Malawi National Emergency Telecommunications Plan (NETP)

May 2023

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Key Acronyms

ACL	Access Communications Limited
ARC	African Risk Capacity
ARDMC	Area Disaster Risk Management Committee
CAP	Common Alerting Protocol
COC	Central Operations Chamber
CONGOMA	Council for Non-Governmental Organisations for Malawi
DCCMS	Department of Climate Change and Meteorological Services
DoDMA	Department of Disaster Management Affairs (DoDMA
DRM	Disaster Risk Management
EOC	Emergency Operations Center
ETC	Emergency Telecommunications Cluster
FAO	Food and Agriculture Organization
IFRC	International Federation of Red Cross and Red Crescent Societies
ISP	Internet Service Provider
ITU	International Telecommunications Union
LADRMC	Local Authority Disaster Risk Management Committee
MACRA	Malawi Communications Regulatory Authority
MARL	Malawi Amateur Radio League
MNO	Mobile Network Operator
MoICT	Ministry of Information and Communication Technologies
MRA	Malawi Revenue Authority
MTL	Malawi Telecommunications Limited
NDPRCM	National Disaster Preparedness and Relief Committee
NDPRTC	National Disaster Preparedness and Relief Technical Committee
NDRMCS	National Disaster Risk Management Communication Strategy
NETP	National Emergency Telecommunications Plan
NGO	Non-Governmental Organization
OCL	Open Connect Limited
PPDR	Frequencies for Public Protection and Disaster Relief
RCMRD	Regional Centre for Mapping of Resources for Development (RCMRD
SOP	Standard Operating Procedure
telecom/ICT	telecommunications and Information and Communication Technologies
TNM	Telekom Networks Malawi Limited
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
VDMC	Village Disaster Risk Management Committee
WFP	World Food Programme

Introduction

This National Emergency Telecommunication Plan's (NETP) goal is to set the strategy that will enable and ensure communication availability during the phases of disaster risk management (DRM). This goal is achieved by promoting coordination across all levels of government, between both public and private organizations, and within the communities at risk.

The NETP considers the definition of policies, the organizational structure, and the methods of coordination between the different actors during all four phases of DRM in Malawi. It also establishes the principles that guide the allocation of resources and responsibilities for the achievement of the proposed objectives, including the expected telecommunications, information, and communication technologies (telecom/ICT) response times, tasks and processes.

The NETP has a transversal nature, given the modern importance of telecom/ICTs during disaster management. Therefore, that management must be carried out under the leadership of the national government, be an integral part of the national disaster risk management plan, and be based on the nationwide organizational structure and governance model established for DRM.

The following sections address these points and propose a series of actions that should be completed to enhance and update the telecom/ICT plan for DRM in Malawi.

The Objective and Scope of the NETP

This NETP seeks to describe the relevant elements of telecom/ICT use for DRM in Malawi during its four phases: Mitigation, preparedness, response, and recovery. In particular, the purpose of this plan is to guide the actions of the telecom/ICT sector to provide effective support for and improve coordination between the different agents involved in DRM in the country. This NETP also seeks to strengthen telecom/ICTs in the country, so the relevant actors in this sector can appropriately support efforts to mitigate disaster risk, as well as prepare, respond, and recover when faced with future emergencies.

This NETP is intended for all persons and institutions involved in DRM in Malawi, including the authorities at all levels of government, the private sector, and other actors and participants in the telecom/ICT and emergency aid sectors.

Structure of the NETP

This document is divided into nineteen chapters. Chapters 1 through 4 describe the existing institutional and normative framework for emergency telecom/ICTs in Malawi. Chapters 5 through 19 refer to the main components that should be considered for each of the four phases of DRM and delineate recommendations and key action items that need to be carried out r to continue developing and updating an effective NETP. Chapters 5 through 9, in particular, correspond to the mitigation phase of DRM and deal with such topics as the country's vulnerability to natural hazards, the current state of the telecom/ICT sector, and the establishment of a specific telecom/ICT regulatory framework for DRM. Chapters 10 through 14 correspond to the preparedness phase of DRM and include topics related to telecom/ICT standard operating procedures, contingency planning, and early warning systems. The response phase of DRM is covered in Chapters 15 through 17, which discuss topics like communication and coordination

during any emergency response, collection and analysis of information, and emergency awareness and updates. Finally, the recovery phase for DRM is addressed in Chapters 18 and 19, which present topics such as the assessment of damage to the telecom/ICT infrastructure, and the reconstruction and follow-up activities will need to be carried out after the disaster.

Summary of Action Items

The following Action Items should be undertaken by the Malawi government:

Action Item 1

Continue with the development and approval process of the new disaster management law (the draft DRM Bill), so the country can have a comprehensive legal, policy, and institutional framework for effective disaster risk management. This framework should name and define a single institution to be held accountable of leading and implementing emergency telecommunications issues in the DRM framework, including reviewing and updating the NETP.

Action Item 2

Review and update the National Disaster Risk Management Communication Strategy (NDRMCS) with the proposed National Emergency Telecommunications Plan presented in this document. This NETP should combine all policy instruments, manuals, individual communications strategies and standard operating procedures developed through the years and released in different documents by the Government. It should also include all the roles and responsibilities of the different stakeholders involved in Malawi's disaster risk management process, including public and private organizations, humanitarian entities, and NGOs, among others. Disaster management agencies' policies regarding communications should be considered as part of this integrated and comprehensive NETP.

Action Item 3

The Cabinet and the National Disaster Preparedness and Relief Committee (NDPRCM) should lead and approve the updated vulnerability maps for the different types of hazards in the NETP, and especially those related to droughts, floods, and epidemics developed and maintained by the relevant agencies involved in assessing and monitoring natural hazards in Malawi (e.g. Department of Climate Change and Meteorological Services, the Department of Water Resources, the Department of Agricultural Extension Services, the Department of Fisheries, and the National Smallholder Farmers Association of Malawi). This information must be described at the municipal level and be available to telecom/ICT operators. It should also include information on the most vulnerable communities, specifying the type of hazards they are prone to, as well as the telecom/ICT resources available for each of them.

Action Item 4

The Malawi Communications Regulatory Authority (MACRA) shall periodically develop and update the network inventory and coverage of the mobile and fixed, terrestrial, and satellite telecom/ICT network and service providers and the radio and television broadcasting service providers, relevant for its use during all phases of DRM. It should also include in this inventory other types of telecom/ICT networks relevant for disaster relief, such as radio-amateur and first responder networks.

Action Item 5

All telecom/ICT network and service operators, terrestrial and satellite, mobile and fixed, and radio and television broadcasting providers, as well as government agencies responsible of telecom/ICT networks,

(e.g., first responders), must develop -or update- and present for their approval by the Malawi Communications Regulatory Authority a vulnerability analysis of the critical infrastructure of their networks according to the different types of hazards to which Malawi is prone. This vulnerability analysis should also include precise coverage maps of the telecom/ICT networks.

Action Item 6

The Malawi Communications Regulatory Authority should be held accountable for establishing specific regulations for the telecom/ICT sector on disaster risk management in the country. These regulations should be based on its functions, as granted by legislation, thereby encouraging telecom/ICT network and service providers to actively participate in each phase of such disaster management.

Action Item 7

The HF and VHF networks should be adopted and maintained for continuous operation. MACRA should carry out and keep updated the corresponding analysis and studies to decide which model (i. Public safety exclusive dedicated network, ii. Shared public safety and commercial network or iii. Commercial network) would fit Malawi's needs for broadband PPDR in the 694-791 MHz frequency range.

Action Item 8

1. *Malawi must initiate the process for the Tampere Convention to be bounded by. To this end, it is recommended that the National Disaster Preparedness and Relief Committee, the Ministry of Foreign Affairs, the Customs Authority, and the Malawi Communications Regulatory Authority initiate the necessary steps for the ratification of the Convention. Subsequently, the necessary legislative and regulatory adjustments for the effective implementation of the Convention must be undertaken by the relevant authorities.*
2. *If the above occurs, the Malawi Communications Regulatory Authority must establish specific regulations for the implementation of the Tampere Convention.*
3. *Coordination and collaboration with different international agencies, such as the ETC (Emergency Telecommunications Cluster) and the ITU (International Telecommunications Union) regarding issues of preparedness and response to eventual disasters or emergencies is clearly imperative, and they must continue and be strengthened. These actions will avoid duplication of effort and overlapping of work.*

Action Item 9

1. *Update and strengthen Standard Operating Procedures for emergency and disaster response that is related to communications within and between agencies and the technical means for communication (voice/data), including interoperability, in order to include an exhaustive list of all actions that may be required for disaster response.*
2. *Define and keep updated a list of the government entities and the contact points (key decision makers) within these entities that must maintain ongoing communications during all phases of DRM.*
3. *Maintain an updated database with these same focal points of every agency involved in disaster risk management.*
4. *Analyse the possible interoperability between the equipment (wireless) and the communication networks of the government entities.*
5. *Establish a set of radio frequencies that can be used for communications between the contact points (key decision makers) and be sure they are fully compatible with the radio communication equipment being used.*

6. *Establish alternative methods of communication, if necessary, for example, through existing communication operators.*
7. *Develop 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 10

Public and private telecom/ICT network and service providers, including terrestrial and satellite, whether mobile, fixed, or broadcasting, must individually keep their contingency plans updated to be ready to respond to an emergency. Measures such as network redundancy, mobile base stations, secondary energy sources, satellite terminals stored and ready to use, among others, must be considered and included in the network design, particularly in those regions and communities at risk based on the hazard maps and risk assessments and considering the overall network vulnerability analysis.

Action Item 11

1. *Malawi must continue to develop surveillance and monitoring systems for probable threats prior to the occurrence of disasters and/or emergencies; for instance, by implementing and enhancing the National Meteorological Policy issued by the government in 2019, to address the obstacles identified for EWS, including timely communication to the communities. With the cooperation of the telecom/ICT service providers, the solutions to warn and alert the public must be implemented, i.e., through cell broadcast technology and the broadcasting networks (radio and TV). Early Warning Cluster could have a leading role in these activities.*
2. *The Common Alerting Protocol (CAP) is one of the most efficient mechanisms to use to alert the population of a hazard and provide clear and precise information and communicate relevant facts to the population at risk.*

Action Item 12

1. *MACRA, jointly with telecommunications operators, should review and update the plans and scope related to the drills and trainings for emergency telecommunications.*
2. *Telecommunications trainings and drills for emergencies should be regularly carried out in order to improve emergency responders' capacity to use communications equipment, as well as to enhance their ability to execute policies, plans, and procedures that govern the use of these communications networks. The telecom/ICT sector should actively participate in these drills and exercises, and also develop and carry out their own so as to effectively implement the NETP.*

Action Item 13

The Malawi authorities, working together with network operators and telecom/ICT service providers, should develop mechanisms to help them understand the accessibility requirements needed to guarantee that vital digital communication technologies are inclusive and, therefore, accessible to all persons, including people with disabilities, the elderly, women and girls, and refugees and immigrants. This effort should then be linked to the early warning systems to be developed in the country, so that people can receive and understand the alerts so early actions can take place.

Action Item 14

The National Disaster Preparedness and Relief (NDPRCM), through its Early Warning and its Transport, Logistics, and Communications Clusters should consider planning for the development of 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, terrestrial or satellite, local or remote, and could be located in a vehicle or in a shelter, among other possibilities. Maintaining interoperable and continuous communications between the command posts and the rest of the stakeholders is vital for an effective response to the emergency.

Action Item 15

During the response phase, call centres should be established to warn the affected population of new risks, disseminate updates about the emergency situation, and connect affected populations with their relatives. Generally, these call centres can be located in shelters, and should use a means of communication that do not congest the networks, for example, text messages. To establish these call centres, Malawi could use satellite networks, which can be easily installed, or seek collaboration with telecom/ICT operators or international organizations so as to establish the required telecom/ICT infrastructure successfully.

Action Item 16

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

Action Item 17

Based on the experience acquired during disaster management, a report should be developed after the response and recovery phases by the agency held accountable for reviewing and updating the NETP to identify lessons learned and the 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 also be updated every 2 to 3 years.

1. Description of the four phases of disaster risk management[1]

Disaster risk management (DRM) has two distinct stages-- risk management and crisis management. In the first stage, appropriate measures are taken in advance to predict and warn of a disaster as well as prevent and/or mitigate its damage. These efforts occur under normal or non-emergency conditions and correspond to the mitigation and preparedness phases. Alternatively, crisis management takes place during actual emergencies and includes actions, such as search and rescue, response coordination, damage assessment, activation of a policy response, or mitigation of a secondary related disaster. This second stage of disaster management 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 such activities as identifying existing hazards and risks, conducting vulnerability assessments, the construction or maintenance of a critical telecommunications infrastructure, and the development of written plans and procedures, such as the NETP.

