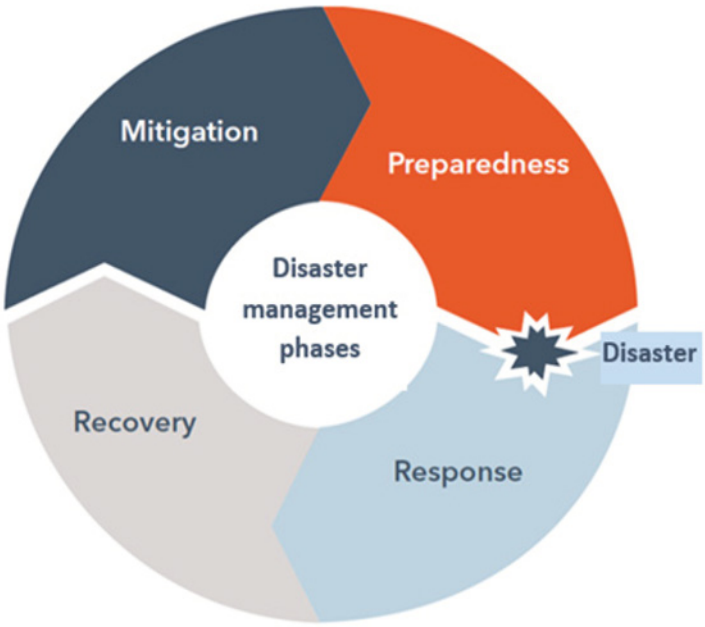
The response phase is carried out during the emergency itself and includes humanitarian activities such as search and rescue, the evacuation of people from affected areas, and the opening of shelters, among others designed to assist the population.

The role of telecommunications and ICTs during this phase is vital for connecting stakeholders such as first responders, government stakeholders and government agencies, communities at risk, shelters, health centres, and NGOs, among others. This is especially important considering that several entities carry out a variety of activities and procedures at the local, national, and international levels.

Recovery

The recovery phase generally starts a few weeks after the disaster and focuses on providing the necessary aid to return to or improve on levels of safety and functionality the community had before the disaster. Activities during this phase include infrastructure reconstruction, restoration of public sector operations, and debris removal. This restoration and reconstruction must include telecommunication/ICT infrastructure, especially due to the fundamental role that the sector plays within the community. The reconstruction should be based on the lessons learned and the principle of building back better.

Figure 2: Phases of disaster risk management



Source: ITU

3 Legislation and telecommunication regulations

Legislation and regulations are key to successful disaster risk management, as these are the foundation stone upon which DRM is implemented, and where the roles and responsibilities of all stakeholders are defined. These are the frameworks on which all coordination mechanisms, communication channels, and SOPs are determined and how decision makers in relevant agencies are identified[2].

It is important for SADC Member States to base their DRM processes as well as their emergency telecommunication plans and procedures on a high-level policy statement, national legislation and/or a national DRM plan that provides an institutional and inter-institutional framework for the actions of government and civil society in an emergency or disaster. This national high-level legislation or framework provides the legal authority for regulatory agencies and government to draft rules and regulations for disaster and emergency management plans, including plans related to telecommunications, such as the NETP.

National regulatory authorities of the ICT sector should issue appropriate technical and legal rules and regulations that should describe in clear detail the responsibilities, protocols, and strategies that each stakeholder – including telecommunication/ICT operators, public and private organizations, government and the community – should implement to effectively and efficiently use, provide, or facilitate emergency telecommunication/ICT services during national disasters.

Specific telecommunication/ICT regulations for emergencies should include the following for each phase of the DRM[3]:

Mitigation and preparedness phases:

a) Establish a unique national emergency number (a 3-digit number)[4]. Calls made to this number must be free of charges (toll-free) for the end user and not generate interconnection charges between operators.
b) Establish expedited type-approval or homologation mechanisms to facilitate the importing of telecommunication/ICT equipment in the case of emergencies or disasters.
c) Oblige telecommunication service providers to carry out vulnerability analyses of their networks according to the risk maps for different geographical areas and thereby establish corresponding contingency plans that guarantee, to the fullest extent possible, vital communications for emergency management and disaster risk reduction, as well as timely restoration of user communications. These plans should be submitted to and approved by the NRA.
d) Require that radio and commercial broadcasting operators, public and private television broadcasting operators, as well as civil society entities with assigned radio frequency spectrum, transmit information campaigns for the mitigation of disasters and emergencies. These campaigns should be developed in coordination with the DRM coordinating authority or other designated agency such as the NRA and should have a regulated duration and a broadcast timeline.
e) Require that radio and commercial broadcasting operators, public and private television broadcasting operators, as well as mobile providers, disseminate alerts to inform the population of a hazard accurately and in a timely manner.

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2 United Nations International Strategy for Disaster Reduction (2018). Implementation guide for local disaster risk reduction and resilience strategies – A companion to use for implementing the Sendai Framework target E.
3 ITU. (2020). ITU Guidelines for national emergency telecommunication plans.
4 Or 3-digit Common Emergency Number for Africa, in line with Recommendation ITU-T E.161.1.

f) Establish emergency alerts and early warning system requirements (e.g., cell broadcasts, local-based SMS, etc.).

Response phase:

a) Ensure that providers of commercial fixed and mobile telecommunications services take the necessary measures to make their networks available with adequate capacity for communication to the authorities and affected population that is free of charge and is carried out as soon as a disaster situation or emergency is declared.
b) Require that mobile network operators provide SMS messages to their customers and encourage them to use these SMS messages instead of mobile data services. In addition, require commercial telecommunications, as well as fixed-line and mobile operators, to limit the duration of their calls, for example, to a maximum of two minutes at the location of the disaster area for a period of 12 hours following the event that generated the emergency. These guidelines would not apply to calls made from or to any authorities involved in the emergency response.
c) Ensure that providers of commercial fixed- and mobile-telecommunication services give priority of communications to calls made by the authorities for a period of 24 hours after the emergency is declared, extendable as determined and decided by the responsible authority (e.g., the DRM coordinating authority or other designated agency such as the NRA).
d) Oblige radio broadcasting, commercial and community operators, as well as public and private television broadcasting operators, to transmit messages to inform and update the public about the disaster. These messages should include helpful content regarding health services, shelter, food, and family reunification, among others.
e) Oblige telecommunication service providers to immediately assess any damage to their networks and implement their previously prepared contingency plans, so as to re-establish communications as soon as possible.
f) The DRM coordinating authority or other designated agency such as the NRA should facilitate the issuance of authorizations for the use of the radio frequency spectrum on a temporary basis to national and/or international organizations for a period not exceeding six months in order to attend to the emergency. No charges should be incurred for this temporary use of spectrum during the emergency.

Recovery phase:

a) Require commercial and telecommunication service providers to re-establish permanent solutions after a disaster and restore and improve communications to end users with the goal of building them back better.

Considering the importance of legislation and regulations for emergency telecommunications and ICTs, the following section describes the most relevant plans, policies, or regulations in place in the SADC Member States related to telecommunications. These results are based on the answers to the questionnaire provided by the relevant authorities in each country.

3.1 National plan for disaster management

All SADC Member States reported having a national plan or a related document that guides disaster management or provides basic structures and procedures for mitigating risks and coordinating a response during emergencies and related events.

In countries such as South Africa, which provided a brief description of the Disaster Management Act of 2002[5] and a national disaster management framework, various structures have been

[5] Source: Disaster Management Act of 2002 (Act No 57 of 2002) – South Africa.

established that focus on preventing or reducing the risk of disasters, mitigating the severity of disasters, their emergency preparedness, rapid and effective response to disasters, and the post-disaster recovery and rehabilitation processes. According to such frameworks, government agency responsibilities include elaborating risk assessments, identifying and mapping risks, and setting out clear roles and responsibilities for disaster management, strategies, capacities, and any other contingency strategies and emergency procedures for successful disaster risk management.[6]

Similarly, in Botswana, a national disaster risk management plan is the basis on which policies, strategies, and procedures have been established that seek to guide all levels of society in disaster preparedness, disaster response and risk reduction. This plan envisages and identifies risks, defines structures through which disaster management is to be implemented, coordinated and facilitated, and identifies the roles and responsibilities of all leading government and non-government actors for clear disaster risk assessment, prompt preparation and response.

Some SADC Member States reported having similar plans in place:

- Lesotho: Although a national plan for disaster management exists, and as with several other SADC Member States, it contains little information or specific guidelines regarding emergency telecommunications and ICTs. However, there is a communication component that sets out the use of SMS and social media platforms to disseminate relevant information during emergencies.
- Madagascar: The disaster management plan is based on the national risk management policy and legislation (for example the disasters decree of 2019), which establish the organization, powers and functioning of the emergency prevention and management support unit at the Prime Minister's office.[7]
- Malawi: The department of disaster management affairs is the lead agency for disaster management in Malawi, and has published plans and guidelines, such as the national multi-hazard contingency plan, the disaster risk management policy, and the national disaster risk management communication strategy 2019-2022.
- Mauritius: The National Disaster Risk Reduction and Management Action Plan 2020-2030[8] is in place.
- Namibia: A number of DRM plans and policies are in place here, including a national disaster risk management plan, which aims to provide guidance, strengthen national capacity and provide a framework for sector-specific and regional disaster management. The Disaster Risk Management Act 10 of 2012 provides for the establishment of DRM institutions in Namibia and is an integrated and coordinated approach for all phases of disaster management, as well as the national DRM policy, the national policy on climate change, and the national drought policy and strategy, among others.

The remaining SADC Member States provided only the name of the national disaster management plan in place or the name of the agency responsible for its implementation. These plans are listed in Table 2.

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6 More information at: http://www.ndmc.gov.za/Pages/Acts.aspx and http://www.ndmc.gov.za/Pages/Frameworks.aspx

7 Cellule de prévention et de la gestion des urgences (CPGU). More information at: https://www.primature.gov.mg/cpgu/index.php/loi-et-decret/

8 Source: https://ndrrmc.govmu.org/Pages/NDRRMActionPlan.aspx

Action item 1: Laws and regulations for disaster risk management and national disaster management plans

Where not in place, it is recommended that high-level laws and regulations should be established for DRM. A comprehensive legal, policy, and institutional framework should be based on existing DRM policy and national disaster management plans and should indicate the agencies accountable for developing emergency sector regulations. For instance, the national regulatory authority (NRA) for telecommunications should lead and implement emergency telecommunication issues in the DRM framework, including reviewing and updating the NETP. The NRA should be mandated to establish specific regulations for the telecommunication/ICT sector for DRM that encourage telecommunication/ICT network and service providers to actively participate in each phase of disaster management.

3.2 National emergency telecommunication plan

The above-mentioned national DRM plans are not NETPs nor specific in terms of emergency telecommunications and ICTs, and at most, they give only brief guidelines on the subject. It is therefore important for SADC Member States to develop NETPs for the use of telecommunications and ICTs in the context of disaster risk reduction and management, although seven of the SADC Member States did report that they are currently developing such documents[9]:

- Eswatini: Reported having in place a draft NETP.
- Madagascar: Has a draft NETP prepared by the ICT Sector Group, which is comprised of national and international actors based in Madagascar who are working in support activities related to telecommunications, and who will make available any information or capacity related to ICT and telecommunications equipment for humanitarian assistance.
- Malawi: The NETP is being developed with the support of ITU. Different stakeholders have been consulted on the process, and a draft document has been prepared.
- Mozambique: The emergency telecommunications preparedness action plan (ETPAP) was developed in 2020 with support of the World Food Programme/Emergency Telecommunications Cluster (WFP/ETC) and presented in Maputo in 2022. Different actors have been involved in the drafting process, including telecommunication operators, radio and TV operators, community radios, and other stakeholders. This action plan will help national resilience goals in emergency telecommunications and will be complementary to the NETP when drafted.
- Seychelles: The plan is being finalized for government approval.
- Tanzania: A national communication strategy is in place and an NETP is currently being drafted.

No other SADC Member State reported having an NETP or similar document but some reported having other strategies or related policies in place:

- Angola, Lesotho and Namibia: Information provided refers to general legislation for disaster management but no reference to an NEPT or similar strategy.
- Botswana: There is no NETP or national strategy for the use of telecommunications and ICTs, although a national disaster risk management plan does note the critical role played by telecommunications in times of crisis. There is also a national cybersecurity strategy that was developed and approved by the Cabinet in 2021. The objective of this strategy is to create a cohesive and inclusive approach to delivering a safe, secure, and resilient cyberspace and a comprehensive framework that will facilitate coordinated responses by the government, the private sector, and other partners and address issues of cybersecurity.

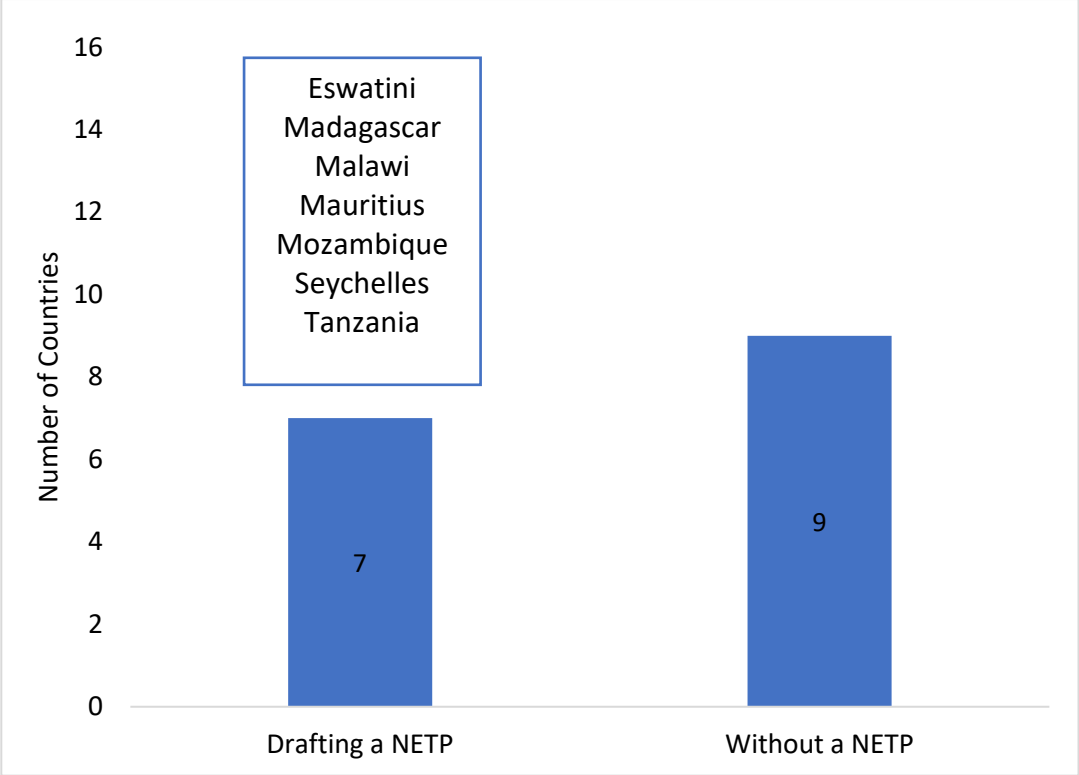
[9] Mauritius is also included.

The strategy addresses the protection of critical national infrastructure, including the telecommunication infrastructure.

- Comoros: A national contingency plan and specific plans for major hazards exist, but no emergency plan for telecommunications.
- The Democratic Republic of the Congo and Zimbabwe: No specific information was provided.
- South Africa: The Electronic Communications Act (ECA)[10] provides for a regulatory framework and the establishment of a public emergency communication centre. In addition, the Independent Communications Authority of South Africa (ICASA) has published numbering plan regulations, as well as other regulations that relate to emergency centres in line with ECA provisions[11].

Based on the responses received to the questionnaire, Figure 3 lists the SADC Member States in the process of drafting an NETP.

Figure 3: SADC Member States in the process of drafting an NETP



Source: SADC – ITU survey

Action item 2: National disaster and emergency telecommunication plans

It is recommended that each SADC Member State should develop or update legislation for DRM. It should include country-specific and up-to-date information on the roles and responsibilities of the different stakeholders (relevant actors) involved in DRM processes, including public and private organizations, humanitarian entities, and non-government organizations (NGOs), among others, as well as the emergency response communications network and the necessary

[10] Sections 76, 77, 78 and 79.
[11] More information at: www.icasa.org.za

telecommunication equipment, among other elements. Disaster management agency policies regarding communications could be considered as part of this integrated and comprehensive plan based on the SADC model NETP.

Box 1: Malawi National Emergency Telecommunication Plan (Malawi NETP)

In May 2023, ITU prepared a report on the Malawi National Emergency Telecommunication Plan (NETP) to help develop and set out a strategy to enable and ensure communication availability during the phases of disaster risk management.

The Malawi NETP was intended for all stakeholders and institutions involved in DRM in Malawi and was developed with the purpose of not only describing the relevant elements of telecommunications and ICTs during the DRM phases, but also to guide the actions of the telecommunication/ICT sector to provide effective support for and improve coordination between the different agents. The Malawi NETP also sought to strengthen telecommunications and ICTs so that the relevant actors in this sector could support efforts to mitigate disaster risk, as well as prepare, respond, and recover when faced with future emergencies.

The plan was divided into nineteen chapters, of which one to four describe the existing institutional and normative framework for emergency telecommunications and ICTs in Malawi, while the remaining chapters considered each of the four phases of DRM as well as setting out recommendations and key action items to continue developing and updating an effective NETP. The document identified seventeen key action elements that recommend specific activities and, in some cases, suggest the actors or institutions responsible for carrying them out.

Malawi is in a position to develop and strengthen its framework for the management of emergency communications and achieve a more integral disaster risk management that reduces the vulnerability of its population to emergencies.

The Malawi NETP is available at: https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Documents/2023/National-Emergency-Telecommunication-Plan-for-Malawi.pdf

3.3 Emergency telecommunications and ICT regulations

Except for the Democratic Republic of the Congo and Madagascar, all SADC Member States reported having at least one regulatory provision already established for emergency telecommunications.

Temporary telecommunication service licensing for emergencies

The following SADC Member States have specific provisions or are in the processes of developing them:

- Botswana: Botswana Communication Regulatory Authority (BOCRA) has the authority for the issuance of licences and can issue temporary licensing of spectrum and allocation of frequencies or numbers for public protection and disaster relief. Licensees are further

required to provide public emergency services and give priority to such services in an emergency[12].