During this phase, the role of telecom/ICTs is to help analyse the risk of potential disasters, disseminate information about impending hazards and how to mitigate their impacts, so those hazards do not lead to disasters, identify communities at risk, and help implement strategies, technologies, and processes that can reduce their negative effects. Activities carried out during the mitigation phase include establishing legal and regulatory frameworks that support the use of emergency telecom/ICTs, conducting risk analyses of the critical telecom/ICT infrastructure, taking steps to reduce the vulnerability of telecommunications networks and improve their capacity for recovery, and assess vulnerabilities to develop multi-hazard early warning systems that have the appropriate technology for each case. These strategies should be implemented both before and after the emergency.[2]

Preparedness

The preparedness phase includes the planning and preparations necessary to respond to an emergency event. These can include the establishment of multi-hazard early warning systems, training, operational processes, and the implementation of the written plans and procedures developed during the mitigation phase. Telecom/ICTs during 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, these actions must facilitate the coordination and communication of all those involved in disaster management.

During this phase, it is important to implement plans that guarantee that communications will not be interrupted, continuously carry out telecom/ICT training and drills, and regularly carry out activities designed to create awareness among those involved. These include campaigns presented in different formats accessible to the population potential hazards and the activities that people must carry out at once during the response phase.

[1] International Telecommunications Union (2020), ITU Guidelines for national emergency telecommunication plans.
[2] Federal Emergency Management Agency (FEMA), The Four Phases of Emergency Management.

Response

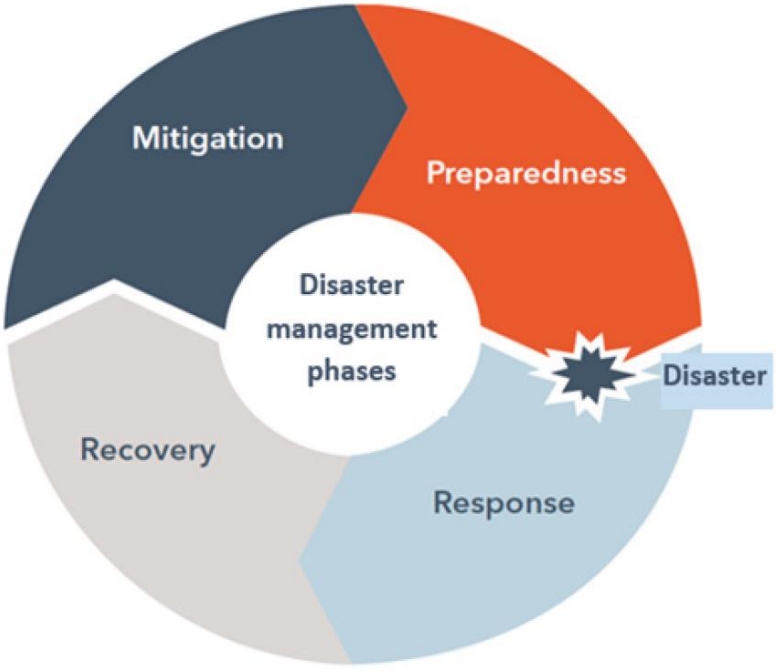
The response phase is carried out during the emergency itself and includes humanitarian activities such as search and rescue, evacuation of people from affected areas and the opening of shelters, and others designed to assist the population.

The role of telecom/ICTs during this phase is vital in order to connect all stakeholders, including first responders, government stakeholders and government agencies, communities at risk, shelters, health centers and Non-Governmental Organizations (NGOs) This action is especially important, as several of these entities carry out a variety of activities and procedures at local, national and international levels.

Recovery

Depending on the magnitude of the emergency, the recovery phase may run a few days, weeks or even months after the disaster, and focuses on providing the necessary aid to allow the population to return to the initial levels of safety and functionality that community had before the disaster. Activities during this phase can include infrastructure reconstruction, restoration of public sector operations, debris removal, and others. This restoration and reconstruction phase must include telecom/ICTs infrastructure, especially due to the fundamental role that this sector plays within the community. This reconstruction should be based in the lessons already learned and applying the principle of building-back-better.

Figure 1. Phases of Disaster Risk Management



Source: ITU (2020)

2. Malawi Legislation Related to Disaster Risk Management

Legislation and regulations are the key for DRM, as they are the basic foundation that defines the roles and responsibilities of all stakeholders involved in the DRM process. These are the frameworks on which coordination mechanisms, communication channels, and standard operating procedures are determined, and which decision- makers in relevant agencies are actually identified.[3]

Thus, it is very important to assess the current legislative and regulatory framework for DRM in Malawi. This framework is described in more detail in the following subsections.

The Malawi Constitution[4]

The Constitution for the Republic of Malawi establishes that the President may declare a state of emergency in times of war, threat of war, civil war, or a widespread natural disaster. This declaration of a state of emergency shall be in force for a maximum of 21 days, unless it is extended for a period no longer than 3 months, or consecutive periods no longer than 3 months at a time, by a resolution adopted by a vote of at least two-thirds of the National Assembly.

The Constitution also determines that the Defence Force of Malawi shall, among other responsibilities, provides technical expertise and resources to assist the civilian authorities in the maintenance of essential services in times of emergency.

Disaster Preparedness and Relief Act of 1991 (DPR Act)

The DPR Act of 1991 establishes the office of the Commissioner, with a Commissioner for Disaster Preparedness and Relief, as well as a Principal Secretary in the Department of Disaster and Management Affairs, mandated to coordinate all disaster preparedness and disaster relief activities in Malawi. The Act also establishes a body known as the National Disaster Preparedness and Relief Committee of Malawi and also determines its composition and functions (Section **Error! Reference source not found.**).[5] It also establishes planning sub-committees to carry out any special or general functions as determined by the Committee, and further, provides for an organisation of civil protection, the role and duties of volunteers, and the emergency powers of the Minister. In these respective provisions, the DPR Act thus provides for the roles and responsibilities of different actors during disaster management.[6]

Particularly, the DPR Act determines that the Minister in charge of disaster preparedness and relief may, on the advice of the Commissioner, establish civil protection regions or declare an area to be a civil protection region. The Act also states that the President may declare that, effective from a date specified by the President in the declaration, a state of disaster will exist within an area defined by the President in

[3] United Nations Office for Disaster Risk Reduction (2018). Implementation guide for local disaster risk reduction and resilience strategies - A companion for implementing the Sendai Framework target E.
[4] Constitution of Malawi. (1994)
[5] Disaster Preparedness and Relief Act (Cap. 33:05). (1991)
[6] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.

that declaration.[7] This declaration, according to the Act, shall remain in force for a period of three months unless otherwise specified.[8]

The Minister in charge of disaster preparedness and relief may also take over certain powers and duties during disasters where that state of disaster has been declared to exist. In that scenario, the Minister may, on the advice of the Committee, impose authority for any power or duty conferred on such area.[9]

The government is in the process of developing a new disaster management law (the drafted DRM Bill), which aims to replace the DPR Act and, currently, is awaiting approval by the Parliament[10]. A description of that draft DRM Bill is not included in this NDMP, as it not yet passed into law.

Disaster Risk Management Policy of 2015

In addition to the DPR Act, the Government of Malawi developed a Disaster Risk Management Policy in 2015, with the objective of creating a framework for the establishment of a comprehensive DRM system for Malawi, that is, devising policy strategies for achieving the long-term goal of reducing disaster losses in the country.[11] This policy has 6 specific objectives:[12]

- Facilitate the mainstreaming of DRM into sustainable development policies and planning processes at all levels.
- Develop an effective system for conducting comprehensive disaster risk assessments at all levels.
- Develop an integrated and effective people-centred early warning system that is both comprehensive and effective.
- Promote a culture of safety and resilience among DRM stakeholders, including communities.
- Assess and address all underlying risk factors.
- Strengthen the disaster preparedness system for more effective response and recovery at all levels.

Policy Priority Area 4 of the document, in particular, that seeks for the "promotion of a culture of safety, and adoption of resilience-enhancing interventions", establishes statements that pursues the "promotion of interdisciplinary and policy-oriented research on appropriate disaster risk management technologies and approaches", as well as of the "involvement of the media, social networks, communities and other institutions in the generation and dissemination of DRM information".

Action Item 1

Continue with the development and approval process of the new disaster management law (the draft DRM Bill), so the country can have a comprehensive legal, policy, and institutional framework for effective disaster risk management. This framework should name and define a single institution to be held accountable of leading and implementing emergency telecommunications issues in the DRM framework, including reviewing and updating the NETP.

[7] This declaration was made, for instance, in January 2022: https://media.malawilii.org/files/legislation/mw-act-gn-2022-8-publication-document.pdf
[8] Disaster Preparedness and Relief Act (Cap. 33:05). (1991).
[9] IbIbid.
[10] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
[11] Government of Malawi. (2015). National Disaster Risk Management Policy.
[12] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.

3. Agencies Involved in Disaster Risk Management in Malawi

National Disaster Management Structure

The National Disaster Preparedness and Relief Committee (NDPRC), created by The DPR Act of 1991, is generally responsible for overseeing the coordination and planning of all activities aimed at alleviating disasters in Malawi. It also has the power to establish any sub-committees responsible for carrying out any special or general functions related to disasters in Malawi. The NDPRCM is composed of Principal Secretaries (ministries) as well as a maximum of five members' representing national and international NGOs and appointed by the Minister in charge of disaster management in the country. The DRM Committee is chaired by the Chief Secretary to the President and Cabinet. Currently the members from civil society are World Vision International, the Malawi Red Cross Society, Action Aid, and the Council for Non-Governmental Organisations for Malawi (CONGOMA).[13]

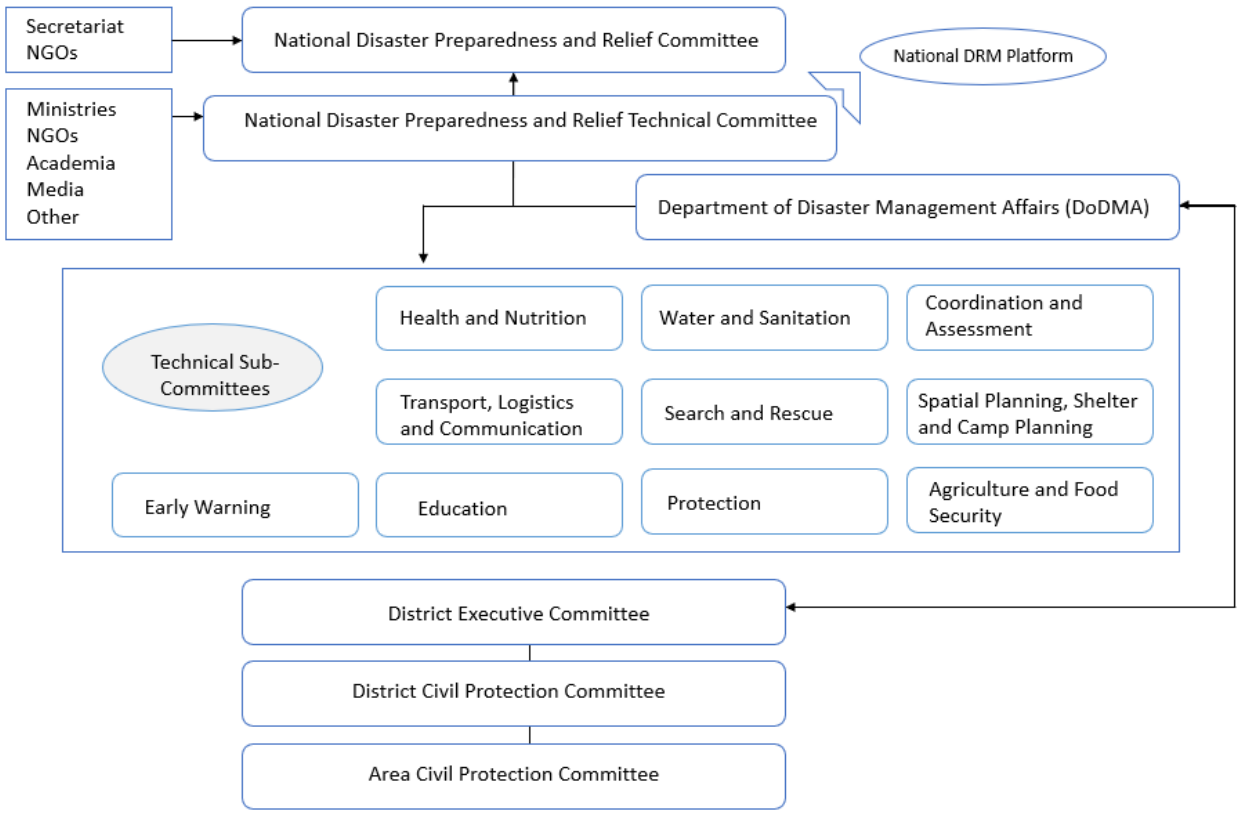
Below the DRM Committee (see Figure 2) is the National Disaster Preparedness and Relief Technical Committee (NDPRTC). It is comprised of Technical Staff at the level of Directors (from Government, NGOs, media, academia, private sector, UN, and donor agencies) and is chaired by the Principal Secretary of DoDMA. It serves, along with DoDMA as the coordinating agency, as the operational entity for disasters in Malawi and reports to the DRM Committee.[14]

The DoDMA, moreover, also established by the Disaster Preparedness and Relief Act of 1991, acts as the agency responsible for coordinating and directing the implementation of disaster risk management programmes in the country.[15] DoDMA's strategic goals include developing an effective system to identify, assess and monitor national and cross-border risks; strengthening a people-centred early warning system at national and local levels; promoting a culture of safety via knowledge, education and innovations; and identifying and addressing underlying risk factors in communities and households, among others.[16]

DoDMA has three functional divisions, namely: 1) Risk Reduction Division,[17]which is responsible for implementing mitigation activities to reduce the impact of disasters; ii) Response and Recovery Division[18], which is in charge of response and recovery actions; and iii) the General Support Division, and its administrative and other responsibilities.

[13] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
[14] Ibid.
[15] United Nations. Malawi Department of Disaster Management Affairs (DoDMA). Retrieved in August 2022 from: https://un-spider.org/malawi-department-disaster-management-affairs-dodma
[16] DoDMA. Retrieved in August 2022 from: https://www.dodma.gov.mw/
[17] DoDMA. Retrieved in August 2022 from: https://www.dodma.gov.mw/index.php/pages/divisions/risk-reduction-division
[18] DoDMA. Retrieved in August 2022 from: https://www.dodma.gov.mw/index.php/pages/divisions/response-and-recovery-division

Figure 2. The National Disaster Management Structure



Source: IFRC.

Below DoDMA, the disaster management structure of Malawi is comprised of different planning and civil protection sub-committees that are responsible for specific areas, sometimes referred to as clusters.[19] One of these clusters is the Transport, Logistics, and Communications Cluster, which has the following members:[20]

- Ministry of Transport and Public Infrastructure (Chair)
- National Roads Authority
- National Roads Safety Council
- Malawi Defence Force
- Malawi Red Cross Society
- Malawi Police Service
- Department of Marine
- Department of Immigration
- Local Transporters Association of Malawi
- Malawi Revenue Authority
- Malawi Institute of Engineers
- Related UN Agency (e.g.WFP)
- National Construction Industry Council
- Malawi Energy Regulatory Authority
- District Councils
- City Councils

This cluster has distinct functions for the different phases of disaster management. In particular, during the preparedness phase, it will coordinate and assess preparedness activities for transport and logistics; ensure that road and other communication networks to disaster prone areas are in good condition; ensure

[19] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
[20] Information provided directly by DoDMA.

that contingency stocks relevant to the cluster are stockpiled and pre-positioned; and develop, monitor and review the cluster´s component of multi-hazard district contingency plans. For the response phase of disasters, this cluster is accountable for undertaking damage assessments on cluster- related aspects and issues, ensuring that the affected population is provided with all necessary relief assistance; also monitoring and directing disaster relief programmes that are being implemented by different line ministries and other stakeholders, and any other related actions. Finally, during the recovery phase of DRM, this cluster conducts a post-disaster needs assessment; facilitates the rehabilitation and/or reconstruction of road networks and other communication networks; coordinates resource mobilization for training and public awareness for risk reduction, rehabilitation and recovery; and facilitates, monitors and evaluates the development, review and implementation of disaster recovery plans.[21]

Finally, the above disaster management structure for Malawi is defined at the local level in such a way that the DRM Committee is decentralised through District Executive Committees, District Civil Protection Committees Area Civil Protection Committees, and Village Civil Protection in its engagement with disaster management.[22]

Additional Relevant Agencies

In addition to the different committees and agencies that comprise the National DRM structure, other relevant actors involved in disaster management, and specially related to emergency telecom/ICT are the following:

Emergency Operations Center (EOC):

Serves as the focal point for the coordination of disaster response and recovery efforts during and after disasters and emergencies. In that sense, the EOC is the headquarters where relevant information is received and transmitted and where requests for deployment of assistance are communicated. In Malawi, an EOC may be established either at the national or the local level (National Emergency Operations Centre – NEOC, or Local Authority Emergency Operations Centre - LAEOC). Its primary functions include collecting, analysing, and disseminating information; coordinating emergency operations and communications; and requesting, dispatching, and tracking resources. [23] [24]

The Malawi Communications Regulatory Authority (MACRA):

Established by the Communications Act of 2016 (Act 34 of 2016), MACRA regulates and monitors the providing of communications services in the country and ensures that reliable, sufficient, and affordable communications services are provided throughout Malawi. [25]

MACRA, nonetheless, is not explicitly accountable for establishing regulations, plans, or similar policies regarding emergency telecom/ICTs.

Ministry of Information:

Establishes the overall policy related to communications in Malawi. The Department of E-government - within the Ministry published a Digital Government Strategy in 2019 which, among other recommendations and projects, establishes that the Department of E-Government should take the lead

[21] Information provided directly by DoDMA.
[22] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
[23] Information provided directly by DoDMA.
[24] Information provided directly by DoDMA.
[25] Government of Malawi. (2016). Communications Act 34 of 2016.

in establishing an Incident Management team, a Business Continuity Plan, and a Backup and Recovery Infrastructure. Nonetheless, no other policies or regulation related to telecom/ICT for emergencies has been developed.

4. National Disaster Risk Management Communication Strategy (NDRMCS) - Voice from the Primary Audience – (2019-2022)[26]

The National Disaster Risk Management Communication Strategy (NDRMCS) has been developed by the Department of Disaster Management Affairs (DoDMA) in 2019[27] to ensure that those who are exposed to disasters are informed about the risks and are aware of the measures to take to prevent, mitigate, prepare for, respond to, and recover from these hazards. In particular, the Strategy aims at creating awareness among the stakeholders in disaster risk management and promoting the adoption of positive DRM behaviors; strengthening the capacity of stakeholders in the development and communication of DRM information; and improving coordination, collaboration and networking of DRM stakeholders for communication interventions. For this purpose, the document provides a framework to deliver key messages and raise awareness and target communities, local governments, media (e.g., print, TV, radio, Internet), NGOs, the private sector, government agencies, opinion formers, development partners and the general public.

The Strategy identifies the major current problems in emergency communications in Malawi and focuses on key aspects to address to achieve a solution:

1. Information and decision-making flow in a top-down approach: It should flow in multiple directions and communities should feed into information sharing and decision-making processes-.
2. Information is generalized and not context specific: It should be more specific and relevant to different contexts, and relevant stakeholders should be prioritized for receiving information.
3. It takes time for information to reach targeted groups: Timely dissemination of information should happen so as to increase lead time.
4. Communities are not sufficiently prepared, resulting in reduced community resilience: More guidance should be provided to them on what actions should be taken to turn early warning into early action.

Therefore, according to the Strategy, the country needs to migrate from a simply reactive approach to establish a combined reactive and proactive one. For this purpose, the NDRMCS document suggests focusing on the following topics:

- Weather Information Accuracy and Accessibility.
- Community Participation and Local Leadership.
- Resilience Building.
- Coordinated Approach Between all stakeholders.
- Resource Mobilization.
- Promotion of Indigenous Knowledge and Technologies.

[26] DoDMA. (2019). National Disaster Risk Management Communication Strategy Voice from Primary Audience (2019 – 2022).
[27] With support from UNDP under the M-CLIMES Project.

- Responsible and Informed Media Reporting.
- Capacity Building for Communicating Disaster Risk Management Information.

The Strategy further presents an analysis of the audience for the design and dissemination of DRM information. It is critical to understand the types of stakeholders that the strategy aims to reach out to, that is, from those that are directly affected to those that have the power to make decisions that can positively or negatively affect the risk elements.[28] Also, it establishes strategic considerations -or key approaches- to achieve the desire results regarding communication for positive behaviour and social change:

Behaviour Change Communication (BCC): According to the Strategy, this is a combination of approaches that include, for instance, social marketing and participatory communication, designed to inform, influence, and support households and individuals to adopt, practice, and sustain a set of desired behaviours.

Community-led Social Change (CLSC): Seeks to engage and empower communities and networks to influence or reinforce social norms and cultural practices to create an environment that supports long-term sustainable change.

Social Mobilization: Engages and motivates civil society (including NGOS or the private sector) for their good will and offering resources to a common cause.

Social Advocacy: Helps to mobilize local level leadership to endorse and develop mechanisms to ensure that the perspectives, concerns, and voices of affected households and communities from the community (especially the marginalized), are reflected via upstream policy dialogue and effective and positive decision-making.

According to the Strategy, different tools should be used for achieving the proposed objectives. These tools include print media (newspapers, magazines, newsletters, leaflets, brochures, pamphlets, road banners, roll-up banners, posters, billboards, large print); electronic media/broadcast (radio, television, documentaries, interactive websites, social media); direct stakeholder engagement (meetings, workshops, symposia, drama, dances, songs, storytelling, poetry, exhibits/displays, road shows, school clubs), and social marketing and advertising (newspapers, radio, television).

Finally, this Strategy highlights that in order to communicate all the messages for disaster risk management properly, these messages need to be simple, clear, and easily understood by the targeted audience, and provide a summary of key messages that can be promoted to address specific issues in DRM for each type of stakeholder.

The document ends with a discussion of activities to be developed by the different authorities that are responsible for the implementation of the Strategy.

Action Item 2

Review and update the National Disaster Risk Management Communication Strategy (NDRMCS) with the proposed National Emergency Telecommunications Plan presented in this document. This NETP should

[28] See Section 3.2 of the DoDMA´s Communications Strategy of 2019.

combine all policy instruments, manuals, individual communications strategies and standard operating procedures developed through the years and released in different documents by the Government. It should also include all the roles and responsibilities of the different stakeholders involved in Malawi's disaster risk management process, including public and private organizations, humanitarian entities, and NGOs, among others. Disaster management agencies´ policies regarding communications should be considered as part of this integrated and comprehensive NETP.

Mitigation Phase

5. Vulnerability to Disasters from Natural Hazards in Malawi

Malawi is exposed to a range of different hazards, including floods, heavy storms, droughts, dry spells, strong winds, epidemics, fires, landslides, and earthquakes. The most common, nonetheless, are weather-related hazards, which are becoming more frequent and less predictable as a result of climate change.[29]

Between 1940 and 2020, Malawi has experienced 75 disasters produced by natural hazards, with floods being the most common type (42), followed by epidemics (15), and droughts (8). These disasters have caused the death of 3,244 people in total, nearly half as a consequence of epidemics, and almost 1,000 because of floods (29.2%). Of the more than 2,500 people injured as a result of such events, around 1,300 have ended up in that situation because of floods. Of the more than 32 million people affected overall, nearly 87% were affected as a consequence of droughts. (see Table 1).

Table 1. Disasters in Malawi between 1967 and 2022*

Type of Hazard	# of events	Deaths	Injured	Population Affected
Drought	8	500		28.278.702
Earthquake	3	13	286	70.836
Epidemic	15	1.687	693	64.153
Flood	42	948	1.318	3.850.722
Landslide	1	8	9	109
Storm	6	88	217	172.867
Total	75	3.244	2.523	32.437.389

* Covid-19 pandemic not included.

Source: EM-DAT: The Emergency Events Database – Universite Catholique de Louvain (UCL) – CRED, D. Guha-Sapir – www.emdat.be, Brussels, Belgium.

In general, of all the disasters that occurred in Malawi in the last 5 decades as a consequence of natural hazards, those that affected the most population wee droughts, while the most injuries occurred from floods, and the deadliest type of hazard was epidemics (non-COVID), even though only 15 of these occurred during that period. When looking at the 10 deadliest disasters in Malawi since 1967 by number of deaths, 6 were epidemics, particularly cholera, followed by 3 floods and 1 drought. These three hazards, therefore, appear to be the ones that present the most risk to the Malawi population. (see Table 2).

[29] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.

Table 2. Ten Malawi disasters with the greatest number of deaths (1967-2022*)

#	Year	Disaster Subgroup	Disaster Type	Disaster Subtype	Event Name	Total Deaths	No Injured	Total Affected
1	2001	Biological	Epidemic	Bacterial disease	Cholera	609		21.414
2	2001	Biological	Epidemic	Bacterial disease	Cholera	502		17.352
3	2002	Climatological	Drought	Drought		500		2.829.435
4	1991	Hydrological	Flood	Flash flood		472		150.000
5	2015	Hydrological	Flood	Riverine flood		278	645	638.645
6	2002	Biological	Epidemic		Acute watery diarrhoeal syndrome	175		
7	2008	Biological	Epidemic	Bacterial disease	Cholera	113		5.269
8	2000	Biological	Epidemic	Bacterial disease	Cholera	83		3.323
9	2009	Biological	Epidemic	Viral disease	Measles	62		11.461
10	2019	Hydrological	Flood			60	672	975.672

Source: EM-DAT: The Emergency Events Database – Universite catholique de Louvain (UCL) – CRED, D. Guha-Sapir – www.emdat.be, Brussels, Belgium

In the last decade, nonetheless, probably as a consequence of climate change, the most severe types of hazards affecting the country (by number of deaths) have been floods and storms, that is, weather-related hazards, which caused 440 deaths of the 465 in total that occurred during that period. (see Table 3).