- Malawi: Malawi is in the process of developing an NETP in which temporary licensing will be considered. Furthermore, the Communications Act of 2016 is due for revision and temporary licensing provisions are planned to be included.
- Tanzania: The draft NETP has addressed the process.

Other SADC Member States, although they do not report having specific provisions for temporary licensing in case of emergencies, do note they have related general provisions within their national telecommunications regulations, or in similar plans or policies.

Such is the case for the following SADC Member States:

- Comoros, Namibia, and Zimbabwe: Similar to South Africa, although no specific provisions are established, the general communication regulations give powers to the NRA to make provisions regarding temporary licensing.
- South Africa: There are no specific regulatory provisions for emergencies in the ICASA Act of 2000 (ICASA Act) or the Electronic Communications Act of 2005 (EC Act).[13] However, the ICASA Act does establish that ICASA has the authority to develop those or similar regulations. During the COVID-19 pandemic, for instance, ICASA developed the ICT COVID–19 national disaster regulations, which in addition to other instruments, prescribed those for temporary spectrum licensing.

The remaining SADC Member States did not provide any information about having regulations in this regard. Additional regulatory issues are presented below.

Temporary spectrum licensing

Nearly half of the respondent countries reported having general telecommunication regulations or national frequency plans that provide for temporary spectrum licensing. This is the case for Tanzania, where the regulator, Tanzania Communications Regulatory Authority (TCRA) may grant temporary permits for the right to use spectrum for coverage of special events that are national or international. With similar provisions, this is also the case for Angola, Botswana, Comoros, Namibia, South Africa, Zambia, and Zimbabwe. In addition, temporary spectrum licensing provisions are being included in the respective draft NETP for Eswatini and Malawi.

Spectrum for public protection and disaster relief (PPDR)

More than half of the SADC Member States reported that the spectrum for PPDR is provided under the national table of frequency allocations of each country or that there is a clearly determined spectrum for this purpose. This is the case for Angola, Botswana, Comoros, Eswatini, Malawi, Mauritius, Namibia, South Africa, Tanzania,[14] and Zambia. In Mozambique, on the other hand, PPDR spectrum for emergency has been planned, but not yet assigned because of the lack of such a network. The remaining SADC Member States did not provide any information in this regard.

In 2020, the SADC Framework for harmonisation of allocation of radio frequency spectrum for public protection and disaster relief (PPDR), which includes frequency bands for narrowband, wideband and broadband PPDR systems, addressed the need for harmonised frequencies

[12] Source: Communications Regulatory Authority Act, 2012 – Botswana
[13] Act No. 36 of 2005 – South Africa.
[14] Radio Frequency Spectrum Regulations, 2015. More information at: https://www.tcra.go.tz/uploads/text-editor/files/National%20Frequency%20Allocation%20Table%20_1621319682.pdf

to be used to benefit from equipment economies of scale, increased spectrum efficiency, improved cross-border coordination and circulation of equipment and the possibility to have interoperable PPDR systems in the SADC region. The SADC frequency bands for PPDR are set out in Table 1.

Table 1: Frequency bands for public protection and disaster relief

Narrowband PPDR	Wideband PPDR	Broadband PPDR
380-385 MHz paired with 390-395 MHz	380-470 MHz preferably 380-430 MHz	a) 698-703 MHz for Uplink and 753-758 MHz for downlink b) 733-736 MHz uplink and 788-791 MHz downlink
	410-420 MHz paired with 420-430 MHz	410-420 MHz paired with 420-430 MHz

There are three models for broadband PPDR employing frequencies in the 700 MHz band (e.g., 698-703 MHz paired with 753-758 MHz):[15]

- Model I – Dedicated Network: A dedicated public safety network, with spectrum used exclusively by public safety users. This model requires significant resources to deploy the network.
- Model II – Shared Network: A network that supports both public safety and commercial usage (with distinct public safety and commercial network cores), with priority access and pre-emption rights for public safety use during emergencies and other times of need.
- Model III - Commercial Network: The public safety community obtains services from one or multiple commercial providers.

In operationalising the framework, SADC Member States should:

- amend their national frequency plans to incorporate Resolution 647 (Rev. WRC-19 resolves 2);
- work towards achievement of interoperability and harmonisation in the utilisation of the PPDR systems at a regional level, and beyond;
- adopt common or interoperable standards for providing PPDR networks and services; and
- notify the ITU-R of the above adopted PPDR frequencies (Table 1) in accordance with Resolution 647 (Rev.WRC-15 Resolves 2).

Equipment type-approval or homologation processes

Apart from Namibia and Seychelles, where no type approval is required for temporary importation of telecommunication equipment,[16] the other SADC Member States reported that instead of having specific provisions for this matter, the type-approval or homologation process is dealt with at the moment of the emergency and upon request. According to the information provided by Botswana, for example, the "type approval application process is deemed timely enough and is able to deal with the requests timely during emergency situations."[17] Similarly, in Mozambique, every piece of equipment to enter the country is approved using a very simple

[15] Government of Canada. (2020). Progress Report on a National Public Safety Broadband Network.
[16] Government Gazette No. 5659, 30 January 2015. In Seychelles, type approval is not required for temporary importation of radio communication equipment for period not exceeding 3 months. This will cover instances of national public disaster situations.
[17] Communications Regulatory Authority Act, 2012.

process managed by the Communications and Regulatory Authority of Mozambique (INCM). Similar cases procedures were observed in Angola[18], Lesotho[19], South Africa[20], and Zambia.

For Eswatini, Malawi and Tanzania, these regulations are currently being considered in their draft NETPs.

Priority call routing

Five SADC Member States reported having provisions related to priority call routing:

- Angola and Comoros: In these SADC Member States, priority call routing is an obligation of service providers, according to their respective general regulations for electronic communications.
- Botswana: BOCRA may, during any emergency, require any service provider to "give priority to the transmission of the messages of the Government or of any authorized person, as well as to intercept messages transmitted under such circumstances".[21]
- Mauritius: Licensees shall give priority, as directed by the Information and Communication Technologies Authority (ICTA), to the telecommunication services needs of the government and relief agencies.
- Zambia: The ICT Act mandates licensees to have priority routing for emergency services.

On the other hand, in Eswatini, Malawi and Mozambique, these provisions are being considered and are in the process of being established, according to the information provided.

3-Digit emergency number (e.g., 911, 112, etc.)

With the exception of the Democratic Republic of the Congo, Namibia and Zambia, SADC Member States reported having regulations or numbering plans that establish 3-digit numbers for emergencies although none indicated that they have a single 3-digit number for emergencies.

Standard operating procedures

No specific provisions for developing standard operating procedures (SOPs) were reported, although Tanzania has operating procedures to guide the daily operations of the emergency operation and communication centre;[22] Lesotho uses a manual that establishes certain responsibilities and procedures for disaster response; and similar manuals and procedures are in place in Comoros for the direction générale de la sécurité civile, Eswatini for a national disaster management agency, Malawi for the department of disaster management affairs, as well as in Namibia, and South Africa.

Contingency planning requirements

Some SADC Member States reported that they require telecommunication operators to develop and update contingency plans. Such is the case in Eswatini, which additionally requires all network operators in the county to have at least two mobile base stations for areas where towers/sites have been destroyed. That was also the case for Angola, as determined by the general

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18 General regulations of Electronic Communications and Presidential Decree 108/16 25th May.
19 Public Procurement Regulations of 2007.
20 Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000) – ICASA Act.
21 Communications Regulatory Authority Act, 2012.
22 More information at: https://www.pmo.go.tz/uploads/documents/en-1664371685-Standard%20Operating%20Procedure%20(SOPs)%20for%20Emergency%20Operation%20and%20Communication%20Center%20(EOCC).pdf

regulations of electronic communications,[23] and Mauritius, where all licensees are required to develop a national emergency and preparedness plan under the direction of ICTA.[24]

Other SADC Member States reported having general national contingency plans or plans to cover specific situations. Lesotho and Malawi, for instance, have general contingency plans that address the needs for all relevant sectors, including the telecommunication sector,[25] and Comoros has a national contingency plan to deal with the three main hazards that threaten the country.[26] Tanzania confirmed that contingency plans are being addressed through their draft NETP.

Emergency alert and early warning system (EWS) requirements (e.g., cell broadcast, SMS…)

Only two Member States reported having specific procedures or requirements for emergency alerts and early warnings: Angola, through the General Regulations of Electronic Communications, and Comoros, where there is a procedure under the Ministry of the Interior and the General Directorate of Civil Security, in collaboration with the electronic communications operators.

In Eswatini and Tanzania, these regulations are being addressed in their respective draft NETPs. Elsewhere, there are no regulations or procedures in place for emergency alerts and early warnings, but mechanisms have been established for the dissemination of relevant information:

- Lesotho: Bulk SMS, national TV and radio, private radios, and social media are used to disseminate early warning messages.
- Malawi: Mobile operators disseminate SMS in case of imminent disaster with relevant information provided by relevant authorities.
- Mozambique: Disaster risk management authorities are currently working on an emergency alert system that will be able to use SMS to alert people in affected regions.
- Namibia: Information is disseminated through national radio and TV broadcasts and by local telecommunication operators.
- Mauritius: The National Disaster Risk Reduction and Management Centre (NDRRMC) is working on a national multi-hazard emergency alert system (NMH-EAS), which includes common alerting protocol and cell broadcast technologies.
- Seychelles: Both mobile operators, Airtel Seychelles Ltd and Cable & Wireless (Seychelles) Ltd, will use SMS to alert people.
- South Africa: The South Africa weather service has an early warning system to alert stakeholders using e-mail, SMS and WhatsApp messages.
- Zambia: There is a system in place to alert the authorities in case of potential river floods.

Requirements for telecommunication and ICT providers (operators, broadcasters, etc.) to deliver general information to the public during emergency situations

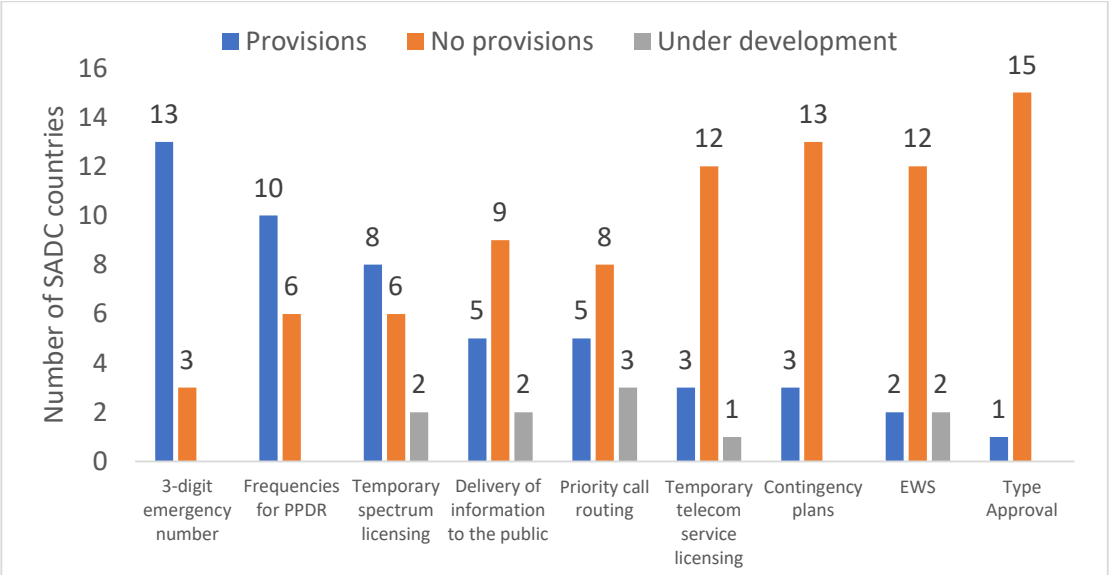
Five SADC Member States reported having regulations that establish the obligation for operators to provide or disseminate information to the public during emergencies: in Angola provisions are established in the general regulations of electronic communications; in Comoros, under the Ministry of the Interior, the General Directorate of Civil Security provides information in collaboration with electronic communications operators; in Namibia, operators are required to route emergency calls at no cost as set out in numbering regulations; in Tanzania, information dissemination is covered through the Electronic and Postal Communications (Radio and

[23] Presidential Decree 108/16 May 25
[24] More information at: https://www.icta.mu/licences-issued/
[25] National multi hazard contingency plan
[26] Plan de contingence national / Direction général de la sécurité civile

Television Broadcasting Content) Regulations 2018[27]; and in Zimbabwe, telecommunication operators must provide services for free during emergencies.

Other SADC Member States reported having no specific regulations in this regard, but some have established procedures when required. In Comoros, Malawi, and Mozambique, service providers disseminate information in coordination with the authorities when a disaster strikes, and in Lesotho, private radios are engaged when needed, and agreements are established with telecommunication operators to disseminate information. In addition, Eswatini and Seychelles reported that they are working on draft regulations in this area.

Figure 4: Emergency telecommunications and ICT regulations, by type



Source: SADC/ITU survey

Action item 3: Provisions for emergency telecommunications and ICTs

Based on the mandate of a high-level DRM law or policy, it is recommended that the regulatory agency responsible for developing emergency telecommunication/ICT regulations should make provisions for all phases of DRM (mitigation, preparedness, responses, and recovery) (see chapter 2).

[27] More information is available at: https://www.tcra.go.tz/uploads/documents/en-1619087946-The%20Electronic%20and%20Postal%20Communications%20(Radio%20and%20Television)%20Regulations,%202018.pdf

Table 2: SADC disaster management plans and emergency telecommunication regulations

SADC Member State	Is there a national plan for disaster risk management in the country?	Regulatory provisions established for emergency telecommunications
ANGOLA	Strategic disaster risk management plan[28]	• Temporary radio frequency spectrum licensing • Requirements to telecommunication/ICT providers to deliver information to the public • Radio frequencies for public protection and disaster relief • Contingency planning • Priority call routing • Early warning systems • 3-digit emergency number
BOTSWANA	National disaster risk management plan	• Temporary spectrum and telecommunications service licensing • 3-digit emergency number • Frequencies for public protection and disaster relief • Requirements to telecommunication/ICT providers to deliver information to the public
COMOROS	Plan de contingence national [29]	• Temporary spectrum licensing • Spectrum frequencies for public protection and disaster relief • Priority call routing • 3-digit emergency number • Emergency alert and early warning system requirements (e.g., cell broadcast, SMS…) • Requirements to telecommunication/ICT providers to deliver information to the public
DEMOCRATIC REPUBLIC OF THE CONGO	Disaster relief organization plan (ORSEC plan)[30]	
ESWATINI	National plan for disaster risk management, national multi-hazard contingency plan (MHCP) and disaster risk reduction (DRR) specific plan	• Contingency plan requirements • Radio frequency spectrum for public protection and disaster relief • 3-digit emergency number

[28] More information at: https://minint.gov.ao/ao/documentos/legislacao/pagina-3/
Source: Presidential Decree 130 of 23rd may.

[29] The latest version dates from 2021 – 2022. Source: National Contingency Plan/ General Directorate of Civil Security.

[30] Source: https://www.ifrc.org/docs/idrl/rdc%20plan.pdf

Table 2: SADC disaster management plans and emergency telecommunication regulations (continued)

SADC Member State	Is there a national plan for disaster risk management in the country?	Regulatory provisions established for emergency telecommunications
LESOTHO	National plan for disaster risk management	• 3-digit emergency number
MADAGASCAR	National disaster plan as well as a national policy	• 3-digit emergency number
MALAWI		• Different provisions under development in the draft NETP • Radio frequency spectrum for public protection and disaster relief • Temporary telecom service licensing • 3-digit emergency number
MAURITIUS	National disaster risk reduction and management action plan 2020-2030[31]	• 3-digit emergency number • Contingency plans for service operators • Priority call routing
MOZAMBIQUE	Contingency plan for disaster is managed by the disaster management institute (INGD)	• 3-digit emergency number
NAMIBIA	National disaster risk management plan	• No type approval required for temporary importation of telecom equipment • Temporary radio frequency spectrum licensing • Radio frequency spectrum for public protection and disaster relief • Requirements to telecommunication/ICT providers to deliver information to the public
SEYCHELLES	National integrated emergency management plan	• No type-approval required for temporary (3 months) importation of radio communication equipment to be used for emergency telecommunications • 3-digit emergency number
SOUTH AFRICA	National disaster management framework	• Radio frequency spectrum for public protection and disaster relief • 3-digit emergency number • Temporary radio frequency spectrum licensing • In general, the telecom authority (ICASA) may make regulations for emergencies

[31] Available at: https://ndrrmc.govmu.org/Pages/NDRRMActionPlan.aspx

Table 2: SADC disaster management plans and emergency telecommunication regulations (continued)

SADC Member State	Is there a national plan for disaster risk management in the country?	Regulatory provisions established for emergency telecommunications
TANZANIA	National disaster plan developed by the department of disaster management under the Prime Minister's Office[32]	• Temporary radio frequency spectrum licensing • Temporary telecommunication services licensing • 3-digit emergency number • Requirements for telecommunication/ICT providers to deliver information to the public • Radio frequency spectrum for public protection and disaster relief
ZAMBIA	National Plan 2015 – 2030	• Radio frequency spectrum for public protection and disaster relief • Priority call routing • Temporary radio frequency spectrum licensing
ZIMBABWE	National government-initiated disaster preparedness and mitigation plans	• Temporary radio frequency spectrum licensing • 3-digit emergency number • Requirements to telecommunication/ICT providers to deliver information to the public

Source: SADC-ITU survey

[32] More information available at: https://www.pmo.go.tz/uploads/documents/en-1664372341-Sera%20ya%20Taifa%20ya%20Menejimenti%20ya%20Maafa%202004%20(1).pdf

4 Organizational structure and relevant actors[33]

A wide range of stakeholders are involved in each phase of disaster management, and a well-defined coordination structure should involve all the relevant stakeholders at local, national, regional and international levels. There should also be a clear governance/coordination framework that allows for planning, executing, and revising the activities to be carried out. In order to facilitate the implementation of an effective plan or policy for emergency telecommunications, such as the NETP, these general DRM administrative and governance frameworks should be flexible and adaptable.