Table 3. Disasters in Malawi in the last decade (2012-2022*)

Year	Drought	Earthquake	Epidemic	Flood	Landslide	Storm	Total
2022						59	59
2021						13	13
2020				1			1
2019				60	8		68
2018				5			5
2017			6				6
2016				12			12
2015				278		5	283
2014			11				11
2013				3			3
2012				4			4
Total	0	0	17	363	8	77	465

* November 25th. Covid-19 pandemic not included.

Source: EM-DAT: The Emergency Events Database – Universite catholique de Louvain (UCL) – CRED, D. Guha-Sapir – www.emdat.be, Brussels, Belgium

Maps and Vulnerabilities

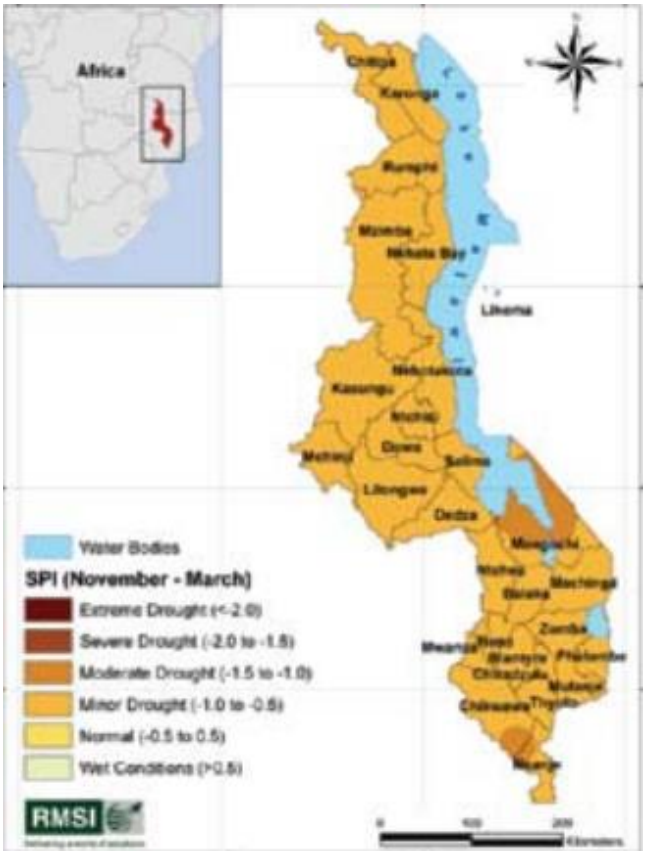
The World Bank, along with other partners, developed a vulnerability study for Malawi and Mozambique, wherein they created hazard maps for floods and for droughts in each country. For droughts, the authors developed a hazard map from the Standard Precipitation Index (SPI), which is based on precipitation data (intensity, magnitude, severity, and duration) within a period of 5 years.[30]

[30] World Bank. Economic vulnerability and disaster risk assessment in Malawi and Mozambique.

According to the study, droughts occur when the precipitation or soil moisture levels are sufficiently below the long-run mean.[31] In the case of Malawi, as shown on Map 1, the entire country appears to be vulnerable to this type of hazard, with propensities to minor droughts in all the regions, and moderate droughts in certain zones in the south of the country. Particularly, the Northern Department of Karonga and the Southern regions of the Upper and Southern Shire Valley, as well as the Bwanje Valley are most at risk for drought.[32]

In total, more than 8% of the population is exposed to drought risk. Even though disasters related to this hazard occur quite regularly, according to the study, they seem to affect fewer people every time, as opposed to the case of floods. In the past, droughts occurred in October and from December to January.[33]

Map 1. Droughts Hazard Map



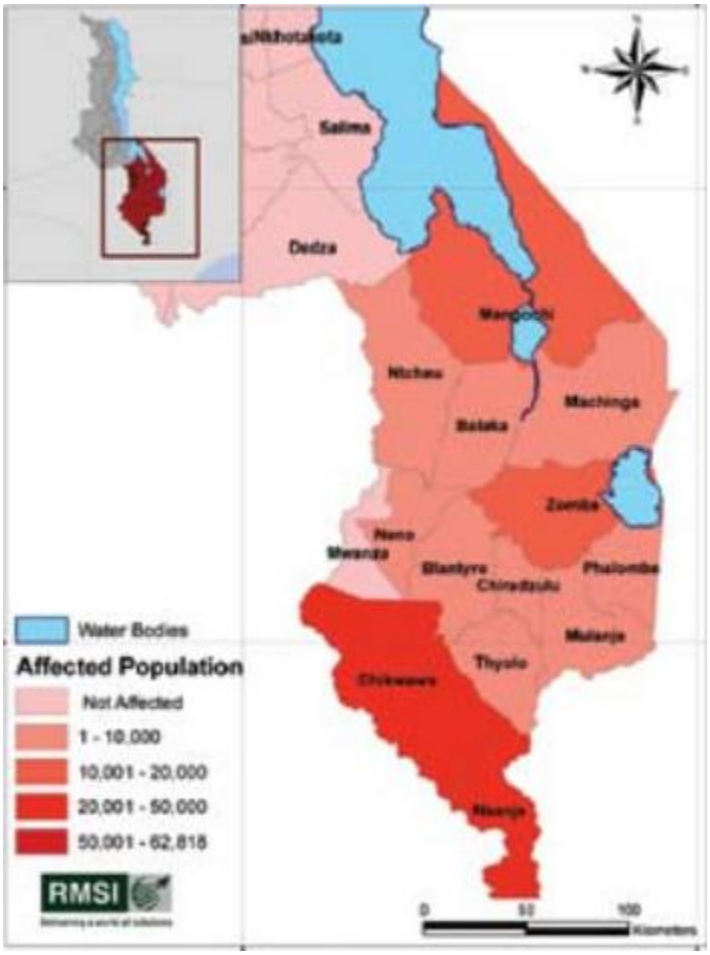
Source: World Bank et. al.

In terms of floods, the model developed by the authors adopts a similar approach to the case regarding droughts, in that this hazard is assessed using estimates for the probability of occurrence for floods of different severities, using, in this case, the data on the number of people affected by this type of hazard in Malawi. As depicted in Map 2, the Southern part of the country is the most prone to floods, especially the area just under the shire basin, in Mangoshi.[34]

[31] Ibid.
[32] Ibid.
[33] Ibid.
[34] World Bank. Economic vulnerability and disaster risk assessment in Malawi and Mozambique.

According to the World Bank et. al., the people of Malawi are quite vulnerable to floods, but the number of these events seems to be quite low. In total, nearly 20,000 people are directly exposed to floods.[35]

Map 2. Floods Hazard Map



Source: World Bank et. al.

Apart from droughts and floods, the population of Malawi is also exposed to other hazards, namely, the following:[36] [37]

- Landslides and mudslides: The Shire region in the south and the Central-Western coastal area of Lake Malawi are more at risk for landslides and mudslides after heavy rainfall. Generally, the Malawians are very vulnerable to landslides, but the absolute risk is quite low.
- Earthquakes: Although this type of disaster does occur in Malawi, they are usually not very strong and do not have a lot of impact. In the past 30 years, for instance, earthquakes under consideration have only occurred 7 times, in the Northern districts of Karong and Chitipa and the Central regions around Dedza.

[35] Ibid.
[36] World Bank. Economic vulnerability and disaster risk assessment in Malawi and Mozambique.
[37] International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.

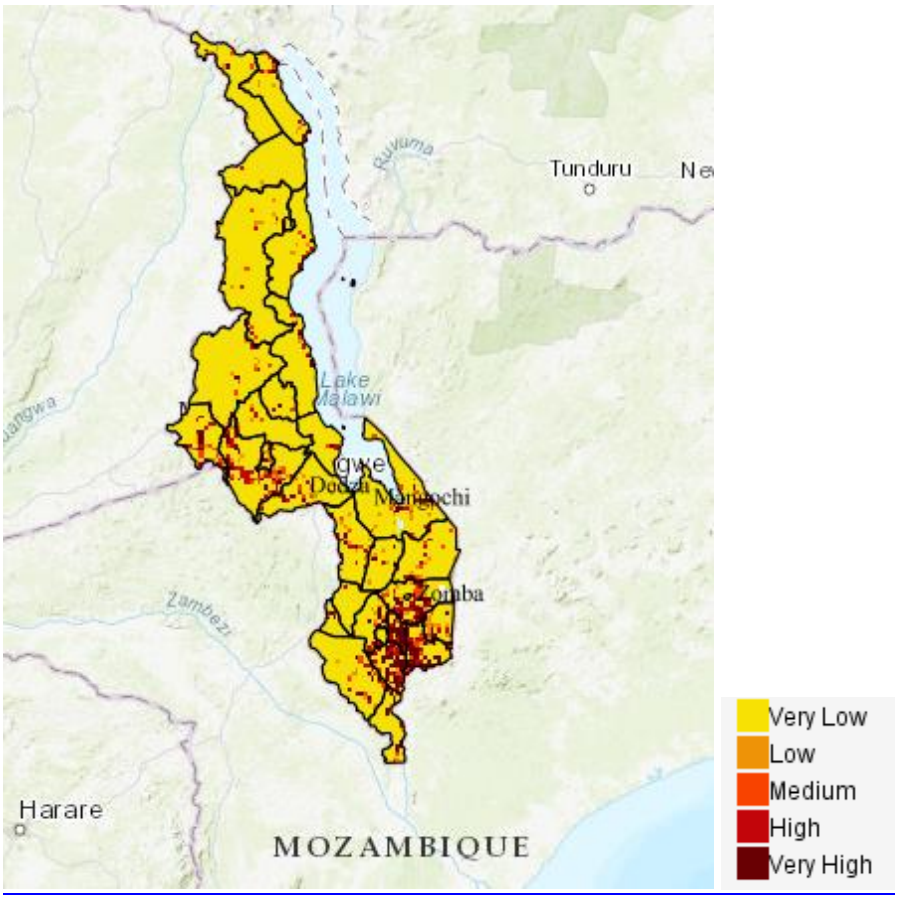
- Epidemics: In Malawi, the risk of contracting disease is very high. The most common diseases are bacterial and protozoal diarrhoea, Hepatitis A, typhoid fever, malaria, plague, HIV/AIDS, and schistosomiasis.

In general, according to the DoDMA (2019), the most disaster-prone districts in Malawiare Karonga, Salima, Nkhota-kota, Rumphi, Nkhatabay, Mangochi, Dedza, Ntcheu, Balaka, Zomba, Phalombe, Machinga, Blantyre, Chikhwawa and Nsanje. However, other districts may also be affected.[38]

A composite map of all hazards can be created using a tool developed by DoDMA in collaboration with the Regional Centre for Mapping of Resources for Development (RCMRD) and SERVIR-Eastern and Southern Africa[39]. This tool uses a compiled hazard and disaster database for Malawi and models vulnerability for three components-- exposure, sensitivity, and adaptive capacity to hazards. The tool is dynamic and user friendly, allowing users to generate their own vulnerability maps by assigning different weights to those main components[40]. For instance, using equal weights for exposure (0.34), sensitivity (0.34) and lack of adaptive capacity (0.33), a vulnerability map for the risks of drought, forest fires, precipitation, and riverine floods can be created (Map 3). As shown, and in line with the maps presented above for droughts and floods, Malawi appears to be more vulnerable to hazards in the Southern regions.

[38] DoDMA. (2019). National Disaster Risk Management Communication Strategy Voice from Primary Audience (2019 – 2022).
[39] Available at: http://apps.rcmrd.org/vulnerabilitytool/
[40] Regional Centre for Mapping of Resources for Development. etermining Malawi's Vulnerability to Natural Disasters. Retrieved from: https://www.rcmrd.org/archives/387-determining-malawi-s-vulnerability-to-natural-disasters

Map 3. Composite Vulnerability Map for droughts, forest fires, precipitations, and riverine floods



Source: Author's creation using the mapping tool at: http://apps.rcmrd.org/vulnerabilitytool/

Action Item 3

The Cabinet and the National Disaster Preparedness and Relief Committee (NDPRCM) should lead and approve the updated vulnerability maps for the different types of hazards in the NETP, and especially those related to droughts, floods, and epidemics developed and maintained by the relevant agencies involved in assessing and monitoring natural hazards in Malawi (e.g. Department of Climate Change and Meteorological Services, the Department of Water Resources, the Department of Agricultural Extension Services, the Department of Fisheries, and the National Smallholder Farmers Association of Malawi). This information must be described at the municipal level and be available to telecom/ICT operators. It should also include information on the most vulnerable communities, specifying the type of hazards they are prone to, as well as the telecom/ICT resources available for each of them.

6. The Telecom/ICT Sector in Malawi

Mobile voice and data services

Until the first quarter of 2022, there were nearly 12 million mobile cellular subscribers in Malawi, representing a penetration rate of 61.1%. In particular, for mobile broadband, active subscriptions were nearly 7.5 million, corresponding to a 38% penetration rate. The coverage, on the other hand, reached 86.3% for the 2G network; 84.4% for the 3G, and 68.8% for the 4G.[41]

There are three main mobile operators in Malawi: Airtel Malawi Limited, Telekom Networks Malawi Limited (TNM), and Access Communications Limited (ACL). Airtel Malawi, established in 1999, is a mobile service provider of data and voice solutions, as well as mobile and fixed internet services (since 2009). This company is a subsidiary of Bharti Airtel International, which operates in 14 countries across Africa and Asia.[42] TNM, meanwhile, was established in 1995 as a joint venture between the incumbent Malawi Telecommunications Limited (MTL) and Telekom Malaysia (TNM acquired Telekom Malaysia's stake in 2007),[43] and currently provides mobile phones, mobile and fixed Internet services, and voice and data plans that cover most of Malawi (more than 88% of the country, geographically)[44] with their 4G/LTE, 3G and 2G networks.[45]

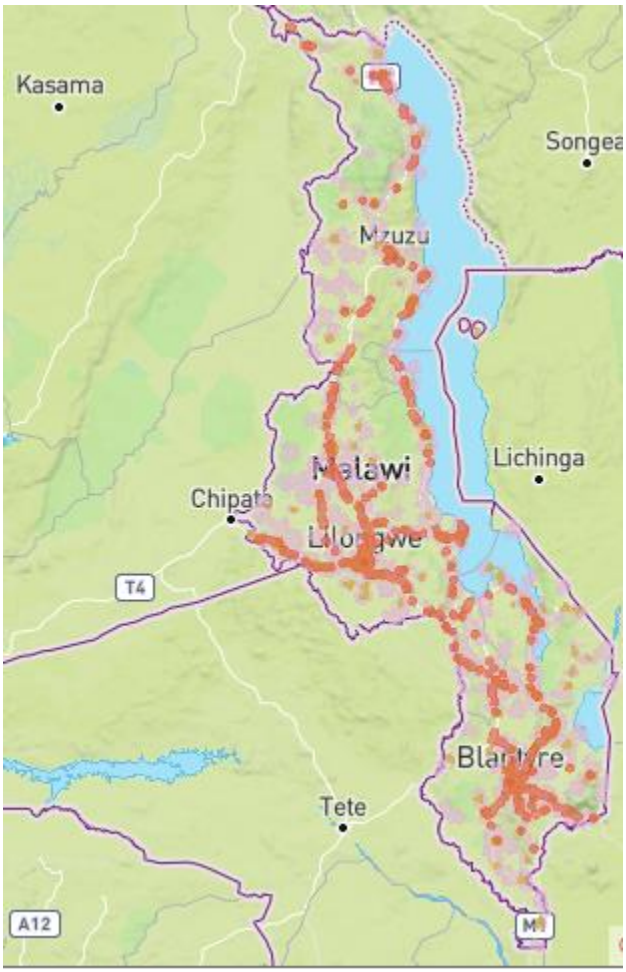
Both Airtel Malawi and TNM have invested in LTE to improve data services; thus, by September 2019, TNM's entire network had been upgraded to LTE.[46]

Finally, Access Communications Limited (ACL) is the third and smallest mobile operator in Malawi and provides services since 2010. In conjunction with the SDR developer, Athonet, this company launched a 4G LTE network in April of 2015, but currently still also provides 3G and CDMA coverage.[47]

The following maps show the main providers´ coverage for each network in the country.

[41] Data provided directly by MACRA.
[42] ITU. Measuring the Information Society Report 2018 – Volume 2. Page 106 – Malawi.
[43] Ibid.
[44] TNM. Company profile. Retrieved from: https://www.tnm.co.mw/#/about/company-profile in August 2022.
[45] BusinessMalawi.com. (2022). List of Malawi Mobile Service Providers. Retrieved from: https://www.businessmalawi.com/list-of-malawi-mobile-service-providers/ in August 2022.
[46] Developing Telecoms. (2021). Malawi calls for a third mobile network licence. Retrieved from: https://developingtelecoms.com/telecom-business/market-reports-with-buddecom/10531-malawi-calls-for-a-third-mobile-network-licence.html in August 2022.
[47] BusinessMalawi.com. (2022). List of Malawi Mobile Service Providers. Retrieved from: https://www.businessmalawi.com/list-of-malawi-mobile-service-providers/ in August 2022.

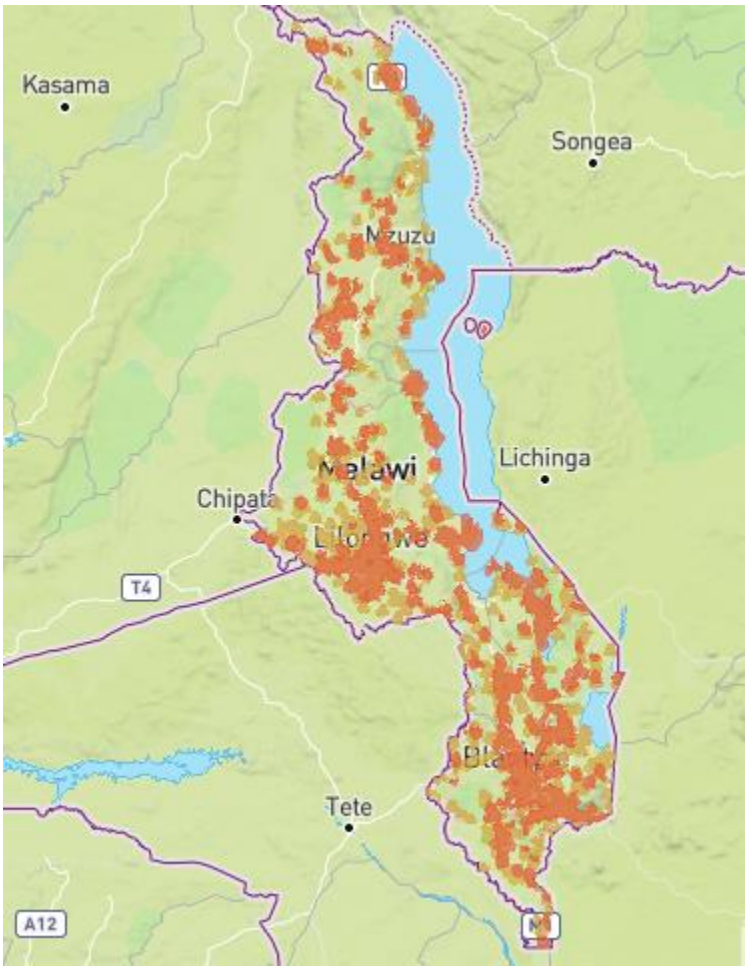
Map 4. Airtel Malawi Network Coverage (GSM, 3G and LTE)



Source: GSMA[48]

[48] Available at: https://www.gsma.com/coverage/#91

Map 5. TNM Network Coverage (GSMA, 3G and LTE)



Source: GSMA

Fixed Voice and Internet Services

The fixed services market in Malawi has two main operators: Malawi Telecommunications Limited (MTL) and ACL, and this last operator is described above. MTL has a 95% market share of the main lines and is also dominant in the upstream transmission services market. It is owned by the Government of Malawi (20%) and a consortium led by Press Corporation, which also owns 41% of TNM.[49]

Apart from the fixed services, MTL also provided mobile services in Malawi since its establishment in 2006. Until 2017, it provided voice and data plans with a 4G/Wimax network to consumers and small- and medium sized enterprises, large enterprises, and the public sector. In 2016-2017, however, the company decommissioned its mobile phone services,[50] and MTL's fibre-optic backbone was separated to form a new company: Open Connect Limited (OCL). OCL, with over 4,000km footprint, is the leading domestic

[49] ITU. Measuring the Information Society Report 2018 – Volume 2. Page 106 – Malawi.
[50] *The Times Group*. (2017). MTL abandons mobile phones. Retrieve in August 2022 from: https://times.mw/mtl-abandons-mobile-phones/

provider of carrier, redundant light, and last mile dark fibre services to leading Mobile Operators, ISP's and Terrestrial TV providers.[51] OCL operates a fibre-optic backbone with cross-border connections to Tanzania and Mozambique to access the East Africa Submarine System (EASSy) submarine cable,[52] and offers wholesale capacity services to all Telecommunications providers, ISPs, broadcasters, and corporate customers.[53]

Other operators have recently entered the market in Malawi, for instance, SimbaNet, an operator with a cross border fiber presence in Uganda, Tanzania, Kenya, Malawi, Burundi, and Rwanda. It provides Data and Broadband Internet Connectivity to more than 500 corporate entities in the region, including banks, NGO's, oil companies, government, telecommunications companies, and broadcasting stations and many other vertical segments. Technologies used by SimbaNET to deliver services to its customers include:[54]

a) Fiber: International capacity, Long Distance, Metro or Last Mile as access technology.
b) LTE / 4G: as last Mile/Access technology.
c) VSAT: as Access technology.

Other Internet service providers include a Globe Internet, which provides services, such as fixed broadband, 4G Wireless, Wi-Fi hotspot services, and Fiber Last Mile services. It acquires its upstream services from wholesale providers, such as WIOCC and GILAT, through the neighboring countries of Mozambique, Zambia, and Tanzania. Within the country, Globe cooperates with local players for Local Backhaul Connectivity, such as Airtel, OCL, SimbaNet, and ESCOM.[55]

In general, the Internet sector in Malawi is reasonably competitive with about 50 licensed ISPs.[56]

National Fibre Backbone

The first phase of Malawi's National Fibre Backbone Project started in April 2017 and was completed in early 2018, thereby connecting the country's 28 districts via a 1,230 km fibre-optic cable network. The fibre-optic cables were deployed by Huawei on power transmission lines owned by the Electricity Supply Corporation of Malawi (ESCOM).[57]

The second phase of the national fibre backbone project is also being implemented by Huawei (June 2021) and will include nearly 3,000 km of fibre optic cables. In addition to connecting cities, the project will also connect over 100,000 businesses and homes across the country.[58]

[51] OCL. About OCL. Retrieved in August 2022 from: https://www.ocl.mw/background/
[52] ITU. Measuring the Information Society Report 2018 – Volume 2. Page 106 – Malawi.
[53] BusinessMalawi.com. (2022). List of Malawi Mobile Service Providers. Retrieved in August 2022 from: https://www.businessmalawi.com/list-of-malawi-mobile-service-providers/
[54] Information provided directly by the company.
[55] Information provided directly by the company.
[56] Developing Telecoms. (2021). Malawi calls for a third mobile network licence. Retrieved in August 2022 from: https://developingtelecoms.com/telecom-business/market-reports-with-buddecom/10531-malawi-calls-for-a-third-mobile-network-licence.html
[57] Comms Update. (2021). Malawi kicks off a second phase of a national backbone Project. Retrieved in August 2022 from https://www.commsupdate.com/articles/2021/06/30/malawi-kicks-off-second-phase-of-national-backbone-project/
[58] Developing Telecoms. (2021). Malawi announces continuation of the national fibre project. Retrieved in August 2022 from: https://developingtelecoms.com/telecom-technology/optical-fixed-networks/11420-malawi-announces-continuation-of-national-fibre-project.html

International Connectivity

Malawi is a landlocked country; therefore, it does not have submarine cable connectivity. Malawi is connected through terrestrial fibre optic cables since 2010 via Mozambique and Tanzania. Most Internet Service Providers (ISP) currently use optical fiber connectivity from Mozambique, Zambia, and Tanzania as their main service interconnection.[59]

Satellite

Different private companies offer data transmission services and Internet access through VSAT (Very Small Aperture Terminal) technology. These service offers vary in speed ranges according to each provider, which mainly use the frequency bands C and Ku, and offer coverage up to the entire national territory.[60]

Broadcasting

According to the Malawi Communications Regulatory Authority (MACRA), 12 broadcasters were reviewed between 1 January and 30 March 2019. Most of the stations performed well, according to the report, and were on air most of the time. The best signal was recorded on MBC Radio 1 and 2, Radio Islam, MBC TV, and ZBS radio.[61]

Amateur Radio

Formed in 2020, the Malawi Amateur Radio League (MARL) is a non-profit organization that seeks to encourage, develop, and promote all activities connected with Amateur Radio, wireless communications, computer science, and radio science in Malawi. According to MARL, its role is to protect amateur radio frequency allocations, promote international goodwill and understanding, and build recognition of amateur radio in all spheres of society in the country. MARL is the National Member Society representing Malawi in the International Amateur Radio Union (IARU), and is a Member of the Member Society of the IARU Region 1.[62]

Action Item 4

The Malawi Communications Regulatory Authority (MACRA) shall periodically develop and update the network inventory and coverage of the mobile and fixed, terrestrial, and satellite telecom/ICT network and service providers and the radio and television broadcasting service providers, relevant for its use during all phases of DRM. It should also include in this inventory other types of telecom/ICT networks relevant for disaster relief, such as radio-amateur and first responder networks.