Regarding the administrative structure, the disaster management process usually takes place under the leadership of the national government or mandated agency, which defines the goals, roles, authorities, responsibilities, and procedures for all relevant stakeholders during each phase of disaster management. Furthermore, an accountable agency or committee under that leadership should be placed in charge of coordinating and defining the responsibilities of sector institutions and their counterparts at the regional, departmental, municipal, and local levels.

Moreover, horizontal cooperation between specialised services at each level of responsibility is as important as vertical organization (hierarchical). For disaster relief communications, it is vital to establish linkages between operation coordinators and telecommunication service providers within each level of the response hierarchy. This vital need for coordination also applies to international humanitarian assistance.

Consequently, it is important to assess the main actors, roles, coordination and leadership structure of each country's disaster management system, and the following section describes this based on information provided by the SADC Member States as well as the telecommunication sector.

4.1 General disaster management organization structure

In general, SADC Member States recognize the importance of having a national agency in charge of leading and making decisions for each phase of mitigation, preparation, response, and recovery of disaster management. A selection of the organizational structures and governance models based on the answers provided in the SADC-ITU survey are presented below:

- Botswana: The national disaster management office, under the Office of the President, has the responsibility to ensure a high state of disaster preparedness and capacity at the community, district, and national levels, as well as to ensure effective, appropriate and timely response to any disaster. The NDMO oversees public sector activities to ensure that all elements of disaster management are integrated with a national disaster risk management plan. The national committee on disaster management (NCDM) is the principal policy formulation and coordination body. It is a multi-sector technical advisory body composed of professionals and specialists from various development areas.
- Madagascar: The national office of risk and disaster management (*Bureau national de gestion des risques et des catastrophes* (BNGRC)) has been mandated to coordinate and implement the national strategy for risk and disaster management (*Stratégie nationale de gestion des risques et des catastrophes* (SNGRC)), and the management of funds for disaster management including the national contingency fund. The prevention and management of emergencies unit (cellule de prevention et de la gestion des urgences

[33] ITU. (2020). ITU Guidelines for national emergency telecommunication plans.

(CPGU)), on the other hand, is the permanent strategic body of the BNGRC and is responsible for providing sectoral technical support to risk and disaster reduction.[34]

- Malawi: The responsibility of managing and coordinating disasters in Malawi is held by the department of disaster management affairs, which oversees different sectoral activities at the national and regional levels.
- Seychelles: The national disaster risk management committee advises the government on all matters related to DRM in the Seychelles. The disaster risk management division has the role of establishing a national emergency operation centre and other regional centres for effective emergency coordination.
- Zambia: The national disaster management council includes sector ministers and is chaired by the Vice President. The disaster management system is comprised of a national disaster management technical committee that includes permanent secretaries from ministries. In addition, coordination is supported by a disaster management and mitigation unit under the office of the Vice President as well as provincial, district, and community–level disaster management committees.

Some SADC Member States also reported having organizational structures and governance models for DRM:

- Eswatini has a national disaster management agency that is responsible for coordinating disaster management issues in the country.
- Lesotho has a national disaster management agency, under the Office of the Prime Minister, that coordinates the DRM with six working groups with different functions.
- Tanzania, Mozambique, and Zimbabwe all have a disaster management system under their respective Office of the Prime Minister, with a national disaster management agency in charge of coordination and implementation through other relevant agencies, departments, or sector committees at both the national and regional levels.

4.2 Role of the minister in charge of telecommunications

Eswatini, Madagascar, Malawi, Tanzania, and Zimbabwe reported having defined disaster management and coordinating roles and responsibilities under the mandate of the minister in charge of telecommunications.

- Eswatini: The ministry of information, communications and technology (MICT) is responsible for leading the communications cluster during emergencies.
- Madagascar: The ministry of digital development, posts and telecommunications has the role of implementing the DRM framework, making agreements with mobile network operators (MNOs), ensuring connectivity during emergencies, managing a centralized online dashboard for receiving and sharing information regarding the emergency and the interventions made, participating in the realization of a mapping of existing teams and equipment, and facilitating emergency work in such areas as authorizations and importing of telecommunication/ICT equipment, and the capacity building of technical teams.
- Malawi: Ensuring that the telecommunications infrastructure is available and in a usable state for the public and emergency responders and managing any communications issues arising that require further policy guidance.
- Tanzania: Providing overall policy directives on the use of telecommunication/ICT in disaster management and coordinating the ratification of international treaties on telecommunication/ICTs for disaster management.
- Zimbabwe: Policy formulation and oversight of the communication provisions for disaster management.

[34] More information available at: https://www.primature.gov.mg/cpgu/

4.3 Role of the national regulatory authority for telecommunications

Some SADC Member States reported having established general disaster management and coordinating roles and functions through the national regulatory authority (NRA) for telecommunications:

- Angola: NRA provides necessary support for the operators.
- Botswana: Requires service providers to "give priority to the transmission of the messages of Government or of any person, and to intercept the messages transmitted under such circumstances".[35]
- Democratic Republic of the Congo: Grants licences/circumstantial authorizations; oversees spectrum management and allocation of emergency frequency bands; conducts evaluations and studies based on statistics of periods and cases of emergency.
- Eswatini: Eswatini Communications Commission (ESCCOM) is responsible for coordinating communication industry players during times of emergency.
- Madagascar: Regulatory Authority of Communications Technologies (ARTEC) allows for then facilitation of emergency work in ICT.
- Malawi: Ensures that a telecommunication infrastructure is available and usable for the public and emergency responders and manages communication issues that require regulatory guidance.
- South Africa: Develops regulations that ensure communications services are available to citizens during a state of disaster. During the COVID-19 pandemic, for instance, ICASA developed the ICT COVID–19 national disaster regulations to ensure that citizens receive communication services during a national state of disaster.
- Zimbabwe: The Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) is responsible for coordinating the provision of emergency services and assigning a radio frequency spectrum to operators.

The Tanzania Communications Regulatory Authority (TCRA) stands out as having established clear and specific roles and functions:

- Tanzania: TCRA must develop, implement, and regularly review the NETP involving all the main stakeholders at national, local, and community levels; establish clear lines of responsibility for the leadership when using ICTs for disaster risk management at the national level to ensure actions are implemented with accountability and predictability; ensure multiple ways of connecting (redundancy) to the emergency operation and communication centre to accommodate different technologies; develop and adopt a regulatory framework for emergency telecommunication purposes; and include provisions in the regulatory framework for the private sector to make available its telecommunication infrastructure, and services during all phases of disaster management so as to facilitate and disseminate vital information when needed.

4.4 National emergency cluster group

Only three of the 16 SADC Member States reported having established a national emergency telecommunication cluster group that represents key ICT contact persons:

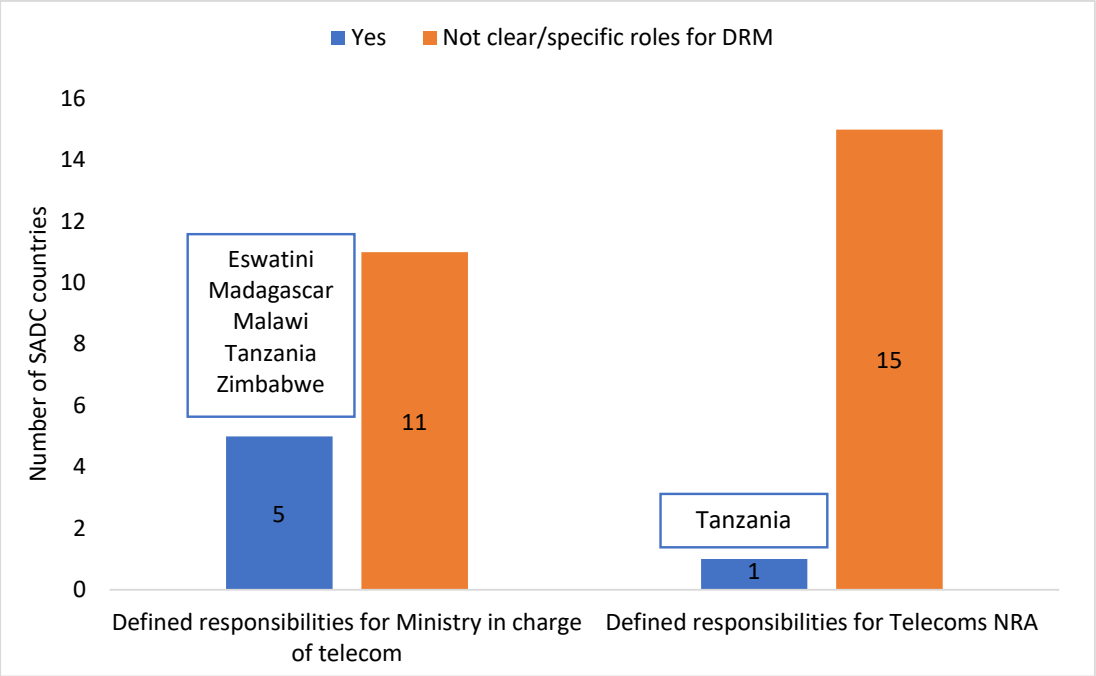
- Botswana: Established a communications or telecommunications sector computer incidence response team (CIRT), which deals with cybersecurity incidents and issues related to telecommunication equipment. It is comprised of telecommunication sector players and housed within BOCRA.

[35] https://www.bocra.org.bw/sites/default/files/documents/COMMUNICATIONS%20REGULATORY%20ACT%2C%202012.pdf Communications Regulatory Authority Act, 2012

- Eswatini: A telecommunication cluster exists and has been included in the draft NETP. The cluster is responsible for coordinating and collaborating during times of emergency on all issues related to telecommunications (spectrum, type approval, licensing, etc.).
- Mozambique: A national ICT working group was recently established to regularly discuss emergency preparedness and response actions.

Seychelles and the Tanzania reported that they are currently creating such a group.

Figure 5: Clearly defined roles for telecommunication ministry and regulator



Source: SADC – ITU Survey

Action item 4: Responsibilities of the ministry and regulator for telecommunications and ICTs

It is recommended that disaster management legislation in each SADC Member State should establish the responsibilities and activities of the ministry and NRA responsible for telecommunications and ICTs. These should include the specific roles that the ministry and national regulatory authorities must play within the general DRM system, and the roles and representation they have within the sector committees or sub-committees for DRM.

Each SADC Member State should establish or enhance communication mechanisms between the various public sector stakeholders (such as the ministry and regulatory authority responsible for telecommunications and ICTs, disaster management agency, customs etc.), and between the government and other actors during emergency situations. If possible, a dedicated communications network should be developed to facilitate communication between these actors.

The ministry and regulatory authorities responsible for telecommunications and ICTs in each SADC Member State should establish a directory of all key persons responsible for the NETP, including phone numbers and email addresses. This information will constitute the SADC emergency telecommunications directory and shall be kept up to date and shared with the

SADC disaster risk reduction unit for cross-border preparedness and response programmes for transboundary hazards and disasters.[36]

Table 3: Summary of organizational structures for DRM in SADC Member States

Member State	Communication mechanisms between government entities and other stakeholders during emergency situations	Ministry responsible for telecommunications and ICTs	Regulatory agency responsible for telecommunications and ICTs	National emergency telecommunication cluster group
ANGOLA			Provide necessary support for the operators	
BOTSWANA	The national disaster management office provides coordination of all disaster risk reduction activities	As empowered by the CRA Act of 2012	Botswana Communication Regulatory Authority (BOCRA) may, during any emergency, require service providers to give priority to the transmission of government messages or of any person, and to intercept messages transmitted under such circumstances.	The Comm-CIRT, is the telecommunication sector, computer incidence response team, whose constituents are telecommunication sector players. It is housed within the regulator BOCRA.
COMOROS		Ministère de l'intérieur	Autorité national de la régulation des TIC (ANRTIC)	
DEMOCRATIC REPUBLIC OF THE CONGO			Granting of licences/ circumstantial authorizations; frequency management and allocation of emergency frequency bands; conducting evaluations and studies based on statistics on the periods and cases of emergency.	
ESWATINI	Communication is mainly through voice calls, video calls, emails, WhatsApp messages, and SMS.	The MICT is responsible for leading the communications cluster during an emergency.	ESCCOM is responsible for coordinating the communication industry players during times of emergency.	The telecommunication cluster is responsible for coordinating and collaborating on all issues regarding telecommunication (spectrum, type approval, licensing, etc.) during times of emergency.
MADAGASCAR		Different activities and responsibilities established.	ARTEC allows facilitation of emergency work in ICT.	

[36] https://drmims.sadc.int/en

Table 3: Summary of organizational structures for DRM in SADC Member States (continued)

Member State	Communication mechanisms between government entities and other stakeholders during emergency situations	Ministry responsible for telecommunications and ICTs	Regulatory agency responsible for telecommunications and ICTs	National emergency telecommunication cluster group
MALAWI	Traditional means of communications, such as official letters, email, telephony, video conferencing, etc. are used.	Ensure that the telecommunications infrastructure is available and in usable state for the public and emergency responders and also manage any communications issues arising that require policy guidance.	Ensure that the telecommunications infrastructure is available and in a usable state for the public and emergency responders and also manage any communications issues arising that require regulatory guidance.	
MOZAMBIQUE	WhatsApp channel is one of the communication mechanisms used by stakeholders	Ministry of Transport and Communications of Mozambique	Instituto Nacional das Comunicações de Moçambique (Communications and Regulatory Authority of Mozambique (INCM))	Recently a national ICT working group was established to regularly discuss emergency preparedness and response actions. The WFP members of this group will represent all United Nations agencies, Instituto Nacional de Gestão e Redução do Risco de Desastres (INGD), INCM and other national stakeholders
SEYCHELLES	The use of radio, SMS, and e-mail	Vice President Office – Department of Information Communication Technology (DICT)	DICT Department of Information Communication Technology	Under development
SOUTH AFRICA			Develop regulations that ensure that communications services can still be available to citizens during the national state of disaster	

Table 3: Summary of organizational structures for DRM in SADC Member States (continued)

Member State	Communication mechanisms between government entities and other stakeholders during emergency situations	Ministry responsible for telecommunications and ICTs	Regulatory agency responsible for telecommunications and ICTs	National emergency telecommunication cluster group
TANZANIA	The draft document of a national emergency telecommunication plan has addressed the mechanism	Providing overall Policy directives on the use of telecommunication/ ICT for disaster management, and coordinate ratification of international treaties on the use of telecommunication/ICT in disaster management	Different activities and responsibilities are established	The draft document of the national emergency telecommunication plan has addressed the process
ZAMBIA	There are committees that are used as communication mechanisms			
ZIMBABWE		Has policy formulation and oversight role on communication provisions for disaster management.	Responsible for coordinating the provision of emergency services and assigning a radio frequency spectrum to operators. At times, the regulator provides fuel to operators to facilitate disaster relief.	

Source: SADC – ITU Survey

5 International cooperation[37]

International cooperation and coordination can facilitate the provision and development of mechanisms and tools used during and after emergency events. This is especially significant for developing countries, where greater technical and humanitarian assistance may be required.

The Tampere Convention is designed to facilitate the use of telecommunication resources for disaster mitigation and relief by establishing a framework for international cooperation for States, non-governmental entities, and inter-governmental organizations. This framework, when applied in conjunction with nationally developed procedures and bilateral and multilateral agreements, reduces regulatory barriers and gives key protections to personnel providing telecommunication support, and at the same time respecting the national interests of the country receiving assistance. To promote the use of telecommunication and ICTs by emergency teams, the Tampere Convention recognizes that it is necessary to abstain temporarily from the application of national legislation on imports and telecommunication service licensing. The Convention also guarantees legal immunity to personnel who use emergency ICTs during catastrophes. These temporarily exemptions and immunity are important considering that, in many countries, legislation continues to hinder, or even prohibit, (e.g., by applying restrictive laws to imports, organizational barriers, or high costs) the arrival and timely installation of communication equipment in affected territories.

Along with the Tampere Convention, other mechanisms can also provide useful resources or support to SADC Member States for successful disaster management, such as bilateral or multilateral agreements, as well as implementing cooperation and coordination provided by international organizations that includes ITU, the Emergency Telecommunications Cluster (ETC) and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).

The following section presents international agreements that are currently in place for the SADC Member States in relation to emergency telecommunications ICTs and other related matters.

5.1 Treaties and international cooperation agreements

Although South Africa is the only SADC Member State that is a member of the International Charter Space and Major Disasters,[38] which allows access to satellite information for large scale national disasters, disaster management authorities may be granted with a user access to receive satellite data via a request for activation. Comoros, Eswatini, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Zambia and Zimbabwe have benefited from this satellite data. Membership is based on the understanding that there are country-based competencies available for the geo-processing of the data, and that this data is used only for the monitoring of disaster response features and cannot be sold.[39]

The African Risk Capacity (ARC) Group[40] was established in 2012 as a Specialised Agency of the African Union (AU) to assist governments in Africa to better plan, prepare, and respond to extreme weather events and natural disasters. Through collaboration and innovative financing,

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37 ITU. (2020). ITU Guidelines for National Emergency Telecommunication Plans.

38 More information at: https://disasterscharter.org/web/guest/home;jsessionid=2710A7DC3DBBB8B6869BA86499492330.APP1

39 More information available at: ITU-D Working Group – Emergency Communications, ITU-R Working Parties (WP-5A, 5C and 5D) and ITU_T SG2 and https://disasterscharter.org

40 More information available at: https://www.arc.int/

ARC enables countries to strengthen their disaster risk management systems and access rapid and predictable financing when disaster strikes to protect the food security and livelihoods of their vulnerable populations. Countries formalise their engagement with the ARC by signing a memorandum of understanding (MoU).[41] SADC Member States that are members of ARC include Comoros, Lesotho, Madagascar, Malawi, Mozambique, Zambia, and Zimbabwe. ARC provides its membership with resources such as the Africa RiskView Software Suite as well as training for the use of tools to monitor seasons and estimate the impact of disaster events in terms of numbers of people affected and the associated response costs.

5.2 The Tampere Convention

According to the United Nations Treaty Collection,[42] of the SADC Member States only Madagascar has signed the Tampere Convention although Eswatini and Mauritius are in the process of ratification, and its provisions are included in the draft NETP in Eswatini. The Malawi Communications Regulatory Authority (MACRA) has been coordinating with the department of disaster management affairs on aspects related to ratification of the Convention, which is currently pursuing the matter with the Ministry of Justice. Also, according to responses to the survey, the planned revision of the Malawi Communications Act will consider the Tampere Convention as well as stakeholders in immigration and customs for this process.