[59] *The Nation*. (2014). MTL connects Malawi to second submarine cable. Retrieved in August 2022 from: https://www.mwnation.com/mtl-connects-malawi-to-second-submarine-cable/
[60] *Isp.Today*. Malawi. Retrieved in August 2022from: https://isp.today/es/offers/MALAWI
[61] MACRA. Broadcasting. Retrieved in August 2022 from: https://macra.mw/broadcasting/
[62] Malawi Amateur Radio League. Retrieved in August 2022 from: http://marl-mw.org/

7. A Vulnerability Analysis of the Critical Telecom/ICT Infrastructure

The telecom/ICT operators and the government agencies responsible for government telecom/ICT networks in Malawi must develop and present a vulnerability analysis of the critical infrastructure of their networks, based on the risk maps and assessments of the different types of hazards to which the country is prone to (presented here in Section 5).

Telecommunications operators should also include coverage maps of their networks for this vulnerability assessment, must be approved by the MACRA, and must be part of Malawi´s NETP, while maintaining the confidentiality deemed necessary.

Action Item 5

All telecom/ICT network and service operators, terrestrial and satellite, mobile and fixed, and radio and television broadcasting providers, as well as government agencies responsible of telecom/ICT networks, (e.g., first responders), must develop -or update- and present for their approval by the Malawi Communications Regulatory Authority a vulnerability analysis of the critical infrastructure of their networks according to the different types of hazards to which Malawi is prone. This vulnerability analysis should also include precise coverage maps of the telecom/ICT networks.

8. The Specific Telecom/ICT Regulatory Framework for Disaster Management

The Communications Act 34, published in November 2016, established that the Malawi Communications Regulatory Authority (MACRA) is in charge of regulating and monitoring the provision of communications services in the country; it mut also ensure that, as far as possible, reliable, affordable, and sufficient communications services are provided throughout Malawi. [63]

In particular, the Act determined that MACRA is vested with the legal ownership of this spectrum on behalf of the Republic of Malawi. Therefore, it may grant licences for the provision of communications services; protect the interests of consumers, purchasers, and other users of communications services; promote access to information and the development of human resources in the communications sector; promote efficiency and competition among all the entities engaged in the provision of communications; and advise the government on policy issues related to the communications sector, among other responsibilities. [64]

The Act also establishes that the MACRA may require any licensee to provide emergency services -with priority routing-, thereby enabling any member of the public to make contact, in particular, with the police, the fire brigade, and the ambulance service. This service should be provided free of charge to all users.[65]

[63] Government of Malawi. (2016). Communications Act 34 of 2016.
[64] Ibid.
[65] Ibid.

Nonetheless, apart from the above stipulations, there are no additional provisions regarding emergency telecommunications noted according to the Act. In particular, the Act does not specifically mandate the MACRA to develop a comprehensive regulatory framework related to telecom/ICTs for DRM.

The MACRA should be held accountable by law for establishing a regulatory framework that includes all the necessary provisions for each of the four phases of disaster risk management for the telecom/ICT sector. Based on this mandate provided by the law, the MACRA should develop the following regulations:

Mitigation and Preparedness Phases

1. Require that radio and commercial broadcasting operators, public and private television broadcasting operators, as well as civil society entities with assigned radio frequencies, transmit information campaigns for the mitigation of disasters and emergencies. These campaigns should be developed in coordination with the National Disaster Preparedness and Relief Committee and the MACRA, and should have a regulated duration and broadcast timeline.

2. 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.

Response phase

1. Ensure that providers of commercial fixed and mobile telecommunications services take the necessary measures to make their networks available and have sufficient capacity for clear and prompt communications to the authorities and affected populations, free of charge and in a timely manner, as soon as a disaster situation or emergency is declared.

2. Require mobile service operators to provide SMS messages to their customers, and encourage them to use these messages instead of mobile data services. Also, require that commercial telecommunications, as well as fixed and mobile service providers, limit the duration of calls to, for example, a maximum of 2 minutes in the geographic area of the disaster for a period of 12 hours following the event that generates the emergency. These norms would not apply to calls made from or to the numbers of the authorities involved in the emergency response, and definite durations should be defined by MACRA after consultation with the operators.

3. Ensure that providers of commercial fixed and mobile telecommunications services give priority of communications to calls made by the authorities for a period of, for instance, 24 hours after the emergency is declared, extendable as decided by the responsible authority (*i.e.,* the MACRA).

4. 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.

5. Oblige telecommunications service providers to immediately assess the damage to their networks and implement the previously prepared contingency plans to re-establish communications as soon as possible.

6. The MACRA could facilitate the issuance of authorizations for the use of the radioelectric spectrum on a temporary basis to national and / or international organizations for a period not

exceeding 6 months in order to attend to the emergency. No charges should be generated for the temporary use of the radioelectric spectrum during such an emergency.

Recovery phase

1. Require commercial and telecommunications service providers to re-establish permanent solutions after a disaster, in order to restore and improve communications to end users, with the goal of building back better.

Action Item 6

The Malawi Communications Regulatory Authority should be held accountable for establishing specific regulations for the telecom/ICT sector on disaster risk management in the country. These regulations should be based on its functions, as granted by legislation, thereby encouraging telecom/ICT network and service providers to actively participate in each phase of such disaster management.

The Frequencies for Public Protection and Disaster Relief (PPDR)

The following is the radio spectrum allocated and assigned for emergencies and disaster response in Malawi:[66]

a) Frequency Bands adopted for PPDR:

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

Source: MACRA.

b) Networks of First Responders
- Malawi Police
- Marine services
- DoDMA
- WFP
- Red Cross

First responders in Malawi do not have the same frequency assignment for their VHF networks. Also, there is no dedicated network held by government entities for disasters. Instead, networks that are used during

[66] Information provided directly by the MACRA.

emergencies are local mobile networks, satellite phones, a VHF network owned by DoDMA (not operational at the moment), and the VHF network from UN organisations.

There are three models for broadband PPDR using frequencies in the 700 MHz band (e.g., 698-703 MHz paired with 753-758 MHz):[67]

1. Model one: Exclusively public safety-dedicated network, with spectrum being used exclusively by public safety users. This model requires significant resources to deploy the network.
2. Model two: Shared public safety and commercial network, with distinct public safety and commercial network cores, and priority access and pre-emption rights for public safety use during emergencies and other times of need.
3. Model three: Commercial network, *i.e.*, public safety users obtain services from one or multiple commercial providers.

The model to be used should be based in a specific study for Malawi, and should include an analysis of the compliance of the following general principles:[68]

- Interoperability: Allow first responders on the network to access other users, as authorized, from anywhere and at any time.
- Permanent access: Allow first responders to have permanent, immediate and uninterrupted access to the network.
- Coverage: Provide access in uncovered urban, rural and remote areas.
- Resilience: Be resilient and robust in meeting the access requirements mentioned above.
- Provide mission critical services: Offer mission critical services to first responders, including data and video.
- Security: Include network security mechanisms for information and data.
- Sustainability: Be friendly to the environment and establish resources to keep updated in the future, meeting the goals and needs required.
- Accessibility: Be accessible to the entire community of first responders.
- Spectrum use: Use spectrum efficiently and effectively.

Action Item 7

The HF and VHF networks should be adopted and maintained for continuous operation. MACRA should carry out and keep updated the corresponding analysis and studies to decide which model (i. Public safety exclusive dedicated network, ii. Shared public safety and commercial network or iii. Commercial network) would fit Malawi's needs for broadband PPDR in the 694-791 MHz frequency range.

9. International Conventions or Treaties

Malawi is a party to different global conventions and agreements, including the Convention on Civil Aviation of 1944 (Chicago Convention); the International Covenant on Civil and Political Rights (ICCPR) and

[67] Following "Progress Report on National Public Safety Broadband Network", Canada (2020).
[68] Id.

the International Covenant on Economic, Social and Cultural Rights (ICESCR) of 1966; as well as regional agreements, including the African Union Convention for the Protection and Assistance of Internally Displaced Persons (IDPs) of 2009, and others.[69] Nonetheless, Malawi is not a party to any convention related to emergency telecom/ICTs in specific ways, nor to any agreement related to disaster management in general, other than the African Risk Capacity Agreement (ARC), described below.

The African Risk Capacity (ARC) Agreement

Malawi signed a Memorandum of Understanding (MoU) with the African Risk Capacity (ARC) on February 22, 2016[70], to work together and better prepare to deal with extreme weather events and natural hazards efficiently. ARC was established in 2012 as a Specialised Agency of the African Union to help Member States improve their capacities to better plan, prepare, and respond to weather-related disasters; and particularly, to reduce the risk of loss and damage caused by extreme weather events' affecting Africa's populations. This task is accomplished by providing, through sovereign disaster risk insurance, targeted responses to natural hazards in a more timely, cost-effective, objective, and transparent manner. [71]

Upon entering the MoU, the Malawi government agreed to commit to carrying out technical work required under the Capacity Building Programme for one year, as well as to avail themselves of relevant technical experts who form a core government team and act as focal points within their department for specific work streams of the programme, and also allow these staff members to retain their office space and dedicate the necessary time to ARC activities.[72]

In the same manner, African Risk Capacity agrees to provide resources (e.g., *Africa RiskView* software) that will enable the government team to complete the activities of the programme; provide training inside and outside the country for the government team on various aspects of the programme, thereby transferring knowledge and capacity; and provide technical expertise and guidance throughout the programme

The Tampere Convention

Malawi is not a signatory to the Tampere Convention.[73] The country should initiate the necessary procedures to sign and ratify the treaty and take the necessary legislative actions to apply the contents of the Convention to current legislation, either adding or complementing the provisions of the current regulations regarding telecommunications for international assistance on DRM.[74]

If the country ratifies the Convention, it is important that both the MACRA and the Ministry of Foreign Affairs, as well as the customs authority, initiate the required steps for its implementation. Likewise, it would be relevant to make certain legislative and regulatory adjustments at the national level, thereby complementing the current regulations on international assistance for disaster management. These steps

[69] International Federation of the Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
[70] African Risk Capacity. (2022). Memorandum of Understanding. Retrieved in July 2022 from: https://www.arc.int/country-mous
[71] Ibid.
[72] Ibid.
[73] United Nations Treaty Collection. (2022). CHAPTER XXV – TELECOMMUNICATIONS. Available at: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXV-4&chapter=25&clang=_en
[74] International Telecommunications Union (2020). ITU Guidelines for national emergency telecommunication plans.

will help all those involved in DRM in the country internalize and effectively adopt this legal framework for ongoing cooperation.[75]

In accordance with the above details, and within the framework of the Tampere Convention, the responsible authority regarding telecom/ICT regulation, MACRA, must establish specific regulations for the implementation of the Convention, including, for example:[76]

1. Be exempt from any type of charge, including charges for the use of radio spectrum and for service license, among others, international aid provided through the Tampere Convention.
2. Temporarily and expeditiously issue any authorization for the use of the radio spectrum that is necessary in line with the provisions of national legislation.
3. Simplify or exempt any other existing regulation that prevents the use of telecom/ICT resources coming from international aid under the Tampere Convention.

To execute the agreement, in the event of ratification, it is also recommended that the government entities of the cooperation framework be informed, so that all stakeholders have clear knowledge of the relevant legal provisions and can effectively apply them when a disaster does strike.

International Cooperation

No specific legislation or regulations in Malawi contains any provisions regarding facilitation of international humanitarian assistance or coordination of such assistance. According to the IFRC[77], while the DPR Act (Section 0) entrusts the Commissioner with the responsibilities of controlling and directing personnel, materials, and services during disaster response and recovery, it does not explicitly establish powers or responsibilities to coordinate, facilitate, and monitor both international and domestic relief mobilisation.[78]

Current practice regarding the entry of relief aid in Malawi, according to the IFRC, requires humanitarian actors to make requests for that entry through DoDMA, which in turn submits an application to the Treasury Department in the Ministry of Finance, and this Ministry then submits the application to the Malawi Revenue Authority (MRA) to clear the relief items. [79]

Along with the above actions, in Malawi there are also no provisions that deal with privileges and immunities, as well as any customs issues.[80]

There are international coordination mechanisms within the framework of international cooperation that Malawi can use to improve DRM. For example, the United Nations Office for the Coordination of Humanitarian Affairs; the United Nations Office for Disaster Risk Reduction; or the Emergency Telecommunications Cluster, offers a set of tools that countries can use to promote more efficient disaster management.[81]

[75] Ibid.
[76] Ibid.
[77] International Federation of the Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
[78] Ibid.
[79] Ibid.
[80] Ibid.
[81] Ibid.