5.3 International cooperation

Regarding current cooperation projects with UN agencies and other international players on emergency telecommunications, such as ETC, United Nations Office for Disaster Risk Reduction (UNDRR), World Bank, and the International Federation of Red Cross and Red Crescent Societies (IFCR), only Madagascar and Malawi reported currently working on such projects. Madagascar is working with the World Bank to connect all municipalities using a 3G network. In Malawi, the department of disaster management affairs reported it is working with the World Food Programme (WFP) as the lead for the ETC.

5.4 Entry process for experts and equipment

None of the SADC Member States provided information on having expedited processes established in advance for the entry of experts or telecommunication equipment during times of disaster. Nonetheless, some reported that they had mechanisms for this entry, such as Madagascar, where the import process relies on verbal communication and adoption by the Council of Ministers. In Comoros, where even though there is no legal framework for expedited processes, there are some general provisions in place at the customs level to facilitate the dispatch of emergency products.

To avoid delays in the entry of emergency telecommunication equipment into the country, there is a need to create awareness and streamline customs and shipment protocols to expedite shipment of power supplies made from Lithium batteries.

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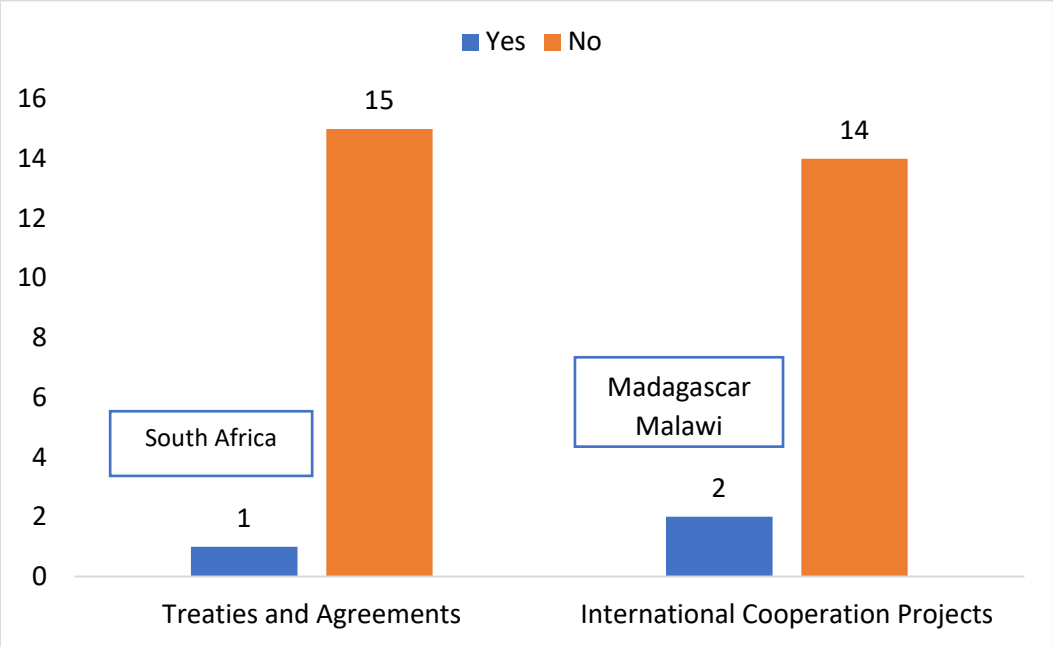
41 More information available at: https://www.arc.int/country-mous

42 Available at: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXV-4&chapter=25&clang=_en

Figure 6: International cooperation agreements or projects for emergency telecommunications



Source: SADC-ITU survey

Action item 57: The Tampere Convention and coordination with international agencies

It is recommended that the ministry and regulatory authority responsible for telecommunications and ICTs of each Member State, as well as other relevant agencies such as the ministry of foreign affairs and the customs authority take the necessary steps for the ratification of the Tampere Convention and, subsequently, make the necessary legislative and regulatory adjustments for its effective implementation.

The regulatory authority should also establish specific regulations for the effective implementation of the Tampere Convention, as well as coordinate and collaborate with international agencies, such as the Emergency Telecommunications Cluster (ETC) and International Telecommunication Union (ITU) on issues of preparedness and response to eventual disasters or emergencies is imperative and must continue to be strengthened. This process will avoid duplication and overlapping of efforts.

Table 4: International cooperation for disaster management

Member State	Name and briefly describe the treaties and international cooperation agreements signed by the country that relate to emergency telecommunications	Is the Tampere Convention signed/ratified by the country?	Are the Tampere Convention provisions included in the national legislation or regulations?	Name and describe current cooperation projects with UN agencies and other international players for emergency telecommunications	Have expedited processes been established in advance for the entry of experts or telecom equipment in times of disaster?
COMOROS					General provisions in place at the customs level to facilitate the dispatch of emergency products
ESWATINI		Convention is currently in the process of ratification	Provisions are included in a draft NETP		This provision has been allocated in the draft NETP
MADAGASCAR		Signed on 12 September, 2002		Project in collaboration with the World Bank to connect all the municipalities using a 3G network	Verbal communication and adoption by the Council of Ministers
MALAWI		The convention is currently in the process for ratification	The review of the Communications Act will take Tampere Convention on board	The department of disaster management affairs works together with the World Food Programme as the lead for the telecommunication cluster	
SOUTH AFRICA	International Charter Space and Major Disasters: allows for member states to gain access to satellite information for large scale national disasters				

Source: SADC – ITU survey

6 Mitigation phase

The SADC Member States are prone to many natural disaster risks, including floods, droughts, tropical cyclones, epidemics, fires, landslides, earthquakes, and volcanic eruptions. Most of these disasters are epidemics or weather–related, and they could become more common and severe due to climate change.

6.1 Vulnerability to disasters from natural hazards

According EM-DAT, the SADC Member States have suffered 1 026 disasters caused by natural hazards since 1903, with flooding being the most frequent (365 events), mostly as a consequence of overflowing of large river basins like the Zambezi and Limpopo as well as heavy rains or tropical cyclones. Other hazards that affect the region more frequently include epidemics (264), storms (202) and droughts (119) as well as earthquakes, landslides, wildfires and to a lesser extent, insect infestations and extreme temperatures. The Democratic Republic of the Congo has the greatest number of disaster events (147), followed by Mozambique (124), South Africa (121), and Tanzania (117).

Table 5: Number of disaster events in the SADC Member States 1903-2023*

Member State	Drought	Earth-quake	Epi-demic	Extreme tempera-ture	Flood	Insect infesta-tion	Land-slide	Storm	Volcanic activity	Wildfire	Total
Angola	9		19		45		1				74
Botswana	7		3		11	1		1			23
Comoros	1	1	6		2			9	6		25
Demo-cratic Republic of the Congo	3	5	80		39		8	5	4	3	147
Eswatini	7		3		3			5		1	19
Lesotho	9		3		5			7			24
Madagas-car	10		8		11	2		68			99
Malawi	9	3	17		43		1	6			79
Mauritius	1		2		1			19			23
Mozam-bique	15	1	29		44	1	2	31		1	124
Namibia	9		7		17						33
Seych-elles		1	2		2			2			7
South Africa	12	5	7	3	51		1	32		10	121
Tanzania	11	7	34		53	3	1	7		1	117

Table 5: Number of disaster events in the SADC Member States 1903-2023* (continued)

Member State	Drought	Earth-quake	Epi-demic	Extreme tempera-ture	Flood	Insect infesta-tion	Land-slide	Storm	Volcanic activity	Wildfire	Total
Zambia	7		20		25	2	1				55
Zimba-bwe	9		24		13			10			56
Total	**119**	**23**	**264**	**3**	**365**	**9**	**15**	**202**	**10**	**16**	**1 026**

* Covid-19 pandemic not included.

Source: The Emergency Events Database EM-DAT: www.emdat.be

Drought is by far the greatest challenge, causing more than 100 000 deaths, followed by epidemics (49 000), and floods (9 000). Of the 167 373 deaths caused by disasters in the SADC region, more than 60 per cent occurred in Mozambique, with the loss nearly 100 000 lives as a consequence of the 1981 drought through the impact on food production and subsequent related diseases and lack of medicines.[43]

Table 6: Number of deaths by type of disaster 1903-2023*

Member State	Drought	Earth-quake	Epi-demic	Extreme temperature	Flood	Insect infesta-tion	Land-slide	Storm	Volcanic activity	Wild-fire	Total
Angola	58		5 087		825		13				5 983
Botswana			655		43						698
Comoros			86		6			567	19		678
Democratic Republic of the Congo		53	16 408		962		434	49	379	11	18 296
Eswatini	500		142		11			54		2	709
Lesotho			56		66			1			123
Madagascar	200		1 992		162			3 086			5 440
Malawi	500	13	2 677		1 010		8	100			4 308
Mauritius					11			72			83
Mozam-bique	100 068	4	3 081		2 494		104	1 487		49	107 287
Namibia			291		264						555
Seychelles		3			5						8
South Africa		37	336	63	2 003		34	336		137	2 946
Tanzania		36	9 493		887		13	51			10 480
Zambia			1 335		81		9				1 425

[43] Additional information ca be found at: https://reliefweb.int/report/mozambique/mozambique-droughtfloods-mar-1982-undro-situation-reports-1-10

Table 6: Number of deaths by type of disaster 1903-2023* (continued)

Member State	Drought	Earth-quake	Epi-demic	Extreme temperature	Flood	Insect infesta-tion	Land-slide	Storm	Volcanic activity	Wild-fire	Total
Zimbabwe			7 099		313			942			8 354
Total	**101 326**	**146**	**48 738**	**63**	**9 143**		**615**	**6 745**	**398**	**199**	**167 373**

* Covid-19 pandemic not included.
Source: The Emergency Events Database EM-DAT: www.emdat.be

Of the 15 most deadly disasters caused by natural hazards in the SADC region, ten were caused by epidemics, mainly cholera outbreaks, in the 1990s in Angola, Democratic Republic of the Congo, Mozambique, United Republic of Tanzania, and Zimbabwe. Other major disasters have been weather-related, particularly floods in Mozambique and South Africa and storms in Comoros.

Table 7: Most deadly disasters in SADC Member States*

Year	Disaster Subgroup	Disaster Type	Disaster Subtype	Event Name	Country	Region	Total Deaths	Total Affected
1981	Climatolog-ical	Drought	Drought		Mozam-bique	South, Central, Maputo, Gaza, Inhambane, Manica, Sofala, Zambezi	100 000	4 750 000
1997	Biological	Epidemic	Bacterial disease	Cholera	Tanzania	Dar es Salaam, Zanzibar	2 025	35 591
1998	Biological	Epidemic	Bacterial disease	Cholera	Tanzania		1 871	35 824
1996	Biological	Epidemic	Parasitic disease		Zimbabwe		1 311	500 000
1989	Biological	Epidemic	Bacterial disease	Cholera	Angola	Luanda, Benguela	766	15 525
1998	Biological	Epidemic	Bacterial disease	Cholera	Demo-cratic Republic of the Congo	Bunia (Oriental province) and Bukavu (Sud-Kivu province)	746	9 605
1997	Biological	Epidemic	Bacterial disease	Cholera	Mozam-bique	Maputo City, Maputo, Gaza, Inhambane, Manica, Sofala, Tete, Zambezia provinces	619	26 783
1998	Biological	Epidemic	Parasitic disease		Tanzania	Sumbawanga district	590	4 853
1990	Biological	Epidemic	Bacterial disease	Cholera	Mozam-bique	Northwestern	588	4 000
1992	Biological	Epidemic	Bacterial disease	Cholera	Mozam-bique		587	225 673
1987	Hydrological	Flood	Riverine flood		South Africa	Natal, Kwazulu	506	65 000
1951	Meteorolog-ical	Storm	Convec-tive storm (Tornado)		Comoros		500	

Table 7: Most deadly disasters in SADC Member States* (continued)

Year	Disaster Subgroup	Disaster Type	Disaster Subtype	Event Name	Country	Region	Total Deaths	Total Affected
1971	Hydrological	Flood	Riverine flood		Mozam-bique		500	500 000
1977	Biological	Epidemic	Bacterial disease	Cholera	Tanzania	Widespread	500	6 000

* Covid-19 pandemic not included.

Source: The Emergency Events Database EM-DAT: www.emdat.be

The number of people injured through epidemics stands out, with more than 280 000 of about 311 000 total affected people in the SADC Member States since 1903. Madagascar, in particular, has the most injuries (112 434), followed by Tanzania (79 243) and Democratic Republic of the Congo (43 494).

Table 8: Number of injured people by type of disaster 1903-2023*

Member State	Drought	Earth-quake	Epidemic	Extreme tempera-ture	Flood	Insect infesta-tion	Land slide	Storm	Volcanic activity	Wild-fire	Total
Angola			4 599		49						4 648
Botswana					7						7
Comoros					150			232			382
Democratic Republic of the Congo		696	37 814		1 917		17	2 650	400		43 494
Eswatini											
Lesotho								1			1
Madagas-car			101 459		19			10 956			112 434
Malawi		286	30 688		1 503		9	265			32 751
Mauritius					82			1 914			1 996
Mozam-bique		36	10 494		258			4 449		23	15 260
Namibia			518								518
Seychelles			253		2						255
South Africa		112		20	424			1 404		530	2 490
Tanzania		446	78 377		301			119			79 243
Zambia			4 489		913						5 402
Zimbabwe			11 726		2			314			12 042
Total		**1 576**	**280 417**	**20**	**5 627**		**26**	**22 304**	**400**	**553**	**310 923**

* Covid-19 pandemic not included.

Source: The Emergency Events Database EM-DAT: www.emdat.be

In the last ten years, the SADC region has endured 273 disasters caused by natural hazards, which have resulted in 16 313 deaths, 253 443 injured, and impacted the lives of 101 323 068 people, with the Democratic Republic of the Congo recording 8 000 deaths, and Madagascar, Malawi, Mozambique and Zimbabwe all recording more than 1 000 deaths.

Table 9: Natural hazards in SADC Member States (2013–2023)*

Member State	# Events	# Deaths	# Injured	# Affected
Angola	21	728	4 601	3 164 260
Botswana	5	12		49 685
Comoros	4	8	180	364 822
Democratic Republic of the Congo	39	7 897	38 856	27 656 783
Eswatini	5	11		725 458
Lesotho	5			1 913 150
Madagascar	32	1 032	108 171	5 932 747
Malawi	22	1 525	32 456	12 239 335
Mauritius	4	13	82	32 721
Mozambique	32	1 423	12 963	12 850 892
Namibia	9	17	518	1 937 111
Seychelles	3		253	7 688
South Africa	33	861	141	15 684 199
Tanzania	28	835	38 691	3 041 454
Zambia	13	101	4 489	3 940 251
Zimbabwe	18	1 850	12 042	11 782 512
Total	**273**	**16 313**	**253 443**	**101 323 068**

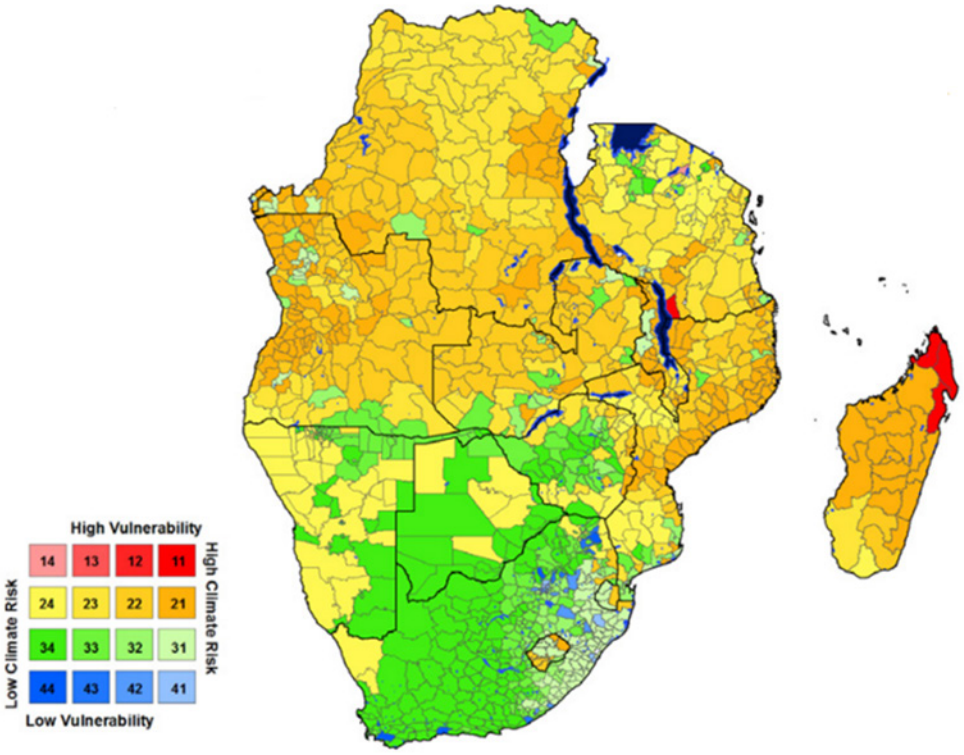
* Covid-19 pandemic not included.
Source: The Emergency Events Database EM-DAT: www.emdat.be

6.2 Maps and vulnerabilities

As part of a broad approach to produce documents and an associated foresight framework to help SADC countries implement an innovative strategic planning and policy for climate

resilience, the SADC Futures Project[44] developed a climate risk assessment for the region in 2020. The project created maps to identify the most vulnerable areas regarding the potential effects of extreme rainfall and drought in the SADC region for the 2031–2059 period. These maps were constructed by developing a vulnerability index based on different social and biophysical indicators (with data from the global multidimensional poverty index), as well as using regional climate models from CORDEX-Africa. By mapping the vulnerability index with the distribution of climate hazards, the most vulnerable areas were identified.[45]

Figure 7: Hotspots of vulnerability and risk of extreme rainfall (by district)*



Note: The designations employed and presentation of material in this publication, including maps, do not imply the expression of any opinion whatsoever on the part of ITU concerning the legal status of any country, territory, city or area, or concerning the delimitations of its frontiers or boundaries.

* In this map, vulnerability is represented from high (red), medium high (orange), medium low (green) and low (blue), while climate hazards are represented by colour shading from high (darker) to low (lighter) risk. The first number within each matrix colour represents the normalized and rounded mean vulnerability value for the district, with the second number representing the rounded climate hazard value (i.e. 34 equates to 'medium low vulnerability', 'low climate hazard).

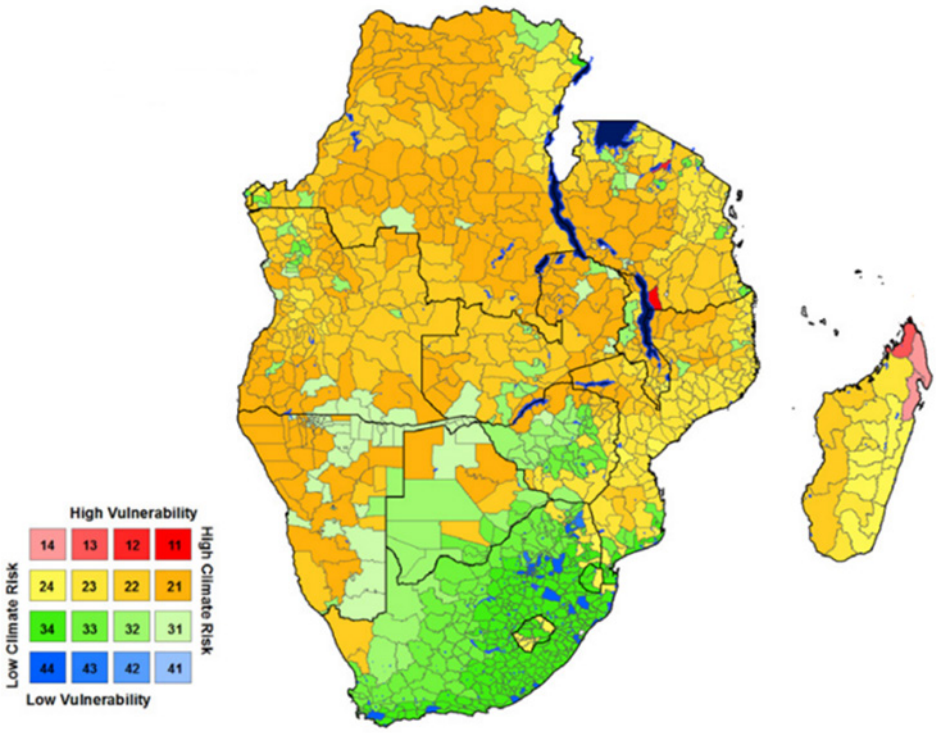
Source: Quinn, C. *et al* (2020) Rapid climate risk assessment for the SADC region

[44] The SADC Futures Project is a joint initiative of the SADC Secretariat' Food, Agriculture and Natural Resources (FANR) Directorate, the Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA), the International Livestock Research Institute (ILRI) through the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and German Development Cooperation facilitated through the SADC / Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH 'Adaptation to Climate Change in Rural Areas' program (ACCRA), funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).

[45] Quinn C, Carrie R, Chapman S, Jennings S, Jensen P, Smith H and Whitfield S. 2020. Rapid climate risk assessment for the SADC Region. SADC Futures: Developing Foresight Capacity for Climate Resilient Agricultural Development Knowledge Series. CCAFS Report. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

The map in Figure 8 indicates few hotspots of high rainfall and high vulnerability (red colour), along the northern coast of Madagascar (particularly Antsiranana and Toamasina) and along the coast of Lake Nyasha/Malawi (particularly the east coast around Ruvuma in Tanzania). Potential hotspots can be identified along the eastern border of the Democratic Republic of the Congo and the coasts of Angola and Mozambique.[46]

Figure 8: Hotspots of vulnerability and risk of extreme drought (by district)



Note: The designations employed and presentation of material in this publication, including maps, do not imply the expression of any opinion whatsoever on the part of ITU concerning the legal status of any country, territory, city or area, or concerning the delimitations of its frontiers or boundaries.

Source: Quinn, C. *et al* (2020) Rapid climate risk assessment for the SADC region

In the case of extreme drought, potential hotspots with medium-high vulnerability were identified along Lake Nyasha/Malawi; while a high drought risk was identified across extensive areas of Namibia, northern Zambia, inland Tanzania, and across large areas of the Democratic Republic of the Congo. Apart from these examples of vulnerability maps, other maps can be developed for each country and for each hazard. These maps should be updated and made available to relevant agencies involved in DRM, including telecommunication operators.[47]

[46] Quinn, C. et al (2020) Rapid climate risk assessment for the SADC region

[47] Other vulnerability maps for some specific SADC countries can be found at: https://publications.iom.int/fr/system/files/pdf/spaces_of_vulnerability.pdf

Action item 65: Updated vulnerability maps

It is recommended that each SADC Member State should maintain updated vulnerability maps in the NETP for the different types of hazards and especially those related to droughts, floods, and epidemics. This Information must be detailed at the municipal level and should be available to telecommunication/ICT operators. These should also include information on the most vulnerable communities, specifying the types of hazard they are prone to as well as the communication resources available. This vulnerability analysis should also include precise coverage maps of the telecommunication/ICT networks.

6.3 Dedicated emergency telecommunications

Telecommunication facilities are essential for the management of operations before, during, and after emergency events. The speed and effectiveness of an emergency response depends on the availability and reliability of communications services whenever needed, including the rapid deployment of temporary capacity/services in priority areas.[48]

It is essential that SADC Member States maintain a map of the risks and vulnerabilities of their telecommunication and ICT networks relevant to different types of disaster and what communications operators need to enable the continued operation or restoration of networks. This should include standardized disaster reporting to identify regions where service has been lost that will enable carriers to carry out contingency plans to reestablish service as soon as possible in the event of a disaster[49].

Eight SADC Member States reported having dedicated networks including radio frequency networks (VHF or HF) for emergency risk management and two reported that these networks are not operational:

- Angola: There is a dedicated network, but only for the use of national defence and military entities.
- Comoros: Use of HF, VHF and UHF radio networks, and operator network infrastructure;
- Lesotho: Geographic information system (GIS) technology is used in all phases of the DRM cycle, as it incorporates data from remote sensing satellites as well as from surveys.
- Madagascar: Use of radio, television, and a truck equipped with ICT, single-sideband modulation, and social networks.
- Malawi: A VHF radio system for the department of disaster management affairs, although not currently operational, is located in the capital city only. No satellite and HF radio networks are in place.
- Mozambique: RF radio network system (VHF and HF), as well as very small aperture terminal (VSAT) services that are activated as a backup during emergencies.
- Seychelles: The emergency system exists, but it is not operational.
- South Africa: Emergency services, such as police, army, medical and other smaller entities, have an exclusive radio frequency network for different uses.
- Tanzania: The disaster management department manages the use of VHF and HF radio networks for disaster service.[50]
- Zimbabwe: 24 mobile satellite units are available.

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48 ITU (2020). ITU Guidelines for national emergency telecommunication plans.

49 Idem.

50 More information at: https://www.pmo.go.tz/uploads/documents/sw-1663942930-Mwongozo%20wa%20Uendeshaji%20wa%20Kituo%20cha%20Operesheni%20na%20Mawasiliano%20ya%20Dharura.pdf

6.4 Telecommunication sector services

Together with a dedicated telecommunication infrastructure, disaster management processes also require the use of every available means of communication to maintain a continuous and timely flow of information between all stakeholders, including the general public. This section gives a brief description of the telecommunication sector according to the survey responses.

Mobile services

The number of mobile network operators varies in SADC Member States, ranging from only two in Eswatini and Seychelles, to three in Botswana, Comoros, Madagascar, Malawi, Mauritius, Mozambique and Zimbabwe, four in Tanzania and five and Zambia.

Mobile service coverage (at least 3G) also ranges from 95 to 100 per cent in South Africa and Tanzania, to around 59 to 66 per cent in Comoros, Democratic Republic of the Congo, Madagascar and Malawi. Coverage of 4G technology reaches only 29 per cent in Madagascar, 45 per cent in Tanzania, but up to 98 per cent in South Africa. In South Africa, 7.5 per cent of the population is covered by 5G mobile technology.

Similarly, mobile penetration rates range from 22 to 40 per cent in Democratic Republic of the Congo, Madagascar and Malawi for data services, and from 41 per cent in Malawi, and 99 per cent in Zambia for voice services only.

Fixed services

Botswana, Eswatini, Madagascar, Mozambique and Namibia reported having only one operator of fixed services, while Malawi, Mauritius and Tanzania have two, Seychelles has four and Zimbabwe has seven.

Differences in fixed-Internet penetration also exist. Some SADC Member States have a relatively high number of subscriptions relative to their population, such as Madagascar with 33 per cent, and others with a low or very low penetration, such as the Democratic Republic of the Congo, with only 0.0041 per cent fixed-Internet penetration, United Republic Tanzania, with about 0.14 per cent, and Namibia, where there are only 86 500 subscriptions.

Satellite services

For satellite services, only Angola reports having a geostationary satellite orbit (GSO) service provided by INFRASAT, and having launched ANGOSAT-2 in October 2022, under its National Space Program Management Office (GGPEN). No other SADC Member States have state-owned GSO satellite networks, although private providers offer satellite services and coverage. In Mozambique, satellite services provide connectivity during the response phase of DRM. There are also satellite phones available to some institutions and agencies to use during the response to disasters.

National backbone

In general, SADC Member States reported having fibre-optic backbone networks, and in most cases, it is deployed and/or operated by the main telecommunication operators. This is the situation in the following SADC Member States:

- Angola: Backbone of fibre-optic networks, with over 22 000 km; submarine cables within the scope of the SACS, WACS, and Monet projects, as well as microwave links.

- Botswana: BoFiNet, a government-owned company operates as a wholesale provider of national and international telecommunication infrastructure. It has deployed a combined national fibre-optic backbone network infrastructure in excess of 10 600 km, connecting major towns and villages to a high-speed open access network infrastructure.
- Comoros: A fibre-optic backbone network exists on each island (Intra-Island) and a backbone linking each island.
- Madagascar: Deployed in 2021, the Telma backbone has 10 000 km of optical fibre.
- Malawi: Operators Airtel, TNM, OCL and SimbaNet have national fibre-optic backbone networks and microwave links.
- Mozambique: The operator, Tmcel, provides a national fibre-optic backbone network.
- Namibia: Telecom Namibia provides the majority of the backbone infrastructure, with NamPower and Paratus also providing these services.
- South Africa: There is a core national dark fibre backbone with several managed bandwidth backbone links at 100 Gbit/s (in progress), as well as backbone extensions (regional links) – typically at 10 Gbit/s and back-hauling from the submarine cable landing stations at Yzerfontein and Mtunzini, capacity on five undersea cables, and several metropolitan area networks.
- Tanzania: The national information communication technology broadband backbone has around 8 319 km of optical fibre.
- Zambia: There are currently seven operators with fibre-optic backbone networks, including the three mobile network operators, where 83 out of 116 districts have fibre-optic backbone points of presence, while 11 districts have transit fibre-optic backbones despite not having points of presence. A total of 22 districts across the country have neither transit fibre-optic backbone nor points of presence. According to the information provided, 18 fibre-optic backbone links that stretch 1 685 km are required to cover the remaining districts that do not have access.
- Zimbabwe: There is a self-healing fibre backbone network supported by microwave links.

International connectivity

In addition to VSAT services, connections via submarine cables exist for:

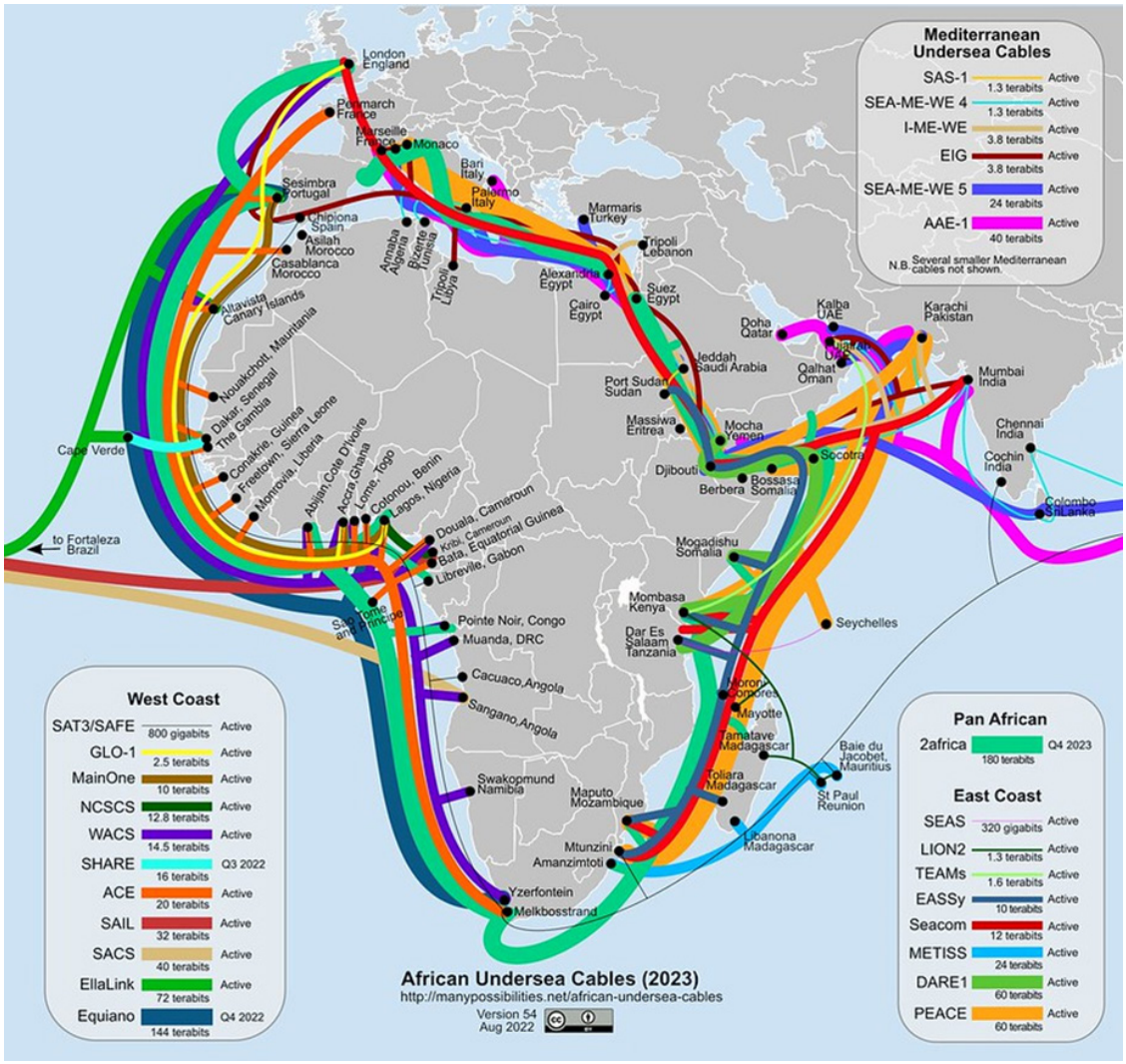
- Angola: The operator, Angola Cables, part of Angola Telecom, operates the submarine cables project.
- Botswana: Connects through the EASSy and WACS cables, with capacity entitlements of 206 Gbit/s and 205 Gbit/s, respectively;
- Comoros: International submarine connections via the Eassy cable, the AVASSA cable, and the Lion 3 fly cable. There is also a connection via a terrestrial microwave link used by a single ICT operator.
- Democratic Republic of the Congo: WACS and ACE cables.
- Madagascar: Submarine cables Eassy, Lion, Metiss, and 2Africa (under development).
- Mauritius: SAFE, LIONS and METISS.
- Namibia: Connected to the WACS cable and the Equiano cable.
- Seychelles: Connected to three submarine cables – Seychelles East Africa Submarine (SEAS) cable, Pakistan East Africa Cable Express (PEACE) and 2Africa submarine cable.
- South Africa: Four undersea fibre-optic cable systems, owned by a consortium of companies, and ranging from a relatively small number of stakeholders to large shareholders.
- Tanzania: Three international submarine cables with connection points to the country.
- Mozambique: SEACOM and EASSy.

Figure 9 depicts the cables with landing points in some of the SADC Member States.

Other services

Other services in most of the countries surveyed include national, regional and community-wide coverage by public and private TV and radio broadcasting operators. Cable TV is available in the Seychelles and its coverage is worth noting in their NETP. Some SADC Member States have amateur radio and high frequency radio maritime communication networks to reach outer islands. These telecommunication networks can also play a vital role in supporting emergency telecommunications.

Figure 9: International submarine cables with links



Note: The designations employed and presentation of material in this publication, including maps, do not imply the expression of any opinion whatsoever on the part of ITU concerning the legal status of any country, territory, city or area, or concerning the delimitations of its frontiers or boundaries.

Source: https://manypossibilities.net/african-undersea-cables/

A 3-Digit emergency number

None of the SADC Member States have established a single 3-digit single number for emergencies; nonetheless, all reported having different 3-digit numbers for various first responders (e.g. police, fire department, etc.).

ICT capacity assessment and inventory map of telecommunication infrastructure and networks

Only Zambia reported having a gap analysis of key ICT infrastructure. This analysis, which focuses on the mobile phone infrastructure as well as backbone fibre infrastructure, was developed by Zambia Information and Communications Technology Authority (ZICTA) in 2022. It assessed both geographical and population coverage.

The remaining SADC Member States that reported information have some data or information but do not have an up-to-date assessment of ICT capacity or an inventory map. That is the case for Madagascar, Namibia and Tanzania, for example, where the regulatory authority for telecommunications has an inventory or a map for telecommunication infrastructure. Zimbabwe has network coverage maps and an annual network rollout status for every licensed operator. The Democratic Republic of the Congo has a map of population coverage for 2G, 3G, 4G mobile networks and a national fibre-optic infrastructure deployment map[51] and in Eswatini, each network operator has its own maps.

According to the information provided, Seychelles is currently in the process of producing such an assessment.

Risk assessments and maps

In terms of risk assessment maps that show location and type of hazards to which the country is vulnerable, five SADC Member States reported having them, at least for some hazards or regions:

- Comoros: The general directorate of civil security has maps for vulnerable areas.
- Eswatini: The national disaster management agency adopted risk profiles developed with the support of the United Nations International Strategy for Disaster Reduction (UNISDR) for floods and droughts and is currently developing risk profiles for urban areas and municipalities.
- Malawi: The department of water resources and surveys has risk assessment maps.
- South Africa: Priority hazard risk assessments have been completed since 2014.
- Tanzania: The map is provided by the disaster management department, under the Prime Minister's Office.