In particular, for international cooperation for the management of telecom/ICTs for DRM, it is recommended that Malawi work together with the International Telecommunications Union (ITU), considering the Union develops different activities on the issues related to telecommunications for emergencies. These activities include the publication of manuals on emergency telecommunications; emergency radiocommunications specifications applicable to all phases of a disaster; databases of available frequencies for emergency radiocommunication services on land and space; and the International Emergency Preferences Scheme and a Common Alert Protocol, among others.[82]

Action Item 8

1. *Malawi must initiate the process for the Tampere Convention to be bounded by. To this end, it is recommended that the National Disaster Preparedness and Relief Committee, the Ministry of Foreign Affairs, the Customs Authority, and the Malawi Communications Regulatory Authority initiate the necessary steps for the ratification of the Convention. Subsequently, the necessary legislative and regulatory adjustments for the effective implementation of the Convention must be undertaken by the relevant authorities.*
2. *if the above occurs, the Malawi Communications Regulatory Authority must establish specific regulations for the implementation of the Tampere Convention.*
3. *Coordination and collaboration with different international agencies, such as the ETC (Emergency Telecommunications Cluster) and the ITU (International Telecommunications Union) regarding issues of preparedness and response to eventual disasters or emergencies is clearly imperative, and they must continue and be strengthened. These actions will avoid duplication of effort and overlapping of work.*

The Preparedness Phase

10. Standard Operating Procedures (SOP)

DoDMA developed in 2016 the Standard Operating Procedures for responding to disasters, with the purpose of providing a list of the major actions involved in responding to disasters and the necessary measures for the response that is required to be taken in Malawi. This process ensures that all concerned stakeholders know the precise measures required of them at each stage of disaster management and also indicate the various actions that would be required by all the stakeholders within their own sphere of responsibilities so they can prepare and review their respective Contingency Action Plans accordingly. These SOPs do not provide for an exhaustive list of all actions that may be required for disaster response, but they do provide guidance for the key procedures that should be followed.[83]

Regarding the procedures related to telecommunications, the DoDMA´s SOPs establish guidelines for the notification of a disaster occurrence. According to the SOPs, the Area Disaster Risk Management Committee (ARDMC) and Village Disaster Risk Management Committee (VDMC) affected by the disaster shall immediately provide a verbal initial report to the Disaster Risk Management Officer using the most necessary means of communication. Thereafter, they will have to use relevant standard forms, as developed by the DoDMA, for damage assessment and reporting. The SOP also determines that, for

[82] Ibid.
[83] Information provided directly by DoDMA.

example, when it is impractical for the concerned ADRMC and VDMC to immediately send a physical report using the applicable form, due to, for instance, communication problems, it shall send such a report by telephone. Next, the Disaster Risk Management Officer shall analyse the initial report from the affected ADRMC and VDRMC and prepare and then notify the other members of the Local Authority Disaster Risk Management Committee (LADRMC) of the disaster situation, using additional sources of information, such as media reports, to gather the key facts on the developing disaster situation disaster. [84]

Standard Operating Procedures (SOPs) are the formal written guidelines or instructions for incident response. They generally have both operational and technical components and allow emergency response personnel to act in a coordinated manner across all disciplines in the event of an emergency.[85] These detailed instructions or procedures promote a uniform and standardized response during emergency response operations. These SOPs should be well aligned with the legislative and regulatory frameworks as well as the specific policies and plans related to DRM.

In addition, from a technical point of view, SOPs should consider the existing interoperability possibilities and, if necessary, the allocation of a radioelectric spectrum in a specific band that allows communication to take place, based on the existing radio equipment. As such, it is important that Malawi maintains updated standard operating procedures, especially those regarding telecom/ICTs.

Action Item 9

1. *Update and strengthen Standard Operating Procedures for emergency and disaster response that is related to communications within and between agencies and the technical means for communication (voice/data), including interoperability, in order to include an exhaustive list of all actions that may be required for disaster response.*
2. *Define and keep updated a list of the government entities and the contact points (key decision makers) within these entities that must maintain ongoing communications during all phases of DRM.*
3. *Maintain an updated database with these same focal points of every agency involved in disaster risk management.*
4. *Analyse the possible interoperability between the equipment (wireless) and the communication networks of the government entities.*
5. *Establish a set of radio frequencies that can be used for communications between the contact points (key decision makers) and be sure they are fully compatible with the radio communication equipment being used.*
6. *Establish alternative methods of communication, if necessary, for example, through existing communication operators.*
7. *Develop 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.*

[84] Information provided directly by DoDMA.
[85] United States Department of Homeland Security (2014), National Emergency Communications Plan.

11. Contingency Plans

Telecommunications operators in Malawi have updated contingency plans for responding in case of emergencies and disasters. These contingency plans focus on key aspects, such as critical infrastructure and maintaining the continuity of the service at all times. The following are the main objectives and topics covered in these continuity plans of the most important operators in the country:[86]

AIRTEL: Continuity plan updated in April of 2016. The plan includes different scenarios based on distinct threats and incidents and establishes critical processes and recovery priorities for each case. The document also lists contact details, minimum operating requirements and team responses, and other related elements.

TNM: Business Continuity Management Plan that was updated in 2020. It documents the actions to be taken to minimize disruption to the critical business processes in the event of a major incident or event or a foreseen event that has the potential to affect the business-as-usual operations. Describes different processes related to human resources, systems, and the hardware and network, for the different stages of DRM.

OCL: Disaster Recovery Management Plan that was updated in 2020 defines the company´s policies and procedures for recovery of the network during disruptive events. The plan is comprised of a number of sections related to resources and the procedures to be used in the event that a disaster affects the network.

Simbanet: Service Continuity Plan with the purpose of supporting the overall business continuity management process and ensuring that the required technical and services facilities can be recovered within required and agreed business timescales. The document includes the processes necessary to manage the infrastructure and the systems to reduce the impact of failures, as well as a description of the services required to support the critical business processes. Also, a business impact analysis is conducted to measure the impacts from a loss of a business process, among other elements.

Apart from the operators´ continuity plans, the government of Malawi also developed a Multi-Hazard Contingency Plan for 2021-2022, in order to establish operational procedures for an effective response to specific hazards based on risks identified by the DoDMA, at the national level. The plan is based on five prioritized hazards, namely, floods; dry spells; disease outbreak; pest infestation; and strong winds/stormy rains. Each of these hazards includes three scenarios through which the planning assumptions were developed: Best-case scenario, moderate scenario, and worst-case scenario. [87]

Regarding emergency telecom/ICTs, the Plan establishes that the Ministry of Information and Communication Technologies (MoICT) should oversee the development of communications preparedness and response activities as a sub-cluster of the Transport, Logistics and Communications Cluster. Also, the Plan determines the specific responsibilities held by the the MoICT, including:

- During Emergency Preparedness and Capacity-Building Activities: Establish a common knowledge-sharing platform-

[86] Information provided directly by the operators.
[87] Government of Malawi. (2021). The National Multi-Hazard Contingency Plan 2021-2022.

- During Response activities: Establish areas with disrupted or disconnected communications and facilitate the establishment of temporary telecommunication, HF, VHF or satellite links as required or needed.
- During Early Recovery Activities: Assess the damaged telecommunication infrastructure as required, and repair it to restore emergency communications.[88]

In general, a contingency plan for telecom/ICT must include specific procedures based on the unique characteristics of the location, such as the level of connectivity of the site, the available facilities or equipment deployed in the area, redundancy, and power sources, among other key elements.

This contingency planning, in addition, should include solutions and alternatives that can be deployed to maintain the operations and communications of the agencies responsible for DRM in the affected area. This process should be helpful for making advance decisions on resource management and to develop procedures for the expected use of the full range of available technical and logistical responses, especially for successful telecommunications.

Action Item 10

Public and private telecom/ICT network and service providers, including terrestrial and satellite, whether mobile, fixed, or broadcasting, must individually keep their contingency plans updated to be ready to respond to an emergency. Measures such as network redundancy, mobile base stations, secondary energy sources, satellite terminals stored and ready to use, among others, must be considered and included in the network design, particularly in those regions and communities at risk based on the hazard maps and risk assessments and considering the overall network vulnerability analysis.

12. Early Warning Systems

The Department of Climate Change, and Meteorological Services of Malawi (DCCMS) has deployed a monitoring system that includes a network of monitoring stations as follows:[89]

- 120 Automatic weather stations.
- 8 lightning detectors.
- 2 Lake buoys (Monitoring stations on Lake Malawi).
- 21 Manual main meteorological stations.
- Over 70 rainfall stations.
- Satellite receiving station

These DCCMS, based on that infrastructure, currently issue the following warnings:[90]

a. Tropical cyclone warnings, in three stages: The Information stage, when the cyclone is in the Indian Ocean, but the likelihood of affecting Malawi is small; the Alert stage, when the cyclone is in the Mozambique Channel, and the chances of affecting Malawi are high; and the Warning stage, when the cyclone is getting closer to Malawi.

[88] Ibid.
[89] Information provided directly by the Department of Climate Change and Meteorological Services.
[90] Information provided directly by the Department of Climate Change and Meteorological Services.

b. Mwera (strong winds) warnings on Lake Malawi.
c. Heavy rainfall associated with flood warnings.
d. Strong wind warnings.
e. Lightning warnings.
f. Drought/ dry spells warnings

Nonetheless, there are no effective telecom/ICT mechanisms currently in place to disseminate this vital information to the public in a timely manner (see Action Item 11). Also, according to the Malawi DRM Policy of 2015, in most cases, there is lack of practical capacity at the community level for the use of early warning information. For instance, often when communities receive early warnings, they do not know the required action that they need to take. Along with the above information, the current early warning systems in the country are not integrated and are not comprehensive. Further, some of the equipment and processes for gathering early warning data are outdated, dysfunctional and/or insufficient.[91]

The National Meteorological Policy, issued by the government in 2019, aims at addressing some of these obstacles. For instance, the policy seeks to improve planning, programming, and implementation of weather and climate activities in Malawi; enable the generation of reliable, responsive, high quality, timely and up-to-date weather and climate services; ensure timely dissemination of accurate and reliable sector relevant information for early preparedness; and provide a framework for monitoring, evaluation, and reporting on interventions for the meteorological sector, as well as a platform for effective stakeholder engagement in the meteorological sector. The Policy, in particular, includes seven priority areas, namely: i) Monitoring and prediction of weather and climate ii) Management of meteorological data and information; iii) Meteorological engineering, communication and Information Technology (IT) development; iv) Meteorological research services; v) Capacity building and awareness; vi) Financing the climate change and meteorological sector; and vi) Other issues.[92]

The Directorate of Disaster Risk Reduction of the DoDMA, which is the division responsible for implementing mitigation activities to reduce the impact of disasters, meanwhile implemented an Early Warning Systems project (with the support of UNDP), with the objective of scaling up the use of modernized early warning systems and climate information in the country. The project started in 2014 with the objective of enhancing the capacity of the government to monitor and forecast extreme weather and hydrology, as well as to promote use of hydro-meteorological information for early warnings that inform long-term development plans.[93] Until 2019, according to UNDP, considerable progress was registered towards the attainment of the project´s objectives, including the purchase and delivery of most of the hydrological and meteorological equipment; its installation in selected sites; and capacity building that included nine training courses ranging from 1 week to 24 months.[94]

A new project with the same donors, called M-CLIMES, has been developing on the basis of the previously described project, with the objective of accessing and using climate related risk information to enhance livelihoods of targeted vulnerable communities in selected areas, and increasing resilience by 2023.[95] Until 2021, this M-CLIMES project already had installed, apart from 33 weather stations, 8 lightning detectors

[91] Government of Malawi. (2015). National Disaster Risk Management Policy.
[92] Government of Malawi. (2019). National Meteorological Policy.
[93] More information available at: https://open.undp.org/projects/00077203
[94] Id.
[95] More information available at: https://open.undp.org/projects/00102187

across the country, and weather stations to monitor lake weather conditions and water quality.[96] Further developments of the project are expected upon its completion in 2023, in order to accomplish the 3 proposed outcomes:[97]

1. Capacity of hydro-met networks and staff enhanced to generate climate-related data and forecast extreme weather and climate change.
2. Tailored climate information/products and decision-support platforms developed and disseminated for agriculture, fisheries, and flood risk management.
3. Communities capacities strengthened for use of EWS in preparedness for and response to climate-related disasters.

According to the DoDMA's website, currently the EWS project is being implemented in 21 districts in collaboration with the Department of Climate Change and Meteorological Services (DCCMS), the Department of Water Resources (DWR), the Department of Agricultural Extension Services (DAES), the Department of Fisheries (DoF), and the National Smallholder Farmers Association of Malawi (NASFAM). [98]

Warning and alert systems are key to informing the public of any threat of a hazard and delivering important emergency information that enables the public to prepare and respond in a timely manner. The impact of a hazard could be significantly reduced if proper information is provided in a timely way. Therefore, warning and alerting systems are critical to saving more lives.

Fixed, mobile and broadcast, terrestrial and satellite telecom/ICT services are important tools to use to alert the community of impending disasters. Mobile broadcast technology can allow for the distribution of notifications via mobile operators, and mobile applications developed by governments can provide warnings and alerts as well. Digital broadcasting on radio and television can also provide alerts and warnings to communities at risk.

Some of these solutions could be implemented in Malawi via joint cooperation between the government and the telecom/ICT service providers. The implementation of an Alert Aggregator based on the Common Alerting Protocol (CAP) for multi-hazard alerts via different dissemination technologies, e.g., cell broadcasts, should be a priority for the government.

The Common Alerting Protocol (CAP) is one of the most efficient mechanisms to use to warn people of a disaster immediately and communicate a few key facts about any emergency through different means, such as the use of mobile and landline telephones, the Internet, sirens, broadcast radio and television, cable television, among others. The government should implement such CAP alert systems following the ITU recommendations.

Action Item 11

1. *Malawi must continue to develop surveillance and monitoring systems for probable threats prior to the occurrence of disasters and/or emergencies; for instance, by implementing and enhancing*

[96] Disaster Risk Reduction Association of Journalists. (2021). *Malawi: New early warning system to reduce mortalities and loss.* Retrieved from: https://diraj.org/stories/malawi-new-early-warning-system-to-reduce-mortalities-and-loss/

[97] Government of Malawi, UNDP and Green Climate Fund. (2020). *Interim Evaluation Report - Saving lives and protecting agriculture-based livelihoods in Malawi: scaling up the use of modernized climate information and early warnings systems.*

[98] Ibid. DoDMA. Risk Reduction Division. Retrieved in July 2022 from: https://www.dodma.gov.mw/index.php/pages/divisions/risk-reduction-division

the National Meteorological Policy issued by the government in 2019, to address the obstacles identified for EWS, including timely communication to the communities. With the cooperation of the telecom/ICT service providers, the solutions to warn and alert the public must be implemented, i.e., through cell broadcast technology and the broadcasting networks (radio and TV). Early Warning Cluster could have a leading role in these activities.

2. *The Common Alerting Protocol (CAP) is one of the most efficient mechanisms to use to alert the population of a hazard and provide clear and precise information and communicate relevant facts to the population at risk.*

13. Drills and Training

The development of an effective NETP should consider including practical strategies that improve the capacities and training of all people involved in the management of emergency telecom/ICT. This action is important because taking into account the development of these capabilities improves the speed, quality, and effectiveness of emergency preparedness and disaster response.

The Emergency Telecommunications Table-top Simulation Guide, developed by the ITU (2020), as well as the online training tool on How to Develop Tabletop Simulation Exercises (TTX), can provide all the relevant information needed to develop and carry out this type of exercise successfully.[99]

Action Item 12

1. *MACRA, jointly with telecommunications operators, should review and update the plans and scope related to the drills and trainings for emergency telecommunications.*
2. *Telecommunications trainings and drills for emergencies should be regularly carried out in order to improve emergency responders' capacity to use communications equipment, as well as to enhance their ability to execute policies, plans, and procedures that govern the use of these communications networks. The telecom/ICT sector should actively participate in these drills and exercises, and also develop and carry out their own so as to effectively implement the NETP.*

14. Support for People with Specific Needs

Telecom/ICTs can also be a key tool for disaster response and management operations in order to reach traditionally marginalized or especially vulnerable groups before, during, and after a disaster. Telecom/ICTs can use multiple modes and channels, such as TV, radio, SMS-text messages, or the different Internet-based services and resources, including video, instant messaging over the Internet, web conferencing, and social networks, among others. These all will allow instant communication and sharing of photos and/or videos and satellite communication.[100]

In that sense, dissemination of disaster preparedness and planning content should be provided in multiple formats. For example, subtitles can be included in the visual communications, so persons with auditive

[99] These documents can be consulted in the following links: https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Documents/Publications/2020/TTX_Guide.pdf
https://academy.itu.int/index.php/training-courses/full-catalogue/practical-disaster-response-how-develop-table-top-simulation-exercises-ttx

[100] Ibid.

difficulties can receive the messages; or visual and sound alerts can be introduced in public spaces to meet the needs of as broad a swath of the population as possible.

Action Item 13

The Malawi authorities, working together with network operators and telecom/ICT service providers, should develop mechanisms to help them understand the accessibility requirements needed to guarantee that vital digital communication technologies are inclusive and, therefore, accessible to all persons, including people with disabilities, the elderly, women and girls, and refugees and immigrants. This effort should then be linked to the early warning systems to be developed in the country, so that people can receive and understand the alerts so early actions can take place.

Response Phase

15. Communication and Coordination

In the response phase, all contingency plans and standard operating procedures developed in the mitigation and preparedness phases must be executed. Telecom/ICTs must be determined to enable communications between first responders, decision makers in the government and the community.

During the disaster response phase, authorities can establish emergency operations centres or communication and coordination command posts to provide critical communications to users in each organization involved. These positions can be fixed or mobile, local or remote, and could be located in a vehicle or in a shelter, among other possibilities.

The functions of these centres or posts are to assess the emergency situation, inform a dispatcher, and identify and request appropriate resources when necessary. Therefore, these command posts should be in contact with each other (one in a remote location outside the perimeter of potential danger, and the other at the site of the emergency, for example), in order to respond to the direct requirements that are generated in the emergency area, dispatch needed equipment and personnel, anticipate the need to provide additional support and assistance, and position more resources in the area.

Considering this circumstance, it is important to maintain interoperable and continuous communication between command posts and the rest of the stakeholders involved in any response to the emergency. As such, it is necessary to use all available means of communication and maintain close coordination with all the various agencies involved.

SOPs and contingency plans, including temporary satellite connectivity and any other available means of communication, are particularly important when terrestrial networks are affected by an emergency situation, and key decision-makers always need to communicate effectively and continuously to coordinate the emergency response.

In Malawi, once the NEOC is activated after a disaster (Section 0), its SOP establishes that, regarding communication and media coordination, the timely preparation and release of public emergency information to the news media and public is the responsibility of the Information and Communication Sub-Committee, which works under the general direction of the Commissioner. Also, NEOC determines that, although each disaster will require a unique public information response, procedures have to be followed so as to ensure coordination of internal and external communications in the event of a disaster.

It is the responsibility of the Commissioner to activate the Information and Communications Sub-Committee, and this Committee must work with the media to provide clear, consistent, and credible information and messages to the public.[101]

Action Item 14

The National Disaster Preparedness and Relief (NDPRCM), through its Early Warning and its Transport, Logistics, and Communications Clusters should consider planning for the development of 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, terrestrial or satellite, local or remote, and could be located in a vehicle or in a shelter, among other possibilities. Maintaining interoperable and continuous communications between the command posts and the rest of the stakeholders is vital for an effective response to the emergency.

16. The Collection and Analysis of Information

A key element during the response phase of disaster management is to develop ICT assessments to prioritize the deployment of critical ICT infrastructure to the most affected areas and also collect and analyse key information related to the immediate needs of the population affected by the emergency so as to manage safe delivery of the response. Gathering and evaluating information is particularly important because this information can be communicated in a timely manner to the corresponding authorities (e.g., health entities, firefighters, civil police, among others), and respond to the needs of the affected population as soon as possible.

For achieving this goal, it is necessary to use all the available telecom/ICT networks and include collection of geospatial information from the disaster so as to analyse the information obtained and coordinate the response planning geographically.

17. Emergency Awareness and Updates

During the response phase, it is also necessary to continue monitoring and warn of *new risks* to the affected population and disseminate updates about the emergency situation.

To achieve this goal, multiple methods of communication, such as sound and television broadcasting, text messages and/or audio messages through mobile operators, social networks, applications, among others, should be employed.

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

In the event that the country does not have the capacity (*e.g.,* the equipment, human or financial resources) to establish this type of call centre, this service can be provided by international organizations,

[101] Information provided directly by DoDMA.

such as the UN through one of its branches. In the Central African Republic, for example, the Emergency Telecommunications Cluster has established a dedicated Covid-19 call centre in that country's capital, Bangui, to give advice to callers and refer potential cases of Covid-19 to the Ministry of Health as part of their national response to the pandemic.[102]

Action Item 15

During the response phase, call centres should be established to warn the affected population of new risks, disseminate updates about the emergency situation, and connect affected populations with their relatives. Generally, these call centres can be located in shelters, and should use a means of communication that do not congest the networks, for example, text messages. To establish these call centres, Malawi could use satellite networks, which can be easily installed, or seek collaboration with telecom/ICT operators or international organizations so as to establish the required telecom/ICT infrastructure successfully.

Recovery Phase

18. Assessment of damage, reconstruction and improvement of the telecom/ICT infrastructure

During the recovery phase, the damage caused to any telecom/ICT networks should be evaluated as a precursor to timely reconstruction and improvement of the damaged infrastructure. This reconstruction should seek, at a minimum, to restore communications to the same condition as they were before the disaster. However, preferably, the ICT infrastructure should be rebuilt using the principle of *building back better*, that is, reconstructing a more resilient infrastructure that can withstand future disasters even better.

It is necessary to maintain the availability of a minimum level of communications for those who carry out damage assessment and reconstruction activities and also establish communication priorities in order to manage available communications resources successfully.

Action Item 16

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

[102] ETC (2020). Central African Republic – Situation Report # 37. Available at: https://www.etcluster.org/sites/default/files/documents/ETC%20CAR%20SitRep%2037_July%202020.pdf

19. Recovery Activities Follow-up

Telecom/ICTs must have the capacity to support the recovery activities in the affected area after the disaster. These include continuing to transmit relevant information for, among other objectives, updating the public on the emergency on topics like health services, shelter, food, or family reunification.

Action Item 17

Based on the experience acquired during disaster management, a report should be developed after the response and recovery phases by the agency held accountable for reviewing and updating the NETP to identify lessons learned and the 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 also be updated every 2 to 3 years.

Annexes

The following information must be collected and included in Malawi's NETP, also taking into account the confidentiality needed in specific cases, e.g., coverage of commercial networks.

A1. Inventory of Telecom/ICT networks

Radio Broadcasting

Company	Station Name	Transmitter Location (address)	Frequency (FM/AM)	Coverage (localities)

Television broadcasting

Company	Station Name	Transmitter Location (address)	Frequency	Coverage (localities)

Mobile Providers

Mobile Provider	Coverage (District, Cities/Localities)	Technology (2G, 3G, 4G)

Fixed Providers

Fixed Provider	Coverage (District, Cities/Localities)	Technology	Service

Satellite

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

Amateur Radio

[Network specifications to be provided, e.g., repeater locations, frequencies, voice and/or data service, type of equipment, etc.]

A2. Disaster Management Network

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

A3. Private Networks

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

A4. Contact Information

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

Name	Institution	Private/Public	Contact information

A5. International Telecom/ICT Support

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

Name	International Organization	Contact information

A6. Standard Operating Procedures

[SOPs for communication within the National Disaster Preparedness and Relief Committee and between the DoDMA and other bodies involved in disaster risk management and high-level government authorities, first responders, etc. What communication means will be used? (including wireless technology, frequencies, equipment, etc.) What are the available alternative means of communication?]

A7. Contingency Plans

[Summary of contingency plans gathered from telecom/ICT services providers. These detailed plans are generally not made publicly available.]

References

1. Constitution of Malawi. (1994)
2. Disaster Preparedness and Relief Act (Cap. 33:05). (1991)
3. DoDMA. (2019). National Disaster Risk Management Communication Strategy Voice from Primary Audience (2019 – 2022).
4. ETC (2020). Central African Republic – Situation Report # 37.
5. Federal Emergency Management Agency (FEMA), *The Four Phases of Emergency Management.*
6. Government of Malawi. (2015). National Disaster Risk Management Policy.
7. Government of Malawi. (2016). Communications Act 34 of 2016.
8. Government of Malawi. (2019). National Meteorological Policy.
9. Government of Malawi. (2021). The National Multi-Hazard Contingency Plan 2021-2022.
10. International Federation of Red Cross and Red Cross Crescent Societies (IFRC). International Disaster Response Law (ISRL) in Malawi.
11. International Telecommunications Union (2020), *ITU Guidelines for national emergency telecommunication plans*.
12. ITU. Measuring the Information Society Report 2018 – Volume 2. Page 106 – Malawi.
13. United Nations Office for Disaster Risk Reduction (2018). Implementation guide for local disaster risk reduction and resilience strategies - A companion for implementing the Sendai Framework target E.
14. United States Department of Homeland Security (2014), *National Emergency Communications Plan.*
15. World Bank. Economic vulnerability and disaster risk assessment in Malawi and Mozambique.