Channels of communication

In terms of channels used to ensure that information gets to those affected quickly and effectively, most SADC Member States reported that they are broadcasting on national radio and television, as well as SMS and social media (e.g., WhatsApp) or print media to alert the public.

Backup or diverse/redundant means of communication

In case of outages, some SADC Member States reported having procedures or backup communications plans that maintain the information flow between relevant agencies of the emergency management system:

- Angola: There are different means of communication in place under the emergency authorities.

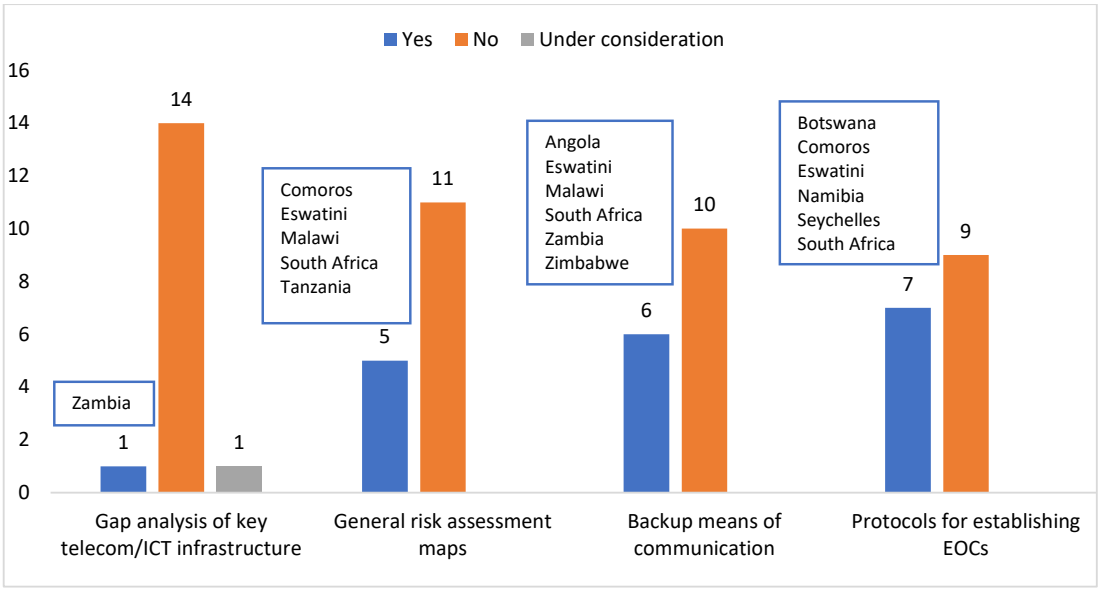
[51] Post and Telecommunications Authority of Congo: ARPTC. https://arptc.gouv.cd National Digital Plan, Horizon 2025: https://www.numerique.cd/pnn/pnn/Plan_National_du_Numérique_HORIZON_2025.pdf

- Eswatini: The draft NETP will require all emergency responders to set up redundancy communications, although partially in place in some emergency agencies.
- Malawi: Emergency management agencies depend on mobile networks and satellite phones in case of emergencies. Malawi reported a need, however, to have a dedicated emergency network for all emergency agencies during disasters including radio (VHF, HF), satellite terminals and fixed and mobile VSATs.
- South Africa: The national disaster management centre has a disaster response plan with a data backup strategy.
- Zambia: Radio (VHF) land mobile communication systems are installed in provincial centres.
- Zimbabwe: The department of civil protection runs a number of satellite phones that are distributed among the disaster-prone areas across the country.

Protocols for establishing emergency operation centres

Some SADC Member States reported having protocols or procedures in place to establish emergency operation centres or communication and coordination command posts in case of disasters to provide critical communications and updates or alerts on new risks. Some SADC Member States reported having operation procedures in place for the establishment of these centres in case of disasters. This is the case for Botswana, Comoros, Eswatini, Namibia, Seychelles, South Africa, and Tanzania. In the case of Zambia, although there are no protocols in place, such centres or posts could be established in consultation with the disaster management and mitigation unit, under the Office of the Vice President.

Figure 10: Other relevant ICTs, maps or protocols



Source: SADC-ITU survey

Action item 76: Critical infrastructure and network inventory

It is recommended that in conjunction with the ministry or NRA, all telecommunication/ICT service operators, radio and television broadcasting operators, as well as government networks, should develop or update and present for approval by the disaster management coordinating authority or other designated agency, a vulnerability analysis of network critical infrastructure reflecting the different types of hazards to which the country is prone. This should include an inventory of

the infrastructure, power, maintenance, and connectivity evaluations. This vulnerability analysis should also include precise coverage maps of the telecommunication/ICT networks.

The disaster management coordinating authority or other designated agency should update the network inventory and coverage of mobile, fixed, terrestrial and satellite telecommunication/ICT networks and service providers as well as radio and television broadcasting service providers relevant for use during all phases of disaster management. In addition, this designated authority should maintain an up to date database with the focal points in charge of technical aspects as well as with those in charge of communication of alerts and relevant information regarding the disaster. In addition, the inventory should include other types of telecommunication/ICT networks relevant for disaster relief, such as radio-amateur and first responder networks.

Other options to terrestrial telecommunication/ICT infrastructure, such as satellite services, including satellite devices for voice/broadband communications, should be assessed to strengthen the emergency response and recovery activities.

Radio networks (HF, VHF and UHF), as well as other frequencies for other radio-communication services related to disaster management such as maritime communications should be adopted, or in case they already exist, maintained for effective continuous operation. In case they are not available, dedicated networks (e.g. public protection and disaster relief (PPDR) network) should be developed and installed for the use by government entities involved in disaster management. User and operational training should also be implemented.

Consideration should be given to the creation of protocols and deployment of equipment to gather and analyse relevant data and information (including geospatial information) on the immediate needs of the population after a disaster and to manage the safe delivery of the response.

It is very important for all SADC Member State coordination and leading disaster management agencies or committees to work jointly with telecommunications sector entities to plan for and implement these activities.

Table 10: Summary of capacities regarding infrastructure and telecommunications for disaster risk management

Member State	Is there a dedicated emergency telecommunications infrastructure?	Is an inventory and map of telecommunications infrastructure and networks available?	Are multiple channels employed to ensure information gets to those being affected quickly and effectively?	Are backup or diverse/redundant means of communication in place in case of outages within the relevant agencies of the DRM system?	Are there protocols for establishing emergency operations centres or communication and coordination command posts at the site of the disaster?	Are there protocols in place and equipment for gathering an analysis of data/information on the immediate needs of the population and managing the safe delivery of that response?
ANGOLA	Only for national defence and military entities		Social media	Different means of communication in place under the emergency authorities		
BOTSWANA			Channels are made available as need arises			
COMOROS	HF, VHF and UHF		TV, social networks, and other media			
DEMOCRATIC REPUBLIC OF THE CONGO		Map of population coverage by 2G, 3G, and 4G mobile networks. Also, there is national fibre-optic infrastructure deployment map on the national territory (BBN)				

Table 10: Summary of capacities regarding infrastructure and telecommunications for disaster risk management (continued)

Member State	Is there a dedicated emergency telecommunications infrastructure?	Is an inventory and map of telecommunications infrastructure and networks available?	Are multiple channels employed to ensure information gets to those being affected quickly and effectively?	Are backup or diverse/redundant means of communication in place in case of outages within the relevant agencies of the DRM system?	Are there protocols for establishing emergency operations centres or communication and coordination command posts at the site of the disaster?	Are there protocols in place and equipment for gathering an analysis of data/information on the immediate needs of the population and managing the safe delivery of that response?
ESWATINI		Each network operator has its own maps available	The national disaster management agency uses all multiple channels for information dissemination, weekly national radio programmes, social media platforms, and print media	Partially in place in some of the emergency agencies	National emergency operations centre (NEOC)	The national disaster management agency uses drone technology and also has access to the UN international space charter for satellite services during major disasters
MADAGASCAR	Radio, TV, truck equipped with ICT, BLU, social networks.	Data is available from ARTEC	Data is available from the BNGRC	Data is available from BNGRC and ARTEC	Data is available from BNGRC and ARTEC	Data is available from BNGRC and ARTEC
MALAWI	VHF not operational		Television, radio, SMS, social media and others	Satellite phones in case of emergencies		
MOZAMBIQUE	Radio network system (VHF and HF) and VSAT services as a backup	In process				

Table 10: Summary of capacities regarding infrastructure and telecommunications for disaster risk management (continued)

Member State	Is there a dedicated emergency telecommunications infrastructure?	Is an inventory and map of telecommunications infrastructure and networks available?	Are multiple channels employed to ensure information gets to those being affected quickly and effectively?	Are backup or diverse/ redundant means of communication in place in case of outages within the relevant agencies of the DRM system?	Are there protocols for establishing emergency operations centres or communication and coordination command posts at the site of the disaster?	Are there protocols in place and equipment for gathering an analysis of data/ information on the immediate needs of the population and managing the safe delivery of that response?
NAMIBIA		Communications Regulatory Authority of Namibia (CRAN) has a comprehensive infrastructure map	TV, radios, and other social media		The protocols are stipulated in the operating procedures	
SEYCHELLES	Not operational	In the process of doing the mapping			NEOC	
SOUTH AFRICA	Radio frequency network		National broadcasters in radio and satellite communications convey the warning messages from the weather service	State Information Technology Agency (SITA) has a central back- up system in place for state- owned agencies and institutions	NEOC	There is a legacy system for national incident reporting systems, but only at the provincial level
TANZANIA	Radio (VHF and HF) networks	Telecommunications authority has an inventory for the telecommunications infrastructure	Draft NETP has addressed the multiple channels for communicating during disaster	Draft NETP has addressed it	Addressed in the 2017 disaster management regulation	Tanzania Meteorological Authority issues warnings and advisories during severe weather events

Table 10: Summary of capacities regarding infrastructure and telecommunications for disaster risk management (continued)

Member State	Is there a dedicated emergency telecommunications infrastructure?	Is an inventory and map of telecommunications infrastructure and networks available?	Are multiple channels employed to ensure information gets to those being affected quickly and effectively?	Are backup or diverse/redundant means of communication in place in case of outages within the relevant agencies of the DRM system?	Are there protocols for establishing emergency operations centres or communication and coordination command posts at the site of the disaster?	Are there protocols in place and equipment for gathering an analysis of data/information on the immediate needs of the population and managing the safe delivery of that response?
ZAMBIA		ZICTA undertook a gap analysis of ICT infrastructure in 2022		VHF land mobile communication systems installed in provincial centres	NEOC and command posts established in consultation with the disaster management and mitigation unit (DMMU)	
ZIMBABWE	Mobile satellite units	Network coverage maps and annual network rollout status for every licensed operator	Disaster occurrences are broadcast on national radio and television including SMS and WhatsApp social media to alert the public	Satellite phones are distributed among the disaster-prone areas around the country		

Source: SADC-ITU survey

7 Preparedness phase: Early warning systems[52]

Early warning systems (EWS), which seek to provide timely information to the population via telecommunication and ICT networks for monitoring, early warning, and alerting, are critical to reducing the impact of disasters and to saving lives. Warning and alerting systems inform the public of any threat or hazard through timely delivery of important emergency information to enable the public to prepare and respond. The impact of a hazard could be significantly reduced if proper information is provided quickly. Warning systems, in general, should include four elements:

1. Disaster risk knowledge based on the systematic collection of data and disaster risk assessments.
2. Detection, monitoring, analysis and forecasting of the hazards and their possible consequences.
3. Dissemination and communication, by an official source, of authoritative, timely, accurate and actionable warnings and associated information on likelihood and impact.
4. Preparedness at all levels to respond to the warnings received.

In relation to the second element, SADC Member States may promote an integrated EWS for example by including other elements such as the monitoring of weather and climate.

A comprehensive EWS strategy should also include different telecommunication and ICT services such as broadcasting services, which can alert people of impending disasters; mobile systems, which can distribute notifications via mobile broadcast technology; and specific apps developed by governments, which can provide warnings, among other possibilities.

ITU early warnings for all initiative

The ITU early warnings for all initiative (EW4A) was launched recently with a newly defined action plan,[53] based on the multi-hazard early warning system (MHEWS), an integrated system that allows people to know about incoming hazards and how governments, communities, and individuals can act to minimize impacts.[54] The MHEWS is based on four pillars: disaster risk knowledge; detection, observation, monitoring and forecasting of hazards; warning dissemination and communication; preparedness and response capabilities.[55]

Concerning warning dissemination and communication, EW4A highlights the use of multichannel dissemination alerting (including radio, TV, sirens, Internet, social media, etc.), as well as the use of one-touch notifications to cell phones in disaster-affected areas. These alert messages can be communicated and formulated in such a way that those who receive them can understand and act on the alert, using a standard and consistent format, such as the common alerting protocol (CAP). In addition, messages are sent to users located in a specific risk zone and adapted to meet user requirements, such as a certain language, by using CB/LB-SMS technologies.

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52 ITU. (2020). ITU Guidelines for national emergency telecommunication plans.
53 Available at: https://library.wmo.int/index.php?lvl=notice_display&id=22154#.Y9PG2nZByM9
54 WMO. (2022). *Early Warnings for All: Executive Action Plan 2023-2027 (The UN Global Early Warning Initiative for the Implementation of Climate Adaptation).*
55 Id.

7.1 Emergency warning system

None of the SADC Member States reported having an integrated public alert and warning system in place. Nonetheless, some have EWS in place for specific hazards or the use of particular monitoring equipment and means of communication that can be used to disseminate relevant information between agencies and to the general public. For instance:

- Comoros: Only for geological hazards (volcanic eruption);
- Malawi: The Department of Climate Change and Meteorology is responsible for early warnings for weather-related hazards, while other systems are deployed to capture levels of water in the designated rivers and lake Malawi;
- Seychelles: Mass SMS to all Seychelles telephone numbers;
- South Africa: The weather service hosts the impact – based early warnings systems for weather-related warnings for all disaster agencies and State-owned entities. Information is disseminated through several media platforms, including e-mail, TV, radio, SMS, and internal communication channels; and
- Tanzania: EWS have been deployed in some geographic areas for flood and weather monitoring.
- Zambia: Two pilots for natural disaster early warning systems are being used to disseminate alerts for flooding and impending disasters, for public safety and to enhance information dissemination in designated areas. The infrastructure is mainly composed of electromechanical/electronic voice communication systems that are installed at selected flood prone locations.

7.2 Common alerting protocol

The common alerting protocol (CAP) lets authorities warn people of a disaster immediately, and up to a global scale, as it defines a standardised form for alerting and communicating key facts of any emergency. On the other hand, people can receive CAP-originated warnings in many ways, such as through mobile devices and landline telephones, Internet (e-mail, Google, Facebook, Twitter, WhatsApp, Smartphone apps, online advertising, Internet of Things (IoT) devices, in-home smart speakers, etc.), sirens (in-buildings or outdoors), broadcast radio and television, cable television, emergency radio, amateur radio, satellite direct broadcast, and digital signage networks (highway signs, billboards, automobile and rail traffic control).

Given the low penetration rate of fixed Internet access in the SADC Member States, and on the contrary, the higher reach of mobile networks, an efficient mechanism for emergency authorities to use is to send one-touch notifications to cell phones in disaster-affected areas.

Despite the benefits of this communication mechanism for emergencies, only South Africa reported using CAP, and only for weather-related warnings.

On the other hand, three SADC Member States reported addressing this technology in disaster management plans:

- Eswatini, where a draft NETP has made a provision for it to be established.
- Namibia, where the common alerting protocol was highlighted as a requirement of the national disaster risk management plan in 2011 (currently under review).
- Tanzania, through the draft NETP, which requires common alerting protocol procedures.

7.3 Cell broadcasting technology and location-based SMS technology

Cell broadcast (CB) is an integrated open system that allows disaster management authorities to send one-touch geo-located notifications to cell phones of all carriers in an affected area of a disaster within two minutes, regardless of the size of the area or the operator.[56] This technology, additionally, enables those location-specific emergency alerts to go through a dedicated broadcast channel, enabling the flow of relevant information even when the mobile network is congested, as often happens in emergency situations. Cell broadcast is not only a very secure means of transmission, but also has many other benefits, including allowing visitors from abroad to receive the alerts and in their own language.[57]

Cell broadcast technology is often complemented with location-based SMS (CB/LB-SMS). It is a proven technology and currently in use by almost all developed countries, including Europe (EU-Alert), United States Commercial Mobile Alert System (CMAS)/ Wireless Emergency Alerts (WEA) (CMAS/WEA), Israel (National Message), Chile (LAT-Alert), and Japan (Earthquake Tsunami Warning System)[58].

Even though none of the SADC Member States have adopted CB/LB-SMS technology for disseminating early warnings and alerts, some reported having SMS technology for this purpose. This is the case for Eswatini, where SMS technology is currently in place for emergency alerts, and Zambia, where the disaster management authority has procured an SMS broadcast system that can also be used to broadcast messages in case of disaster.

Apart from Eswatini and Zambia, other SADC Member States reported disseminating relevant information through SMS delivered by mobile network operators during the disaster. This is the case for Comoros (activity is carried out by the General Directorate of Civil Security in collaboration with telecommunication operators), Seychelles (Cable & Wireless Ltd and Airtel Seychelles Ltd.), Angola, Botswana, Malawi, and Mozambique. Tanzania reported addressing these mechanisms in the draft NETP.

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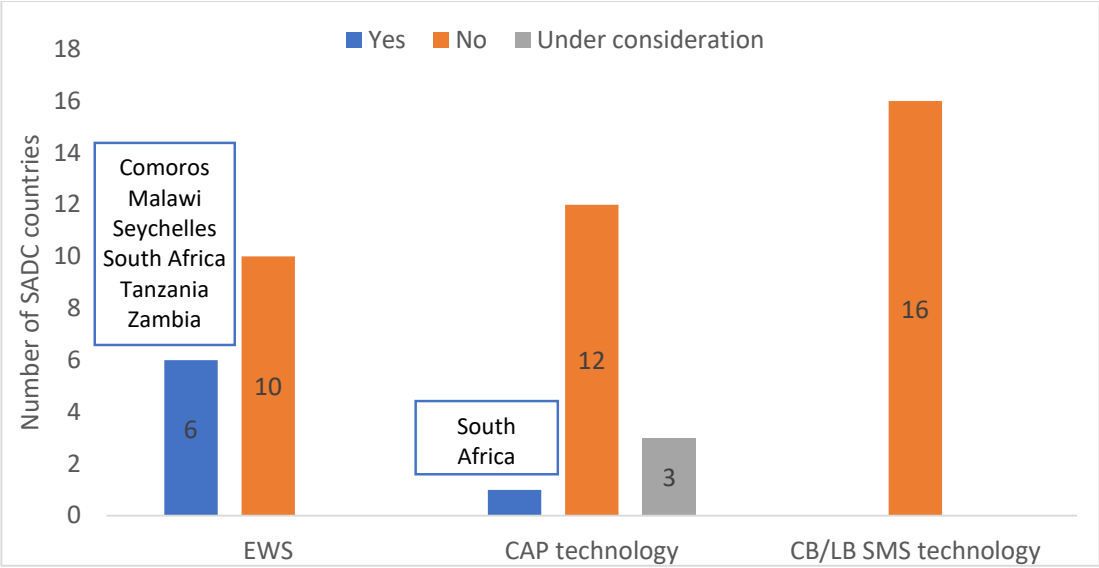
[56] One2many. (2012). Cell Broadcast Emergency Alerts. Available at: https://transition.fcc.gov/pshs/docs/advisory/cmsaac/pdf/CellCastComment070307.pdf

[57] CellCast Technologies. (2007). Cell Broadcast Technology for Emergency Alert Notifications. Available at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/01/One2Many-Cell-Broadcast-Emergency-Alerts.pdf

[58] Idem.

Figure 11: Warning systems and alerting technologies



Source: SADC – ITU survey

Action item 8: Early warning systems and common alerting protocol

It is recommended that SADC Member States should assess, develop and/or enhance existing emergency alert and early warning systems, including surveillance and monitoring systems for probable threats, emergencies and solutions for warning and alerting the public. The common alerting protocol is one of the most efficient mechanisms to alert the population of a hazard and provide information and communicate relevant facts to the population at risk. With the cooperation of the telecommunication/ICT service providers, solutions to warn and alert the public should be implemented, such as the use of radio and TV broadcasting networks and cell broadcast technology and considering the relatively high mobile phone penetration in the SADC Member States, as well as the benefits of cell broadcasting, plans for the development and implementation of this technology should be initiated and implemented. Cell broadcast or cell broadcast complemented with location-based SMS is an efficient mechanism for emergency authorities to send one-touch notifications to cell phones in disaster affected areas.

7.4 Capacity building and drills

The development of an effective NETP should include practical strategies that improve the capacities and training of all people involved in the management of emergency telecommunications and ICTs. Capacity building initiatives improve the speed, quality and effectiveness of emergency preparedness and response. In the case of telecommunications, enhancing the capacity for emergency response must encompass multiple subjects, from basic aspects of the use of telecommunication/ICT during emergencies to technical concepts. Training must also be accompanied by practical activities, such as emergency drills or tests that provide national training opportunities and highlight areas for further improvement, including the availability and reliability of emergency equipment not frequently used.

According to GSMA (2023), emergency preparedness is an ongoing process that requires continuous training and capacity-building efforts aimed at improving the speed, quality, and effectiveness of emergency responses. Regularly training personnel and updating protocols ensure that response efforts remain up to date and effective, allowing adjustments to emergency

plans and protocols accordingly.[59] According to the ETC, the cost of capacity development and training can be outweighed by the benefits obtained in terms of reduced response times, lives saved, and social and economic impacts.[60]

Some international organizations offer free courses that may complement a broader capacity building strategy (effective emergency preparedness should include a variety of training and capacity-building activities, such as practice drills, classroom theory, and practical tests[61]). The ITU Academy, for instance, features a large selection of courses, both face-to-face and online, equipped with the latest tools for design and delivery of this type of instruction. There are three training opportunities on emergency telecommunications and disaster response covering a wide variety of topics at different levels (introductory, intermediate and advanced):[62]

- The Tampere Convention and telecommunications deployments when disasters strike.
- An introduction to developing national emergency telecommunication plans.
- Practical disaster response: How to develop table-top simulation exercises.

Other international agencies also offer this type of training. For instance, GSMA offers training courses taught by industry experts, both face-to-face and online, encompassing practical information and key insights into the most pressing issues faced by regulatory authorities.[63] In collaboration with ITU, GSMA offers a course on the role of mobile in humanitarian action aimed at regulators, policymakers and representatives from other organizations working on regulatory or policy issues. It looks at the role of policymakers and mobile operators in disaster response management and their impact on aid delivery during and after a humanitarian crisis. For example, the course covers how coordination between stakeholders involved in DRM mitigates risks during times of crisis, how adopting flexible approaches to policy and regulations during emergencies can positively impact response efforts, and how mobile platforms can digitize humanitarian aid delivery channels[64].

Also, ETC offers courses to build DRM staff response capacity when emergencies happen. This includes self-paced courses and webinars to improve staff knowledge and awareness; rigorous technical and non-technical training opportunities to enhance skills; and simulation exercises to reinforce these skills. According to the ETC training calendar, courses course include topics such as coordination of ETC or other inter-agency ICT emergency response operations; management of radio-based security communications system (SCS) conforming to the UN standards; management of services for communities projects; deployment, management and support of voice and data services in an emergency operation; and a large-scale inter-agency simulation exercise for various emergency response functions in addition to current and new self-paced content (e-courses, micro-learning) on the ETC learning channel.[65]

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59 GSMA (2023). The Role of Mobile in Disaster Response and Humanitarian Action – SADC National Emergency Telecommunications Plan.

60 ETC (2023). Return on Investment for Emergency Telecommunications Preparedness Model (Presented at South African Development Community Model National Emergency Telecommunications Plans Situational Analysis Validation Workshop).

61 GSMA (2023). The Role of Mobile in Disaster Response and Humanitarian Action – SADC National Emergency Telecommunications Plan.

62 More information at: https://academy.itu.int/

63 More information at: https://www.gsma.com/training/capacity-building/capacity-building-courses/

64 More information at: https://www.gsmatraining.com/course/the-role-of-mobile-in-humanitarian-action-course/

65 Available at: https://www.etcluster.org/sites/default/files/paragraph/attachment/field_file/2023-01/Training%20Calendar%202023.pdf

Capacity building in SADC Member States

Only four SADC Member States reported conducting telecommunication/ICT exercises or drills as part of more comprehensive national disaster exercises:

- Botswana: Comm-CIRT trainings include both government and non-government participants; these trainings are not part of the disaster management simulations led by the national disaster management office.
- Malawi: ICT exercises are conducted for community-based early warning systems (EWS) for capturing water levels, lake buoys to monitor weather (e.g. in Lake Malawi), water gauge levers for different rivers, etc.
- Mozambique: Participates in the World Food Programme (WFP) radio and VSAT communication trainings, as well as the simulation exercises for emergency scenarios.
- Zambia: Telecommunication/ICT exercises are conducted as risk-based ICT site inspections to ensure that telecommunication sites are operating optimally. These exercises include a diverse variety of stakeholders, as ICTs are cross cutting and impact a variety of people.

Action item 9: Training and drills

It is recommended that training and drills for emergency telecommunication should be regularly carried out to improve emergency responder capacity with communications equipment as well as to enhance their ability to execute policies, plans, and procedures governing the use of communication networks. The telecommunication/ICT sector should actively participate in these drills and exercises as well as develop and carry out their own drills and exercises to effectively implement telecommunication/ICT elements of the NETP. In coordination with telecommunications operators, national regulatory authorities should review and update the plans and scope related to emergency telecommunication drills and trainings.

7.5 Support for vulnerable groups

Access to telecommunications and ICTs is vital to vulnerable groups such as persons with disabilities and older persons during emergencies. In addition to traditional forms of emergency communication (TV and radio) and dissemination of visual and acoustic content in public spaces, disaster preparedness and planning information should be provided in multiple formats including the use of landlines, mobile audio, text/SMS messages, and Internet-based services, as well as websites, video, instant messaging over the Internet, voice services on Internet protocol, web conferencing, and social networks that allow instant communication and exchange of information (such as photos/videos) as well as satellite communications.

Support for vulnerable groups such as persons with disabilities, older persons, and women and girls in SADC Member States

According to the information provided in the SADC-ITU survey, the following SADC Member States have included or are planning to include considerations or obligations for vulnerable groups such as persons with disabilities, older persons, and women and girls, in disaster management activities or plans:

- Botswana: The new national policy on disaster risk management – waiting to be passed by Parliament – references the revised National Disability Policy of 2011. Its vision is "An inclusive Botswana where all Persons with Disabilities can exercise all their rights on an equal basis with others." This means that both the national plans and the district plans must take into account the National Disability Policy of 2011.

- Eswatini: The national multi-hazard contingency plan considers vulnerable groups, including women and children, the older persons, and persons with disabilities. The national disaster management agency strategic plan aims to prioritize vulnerable groups during emergencies.[66]
- Madagascar: Persons with disabilities are included in emergency responses and disaster risk reduction, for instance, under Law 031 of 2014, which authorizes the ratification of the United Nations Convention on the Rights of Persons with Disabilities.
- Malawi: Persons with disabilities are involved in stakeholder consultation meetings before and during disasters.
- Mauritius: The national disaster risk reduction management centre encourages the participation of persons with disabilities in its activities.
- Namibia: The national disaster risk management plan considers and makes provision for assistance to people with disabilities during disasters.
- Seychelles: Under development.
- Tanzania: Provisions are included in the national disaster management strategy (2022-2027)[67].

Some SADC Member States also reported that they were conducting awareness campaigns to vulnerable groups including persons with disabilities. This is the case for:

- Botswana: This process is undertaken by some agencies, such as the ministry of health during the case with the COVID-19 awareness campaigns.
- Madagascar: Law 031 of 2014 (Authorizing the ratification of the United Nations Convention on the Rights of Persons with Disabilities) promotes the goal that effective public awareness campaigns should be initiated and conducted to foster a receptive attitude toward the rights of persons with disabilities, as well as to promote a positive perception of people with disabilities and more social awareness towards them.
- Malawi: Multiple languages including English, Chichewa, Yao, and Tumbuka, etc., are used in public awareness campaigns on both national and community radio.
- Mauritius: According to the information provided, the national disaster risk reduction and management centre encourages the participation of people with disabilities in its activities.[68]
- Namibia: Public awareness campaigns are conducted in local languages and most of the materials are also translated into those languages.
- Seychelles: Stakeholder engagement and school programmes.
- Zambia: Public awareness campaigns are conducted in various formats on different topics at a national level, as well as conducted in English and seven local languages. These awareness campaigns are targeted at, among others, persons with disabilities and other vulnerable groups.

Action item 10: Accessibility

It is recommended that the disaster management coordinating authority or designated agency, such as the ministry or national regulatory authority responsible for telecommunications and ICTs, should work together with network operators and service providers, to develop mechanisms to understand the accessibility requirements needed to guarantee that vital digital communication technologies are inclusive and accessible to vulnerable groups, such as persons with disabilities, older adults, women and girls, and refugees and immigrants. Where available, this response

66 https://drive.google.com/file/d/16tWSgqaMxqgMydl6DxgfF-67S_l7W6Ln/view
67 https://www.pmo.go.tz/uploads/documents/sw-1677564328-National%20Disaster%20Management%20Strategy%202022%20-%202027.pdf
68 https://ndrrmc.govmu.org/Pages/whoweare.aspx .

should be linked to existing early warning systems, so everyone can receive and understand the alerts and the early actions that need to be taken.

7.6 Contingency plans

An effective disaster management contingency plan must include operational procedures to enable communications and specific activities/procedures that reflect characteristics of the disaster and of the location, such as the level of connectivity to the site, the available facilities or equipment deployed in the area, including power sources and redundancy. Contingency planning should also include alternative solutions to ensure operations and communications in the affected area. To maintain telecommunications, a contingency plan should consider future resource management and technical and logistic needs.

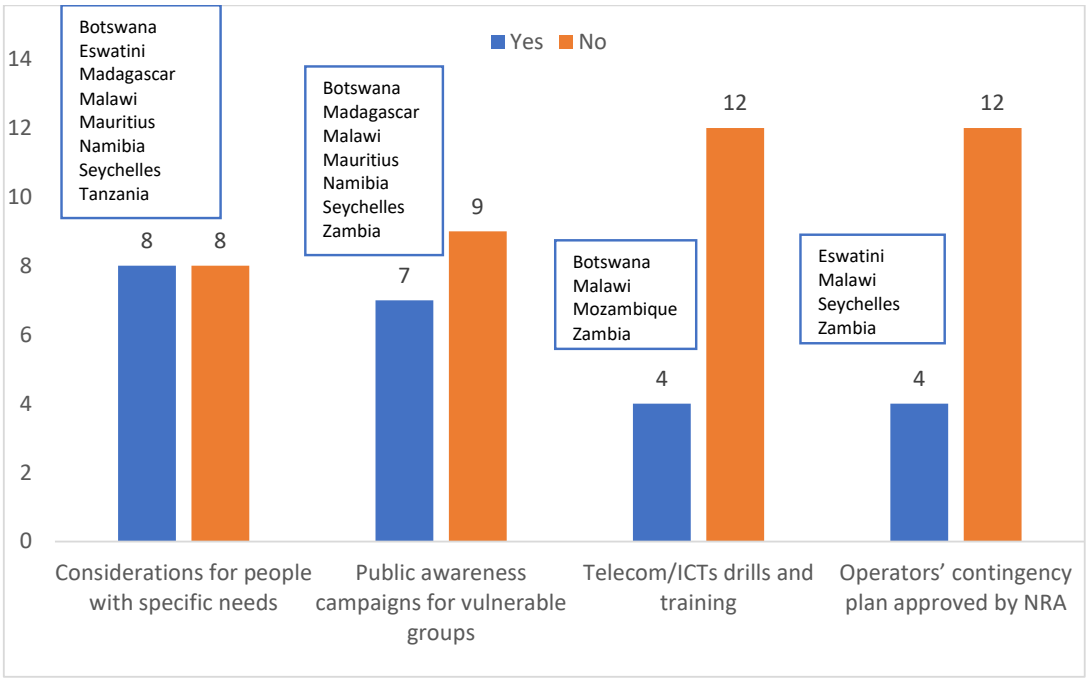
For telecommunications operators, these plans and alternative solutions can be included in a separate business continuity plan, which includes information on critical infrastructure required to continue operating during the emergency, including the identification of essential systems and processes, and clear details on how to maintain them.[69]

Contingency planning in SADC Member States

Botswana, Eswatini, Malawi, and Zambia reported that the operator contingency or business continuity plan is approved by the national regulatory authority for telecommunications. In the case of Botswana, BOCRA has standardised sector guidelines on business continuity and disaster recovery for the communications sector (updated in October of 2019), which calls for operators to submit an annual risk and impact analysis report and to update their contingency plans every five years.

[69] More information at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/08/BCM-Guidelines-for-MNOs.pdf

Figure 12: Operating procedures, contingency plans, and training and support for vulnerable groups



Source: SADC – ITU survey

Action item 11: Contingency and business continuity plans

It is recommended that public and private satellite and terrestrial networks, including mobile, fixed, and broadcasting operators should each keep their contingency and business continuity plans for emergencies up to date. Based on hazard maps, risk assessment and network vulnerability analyses, contingency measures for elements such as network redundancy, mobile (portable) base stations, flyaway VSAT, mobile satellite terminals, and secondary energy sources, should be included in the network design. Safely stored satellite equipment, and satellite network connectivity plans for use during the response phase of a disaster, should also be part of the contingency plans.

7.7 Standard operating procedures

Operating procedures are formal written guidelines or instructions that show how to carry out specific operational tasks or activities during an emergency. They generally have both operational and technical components and enable emergency personnel to coordinate the response in an emergency.[70] These procedures should be aligned with legislative and regulatory frameworks as well as specific policies and plans related to disaster management. The help government stakeholders to manage future emergency communication asset requirements and capabilities and enable the efficient deployment of redundant mobile data services and applications. Response agencies should assess their needs for strategic, commercial, operational and tactical planning on a regular basis, and update them periodically. In addition, radio interoperability procedures and the allocation of spectrum in a specific band, based on the existing radio equipment, should be provided.

[70] United States Department of Homeland Security (2014), National Emergency Communications Plan.

Standard operating procedures in SADC Member States

Some SADC Member States reported having operating procedures in place, particularly for the general disaster management processes or national emergency operation centres (NEOC) for response coordination. This is the case for Eswatini, for example, where the national disaster management agency has recently developed a draft NEOC SOP, or Malawi, where the department of disaster management affairs has general SOPs that provide a list of the major actions involved in responding to disasters and the necessary response measures. Such processes ensure that all concerned stakeholders understand their roles at each stage of disaster management. It also indicates stakeholder actions and responsibilities so contingency action plans can be prepare and reviewed. Botswana, Namibia, and Tanzania also reported having SOPs in place with guidelines and instructions for sector agencies, such as public health, forestry and industrial fires, agriculture, or for geo-hazards, as in Botswana.

Action item 12: Standard operating procedures

It is recommended that standard operating procedures (SOPs) are developed, updated, and strengthened within and among agencies for emergency and disaster response related to communications and the technical means for communication (voice/data), including interoperability. Operating procedures should be updated regularly for all relevant hazards and by all actors involved in telecommunication/ICT disaster risk management, and should include, if possible, the following elements:

- *An up to date list of entities and contact points (including key decision makers) within these entities who maintain communication during all phases of emergency and disaster management.*
- *An up to date registry of focal points of every agency involved in DRM.*
- *Analysis of interoperability of equipment (wireless) and communication networks involved in DRM.*
- *A defined set of radio frequencies for contact point communications (key decision makers) compatible with the radiocommunication equipment being used.*
- *Alternative methods of communication through existing communication operators where possible.*
- *Connectivity plans for satellite equipment during the response phase as well as procedures for primary and alternative communications between all relevant stakeholders involved in disaster response.*

Table 11: Summary of capacities related to the preparedness phase of DRM in the SADC Member States

Member State	Are Persons with specific needs included in DRM activities or plans?	Are Public awareness campaigns conducted in multiple accessible or languages?	Are telecom/ICT exercises regularly conducted?	Do telecom/ ICT exercises include different key stakeholders?	Are - telecom - drills conducted?	Are there Standard Operating Procedures (SOPs) in place?	Do telecom operators have updated Contingency Plans or Business Continuity Plans?	Aare these Contingency Plans mandated and approved by the telecom and DRM authorities?	Is there an Emergency Alert and Early Warning System in place?	Is a Common Alerting Protocol (CAP) established or required for emergency alerts?	Is there a cell broadcasting or SMS technology for emergency alerts currently in place or planned?
ANGOLA											SMS through mobile operators
BOTSWANA	Revised National Disability Policy of 2011	Done by some agencies like the Ministry of Health during COVID-19 pandemic		Comm-CIRT trainings do include both government and non-government participants	Simulations but not on telecom/ ICT	No operating procedures for NEOC, but in place for relevant agencies or sectors	BOCRA has standardized sector guidelines on business continuity and disaster recovery for the communications sector				SMS through mobile operators
COMOROS									Only for geological hazards		SMS through mobile operators
ESWATINI	In a multi-hazard contingency plan and a national disaster management agency strategic plan					The national disaster management agency has a draft national emergency operation centre operating procedure in place	Operators have business continuity and disaster recovery plans in place	Plans are approved by the telecom's regulator		The draft NETP has made a provision for it to be established	SMS technology is currently in place for emergency alerts
MADAGASCAR	Included in emergency responses and disaster risk reduction	Campaigns foster a receptive attitude towards the rights of persons with disabilities							The data is available from the BNGRC	The data is available from the BNGRC	The data is available from the BNGRC

Table 11: Summary of capacities related to the preparedness phase of DRM in the SADC Member States (continued)

Member State	Are Persons with specific needs included in DRM activities or plans?	Are Public awareness campaigns conducted in multiple accessible or languages?	Are telecom/ICT exercises regularly conducted?	Do telecom/ ICT exercises include different key stakeholders?	Are - telecom - drills conducted?	Are there Standard Operating Procedures (SOPs) in place?	Do telecom operators have updated Contingency Plans or Business Continuity Plans?	Aare these Contingency Plans mandated and approved by the telecom and DRM authorities?	Is there an Emergency Alert and Early Warning System in place?	Is a Common Alerting Protocol (CAP) established or required for emergency alerts?	Is there a cell broadcasting or SMS technology for emergency alerts currently in place or planned?
MALAWI	Persons with disabilities are involved in stakeholder consultation meetings and also during disasters.	Public awareness conducted on national radios and community radios in different languages	ICT exercises conducted for community- based EWS early warning systems for weather-related hazards			The department of disaster management affairs has operating procedures in place for DRM process	Telecommunications operators have disaster recovery plans for their infrastructure in case of emergencies within their networks	Approval is provided by MACRA the Telecom Regulator	Only for weather- related hazards		SMS through mobile operators
MAURITIUS	The national disaster risk reduction and management centre encourages the participation of people with disabilities in its various activities										
MOZAMBIQUE				WFP organises radio and VSAT communication training as well as simulation exercises							Under development by the regulator and the DRM agency

Table 11: Summary of capacities related to the preparedness phase of DRM in the SADC Member States (continued)

Member State	Are Persons with specific needs included in DRM activities or plans?	Are Public awareness campaigns conducted in multiple accessible or languages?	Are telecom/ICT exercises regularly conducted?	Do telecom/ ICT exercises include different key stakeholders?	Are - telecom - drills conducted?	Are there Standard Operating Procedures (SOPs) in place?	Do telecom operators have updated Contingency Plans or Business Continuity Plans?	Aare these Contingency Plans mandated and approved by the telecom and DRM authorities?	Is there an Emergency Alert and Early Warning System in place?	Is a Common Alerting Protocol (CAP) established or required for emergency alerts?	Is there a cell broadcasting or SMS technology for emergency alerts currently in place or planned?
NAMIBIA	The DRM framework makes provision for disabilities and gender consideration during disasters	Public awareness campaigns conducted in local languages				Sector specific operating procedures are in place			For meteorological and hydrological hazards	Highlighted in the national disaster risk management plan of 2011 under review	
SEYCHELLES	In process	Stakeholder engagement and school programmes				Partially			Mass SMS to all Seychelles telephone numbers		Cable &Wireless (Seychelles) Ltd and Airtel Seychelles, Ltd.
SOUTH AFRICA									Impact- based early warnings systems for weather related hazards	The weather service hosts CAP warning transmission for weather-related warnings	
TANZANIA	National disaster management strategy (2022-2027)	Addressed in the draft national emergency telecommunication plan	Addressed in the draft national emergency telecommunication plan	Addressed in the draft national emergency telecommunication plan	Addressed in the draft national emergency telecommunication plan	Provided by the disaster management department – Prime Minister's Office	Addressed in the draft national emergency telecommunication plan	Addressed in the draft national emergency telecommunication plan	Addressed in the draft national emergency telecommunication plan	Draft national emergency telecommunication plan has provided the required common alerting protocol procedures	Addressed in the draft national emergency telecommunication plan

Table 11: Summary of capacities related to the preparedness phase of DRM in the SADC Member States (continued)

Member State	Are Persons with specific needs included in DRM activities or plans?	Are Public awareness campaigns conducted in multiple accessible or languages?	Are telecom/ICT exercises regularly conducted?	Do telecom/ ICT exercises include different key stakeholders?	Are - telecom - drills conducted?	Are there Standard Operating Procedures (SOPs) in place?	Do telecom operators have updated Contingency Plans or Business Continuity Plans?	Aare these Contingency Plans mandated and approved by the telecom and DRM authorities?	Is there an Emergency Alert and Early Warning System in place?	Is a Common Alerting Protocol (CAP) established or required for emergency alerts?	Is there a cell broadcasting or SMS technology for emergency alerts currently in place or planned?
ZAMBIA		Public awareness campaigns are conducted in various formats, languages, and related topics, and are targeted toward persons with disabilities and other vulnerable groups	Telecom/ ICT exercises in the form of risk-based ICT site inspections to ensure telecommunication sites are operational	Stakeholder engagements related to capacity building, including ICT topics			All service providers have business continuity plans that they may need to implement in case disaster strikes.	Are a part of the requirements for obtaining a telecom licence	Two pilot sites with electro-mechanical/ Electronic voice communication systems installed and at the selected flood prone locations		ZICTA has procured an SMS broadcast system that can also be used to broadcast messages in case of disaster

Source: SADC – ITU survey

8 Response phase: Communication and coordination

For a successful response phase, all contingency plans and operating procedures established in the mitigation and preparedness phases must be already in place, and interoperable communications must be established between first responders and decision makers in the government and the community. During the emergency response phase, authorities can establish emergency operation centres or communication and coordination command posts to provide critical communications to users in each organization involved for example, from fixed (in a shelter) or mobile locations (in a vehicle), and local or remote locations, among other possibilities.

These centres or posts can assess the emergency situation and identify and request appropriate resources when necessary. It is important that these command posts should be in contact with each other (one in a remote location outside the perimeter of potential danger and another at the site of the emergency, for example) to respond to requirements generated in the emergency area, as well as to anticipate and provide support, assistance, and resources.

It is important to maintain continuous communications between command posts and stakeholders involved in the response to the emergency. As such, it is necessary to use all available means of communication to maintain close coordination with the various agencies involved. Operating procedures and contingency plans, including temporary satellite connectivity and any other available means of communication, are particularly important when terrestrial networks are unavailable and key decision makers need to coordinate the emergency response.

Action item 13: Emergency operation centres

It is recommended that consideration be given to the planning of emergency operation centres or communication and coordination command posts to provide critical communications to users in each organization involved during the response phase of a disaster through fixed, mobile, local or remote posts. Maintaining interoperable and continuous communications between command posts and stakeholders is vital for an effective response to the emergency.

8.1 Collection and analysis of information

A key element during the response phase of disaster management involves the assessment of ICTs that prioritize the deployment of critical ICT infrastructure to the most affected areas. In addition, the collection and analysis of information related to the immediate needs of the population affected by the emergency is necessary to manage the safe delivery of the response. Gathering and evaluating information are particularly important steps because this information if communicated quickly to the corresponding authorities (e.g., health entities, firefighters, civil police, among others) will directly impact the response to the needs of the affected population. It is also necessary to use all available telecommunication/ICT networks and geospatial information to coordinate the response planning geographically.

8.2 Emergency awareness and updates

During the response phase, it is also necessary to continue monitoring and warning of new risks to the affected population and to disseminate updates. To achieve this goal, multiple methods of communication, such as sound and television broadcasting, text messages, and/or audio

messages through mobile network operators, social networks, and applications, among others, should be employed.

Call centres should be established in order to connect affected populations with their relatives during the response phase. Generally, these call centres can be located in shelters and should use means of communication that do not congest the networks, such as text messages. These call centres can also be established in collaboration with telecommunication/ICT operators in additional locations, such as hostels and hotels.

In the event that a Member State does not have the capacity (e.g., equipment, human, or financial resources) to establish this type of call centre, this service can be provided by international organizations, such as the UN through one of its branches.

Action item 14: Call Centres

It is recommended to plan for the establishment of call centres during the response phase to warn the affected population of new risks, disseminate updates about the emergency, and help affected populations connect with relatives. Generally, these call centres can be located in shelters and should use means of communication that do not congest the networks, such as text messages. To establish the required telecommunication/ICT infrastructure connectivity for these call centres, SADC Member States may employ satellite networks, which can be easily installed through collaboration with telecommunication/ICT operators or international organizations.

9 Recovery phase: Reconstruction and improvement

During the recovery phase, the damage caused to telecommunications and ICTs should be evaluated as a precursor to the reconstruction and improvement of damaged infrastructure. At this stage, it is necessary to ensure a minimum level of communications for those who carry out damage assessment and to establish communication priorities in order to manage available communications resources.

This reconstruction stage should seek to restore communications preferably on the principle of building back better, by reconstructing a more resilient infrastructure that can withstand future disasters.

Action item 15: Restoration and reconstruction of the telecommunication/ICT infrastructure

It is recommended that the restoration and reconstruction of telecommunication/ICT infrastructure should be based on lessons learned and the principle of building back better. These activities should also involve the active participation of the private sector, including fixed, mobile, and satellite network and service providers.

Recovery activities follow-up

Telecommunications and ICTs have the capacity to support the recovery activities of affected areas including continuing to transmit relevant information in order to, among other objectives, update the public on the emergency on topics such as health services, shelter, food, and family reunification.

Action item 16: NETP Update

Based on the experience acquired during the disaster management, it is recommended that a report should be developed after the response and recovery phases that identifies lessons learned and includes necessary modifications and improvements that should be made to the NETP. These lessons learned and necessary modifications should be identified with the input of relevant actors involved in emergency telecommunications. The NETP should be updated every two to three years.

Annex 1: Template for collection of information

A.1.1 Inventory of telecommunication/ICT networks

Radio Broadcaster

Company	Station name	Transmitter location (address)	Frequency (FM/AM)	Coverage (localities)

Television Broadcaster

Company	Station name	Transmitter location (address)	Frequency	Coverage (localities)

Mobile Service Providers

Mobile Service Provider	Coverage (district, cities/localities)	Technology (2G, 3G, 4G)

Fixed Service Providers

Fixed Service Provider	Coverage (district, cities/localities)	Technology	Service

Satellite service providers

[Satellite equipment, equipment location, voice and/or data services, satellite service provider, frequencies, etc.]

Amateur Radio

[Network specifications to be provided, such as repeater locations, frequencies, voice and/or data service, and type of equipment]

A.1.2 Disaster management network

[Frequencies of operation (HF, VHF, UHF, etc.), repeater locations and radio sites, inventory of mobile and portable radio terminals, call signs, who is responsible for the equipment/network, etc.]

A.1.3 Private networks

[Name/owner, site locations, frequencies, coverage, etc.]

A.1.4 Contact information

[Contact information of key people from the Government and the private sector (networks) who need to have priority in their communications in case of an emergency]

Name	Institution	Private/public	Contact information

A.1.5 International telecommunication/ICT support

[Contact information of key telecommunication/ICT people/international organizations for disaster relief]

Name	International organization	Contact information

A.1.6 Standard Operating Procedures

[SOPs for communications within the agencies involved in DRM and high-level Government authorities, first responders, etc. What means of communication will be used (including wireless technology, frequencies, equipment, etc.)? What are alternative means of communication?]

A.1.7 Contingency Plans

[Summary of contingency plans from telecommunication/ICT service providers. The detailed plans are generally not made publicly available.]

Annex 2: Questionnaire

The following is the questionnaire sent to relevant authorities of the DRM system in each of the 16 SADC Member States and upon which this report was prepared.

I Legal and organizational

A. Policy, planning and legal framework to support emergency telecommunications/ICT services.

1. Is there a national disaster risk management plan in the country?
2. Is there a national telecommunications contingency plan or a national strategy for the use of ICT/telecoms in the context of disaster risk reduction and management?
3. Are regulatory provisions established for emergency telecommunications, such as:

    a) Temporary license for telecommunications services
    b) Temporary spectrum licenses
    c) Frequencies for PPDR (Public Protection and Disaster Relief)
    d) Equipment Type Approval or Certification Process
    e) Priority call routing
    f) 3-digit emergency number (e.g., 911, 112, etc.)
    g) Standard Operating Procedures
    h) Contingency plan requirements
    i) Emergency alert and early warning system requirements (e.g., cell broadcast, SMS…)
    j) Obligations for ICT/telecommunications providers (operators, broadcasters, etc.) to provide general information to the public during emergencies.

Other regulations established for emergency telecommunications:

4. Name other laws, plans, or policies that establish provisions for emergency telecommunications and provide a brief explanation of each:

B. Organizational Structure and Actors

5. Name and provide a brief description of the main actors and/or organizations responsible for the development and management of emergency telecommunications
6. Describe the governance model or organizational structure for disaster management in the country, including a brief description of the lead agency or committee/board and the emergency management or coordinating agency.
7. The Communication mechanisms between different stakeholders of Government entities (including Ministry of ICT, Telecommunications Regulatory Authority, Meteorological Authority, Disaster Management Agency, Customs, etc.) and between Government and other actors, during emergency situations.
8. What is the role regarding the emergency management system (participation, activities, etc.) of the:

    a) Ministry in charge of ICT/telecoms
    b) Regulatory agency responsible for ICT/telecoms

9. Is there a national emergency telecommunications cluster that represents key ICT contacts?
10. Within the emergency management system, are the roles, objectives and responsibilities coordinated between the national, subnational, and community levels?

II Infrastructure, Services and Communication Procedures

1. Is there a dedicated emergency telecommunications infrastructure, such as VHF and/or HF networks, satellite backup systems, etc.?
2. Briefly describe the telecommunications sector (number of operators, service penetration rate, coverage, capacity, etc., for voice and data services):

    a) Mobile services (voice and data)
    b) Fixed services (voice and data)
    c) Satellite services
    d) National backbone
    e) International connectivity
    f) TV broadcast service
    g) Radio broadcast service
    h) Others

3. Are there emergency communication tools, such as a single emergency number (e.g., 911, 112) informational websites and government apps?
4. Has an up-to-date national ICT capacity assessment been carried out that covers macro and micro assessments of ICT infrastructure at the national level?
5. Is there an inventory and a map of the telecommunications infrastructure and its networks?
6. Are there risk assessments and maps showing the location and types of hazards to which the country is most vulnerable?
7. Do the risk assessment and maps (Question 6 above) take into account the relevant telecommunications infrastructure?
8. Is there an emergency alert and early warning system? If yes, please describe it, including the means of communicating information to first aid agencies and the general public.

    a) Is cell or SMS broadcast technology for emergency alerts currently in place or planned?

9. Is the Common Alerting Protocol (CAP) established or required for emergency alerts?
10. Are multiple channels (such as TV, radio, short message service, messaging, social media, etc.) used to ensure that information reaches the right people quickly and efficiently? If so, how?
11. Has the Government established frequency allocations, in accordance with the ITU Radio Regulations, for critical satellite communications – including L, C, Ku, and Ka bands, among others?
12. Are there backup or miscellaneous/redundant means of communication in place in the event of a breakdown within the relevant agencies of the emergency management system?
13. Are there protocols for establishing emergency operations centres or communication and coordination command posts at the disaster site to provide critical communication, provide updates, or alerts on new risks?
14. Are there protocols in place and equipment available for collecting and analysing data/information (including geospatial information) on the immediate needs of the population and managing the safe delivery of the response?

III International Cooperation

1. Name and briefly describe the treaties and international cooperation agreements signed by the country relating to emergency telecommunications:
2. Is the Tampere Convention signed/ratified by the country?
3. Are the provisions of the Tampere Convention included in national legislation or regulations?

4. Name and describe ongoing cooperative projects with UN agencies and other international actors on emergency telecommunications, including ETC., UNDRR, the World Bank, IFCR, etc.
5. Have expedited processes been established in advance for the entry of experts or telecommunications equipment in the event of a disaster?

IV Other topics

1. Are people with disabilities and special needs included in disaster risk management activities or plans?
2. Are public awareness campaigns conducted in multiple accessible formats, in different languages, with resource persons sensitised to transmit the content of these packages to people with disabilities and other vulnerable groups?
3. Are ICT/telecommunications exercises held regularly, either separately or as part of more comprehensive national disaster exercises? If yes, please describe them.
4. Do ICT/telecom specific trainings and exercises include different key relevant stakeholders, in addition to Government participants (such as telecom operators, civil society, etc.)?
5. Are telecommunication drills held regularly to ensure the public is aware of disaster response plans, including the most effective means of communication to help reduce network congestion, as well as recognising and reacting to a warning signal (e.g., responding to an early warning mechanism, such as a siren)?
6. Are there standard operating procedures (SOPs) for the relevant agencies involved in the DRM process? (Emergency Operations Centres, ICT ministry/regulator, emergency coordination agency, etc.)
7. Do these SOPs (Question #6 above) include formal written guidelines or instructions for incident response, as well as operational and technical elements that enable emergency response personnel to act in a coordinated manner across all disciplines in the event of an emergency. emergency?
8. Do telecom operators have up-to-date contingency plans available to respond to emergencies and maintain continuity of service at all times?
9. Are these contingency plans (Question 8 above) mandated and approved by telecommunications and Disaster Risk Management (DRM) authorities (such as the telecommunications regulator, the DRM lead or coordinating agencies)?

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ISBN: 978-92-61-38821-8

Published in Switzerland
Geneva, 2024

Photo credits: stock.adobe.com