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A man in a light-colored shirt is speaking into a white megaphone with a yellow handle. The megaphone has the Malteser International logo and text on it. In the background, a group of children are looking towards the camera. A banner with logos is visible behind them.

Mapping of Stakeholders and Initiatives on Early Warning Systems in Myanmar

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In the framework of the Global Initiative on Disaster Risk Management – GIDRM



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Abbreviations and acronyms

AADMER	ASEAN Agreements on Trans Boundary Haze Pollution Control (1999) and Disaster Management and Emergency Response
ACDM	ASEAN Committee on Disaster Management
ADPC	Asian Disaster Preparedness Center
AHA	ASEAN Humanitarian Assistance Center
ADRRN	Asian Disaster Response and Reduction Network
ASDA	Ashoka Social Development Association
BRACED	Building Resilience Against Climate Extremes and Disasters
CDA	Community Development Association
COASTMAPIO	Coastal Mapping Capacity Building in the Indian Ocean
DIPECHO	Disaster Preparedness ECHO
DM Law	Natural Disaster Management Law
DMH	Department for Meteorology and Hydrology
DPC	Disaster Preparedness Committee
DRRWG	Disaster Risk Reduction Working Group
DRRSSWG	Disaster Risk Reduction Sub-Sector Working Group
DRR	Disaster Risk Reduction
ECHO	The European Commission's Humanitarian Aid and Civil Protection
DG	Directorate General
EWS	Early Warning System
FESR	Framework of Economic and Social Reform
GAD	General Administration Department
GIDRM	Global Initiative on Disaster Risk Management
GNDR	Global Network of NGOs in DRR
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HFA	Hyogo Framework of Action
INGO	International Non-Governmental Organization
IASC	Inter Agency Standing Committee
JICA	Japan International Cooperation Agency
LDC	Least Developed Countries
MAPDRR	Myanmar Action Plan for Disaster Risk Reduction 2009-2015
MCCR	Myanmar Consortium for Community Resilience
MCDRR	Myanmar Consortium for DRR
MEC	Myanmar Earthquake Committee
MES	Myanmar Engineering Society

MGS	Myanmar Geological Society
MIMU	Myanmar Information Management Unit
MNN	Myanmar NGO Network
MoA	Ministry of Agriculture and Irrigation
MRCs	Myanmar Red Cross Society
MSWRR	Ministry of Social Welfare, Relief and Resettlement
NAPA	National Program of Action to Climate Change
NDM Law	Natural Disaster Management Law
NDPCC	National Disaster Preparedness Central Committee
NGO	Non-Governmental Organization
NNDPCC	National Natural Disaster Preparedness Central Committee
NNDPMWC	National Natural Disaster Preparedness Management Work Committee
NMHEWC	National Multi-hazard Early Warning Center
NSDS	National Sustainable Development Strategy
OFDA	Office of Foreign Disaster Assistance
PONREPP	Post Nargis Recovery Preparedness Plan
PRIS	Policy Review and Implementation Support Task Force of the DRR WG
RCC	Regional Consultative Committee on Disaster Management
RIMES	Regional Integrated Multi-Hazard Early Warning System
RRD	Relief and Resettlement Department
SAR	Myanmar National Search and Rescue
UN Habitat	United Nations Human Settlement Program
UN	United Nations
UNDP	United Nations Development Program
UNESCAP	United Nations
UNESCO/IOC	UNESCO International Oceanographic Commission (UNESCO/IOC)
UNFCCC	UN Framework Convention on Climate Change
UNISDR/ PPEW	United Nations Office for Disaster Risk Reduction (UNISDR) / Platform for the Promotion of Early Warning
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
WB	World Bank
WMO	World Meteorological Organization

Executive Summary



Introduction

Combating the risks to life and livelihoods caused by climate change and increasing numbers of natural hazards has become a global challenge, of particular concern in Asia. Malteser International has been working in Myanmar since 2001 with a focus on humanitarian assistance in disaster-prone areas. Since Cyclone Nargis hit in 2008, prevention and risk reduction have become significant components of Malteser International's work nationally. To this end, Malteser International is collaborating with the Government of the Union of Myanmar (GoUM) at multiple levels and with the Disaster Risk Reduction Working Group (DRRWG) in enhancing early warning capacities. Early warning systems are defined by the United Nations Office for Disaster Risk Reduction as "The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss."¹

The Global Initiative on Disaster Risk Management (GIDRM) launched by the German Federal Ministry for Economic Cooperation and Development (BMZ) brings together stakeholders from Germany and Asia-Pacific and provides a forum for dialogue and mutual learning

on disaster risk management. One of its priority areas is to enhance inclusive disaster response, preparedness structures and expanding effective Early Warning Systems (EWS). GIDRM backs the co-creation and piloting of tangible solutions and facilitates the exchange of know-how, experiences and competence. It also supports the development of strategic guidelines and international standards. The GIDRM now includes eight Asian countries and is coordinated by the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ).

During GIDRM's September 2013 fact-finding mission to Myanmar, senior GoUM officials showed high interest in engaging with the initiative, in particular on issues of Early Warning and Civil Protection. This mapping exercise was commissioned by Malteser International under GIDRM. It is presented as a first step towards supporting GoUM in information-gathering under the Myanmar Action Plan for Disaster Risk Reduction (MAPDRR), in particular under Components 2: Risk Assessment, 3: Multi-hazard Early Warning System and 4: Preparedness at all levels, and especially in implementing Sub-Component 3.4: Enhanced Flood Monitoring and Forecasting Capacities at Township Levels.

1 UNISDR website <<http://www.unisdr.org/we/inform/terminology#letter-e>>

Scope and objectives of the study

The key objective of the study was to analyze national and international stakeholders and their initiatives in Early Warning Systems in Myanmar, to identify priority gaps that need to be addressed by all stakeholders and those that should be dealt with by the GIDRM. The study's scope is based on a broad view of EWS and covers four pillars: 1) Risk Knowledge, 2) Monitoring and Warning Service, 3) Dissemination and Communication and 4) Response Capability. The mapping reviews GoUM ministries and mechanisms, as well as their development, technical support and civil society partners involved in enhancing the effectiveness of multi-hazard EWS in Myanmar.

Methodology and limitations

The methodology included a literature review of key documents from GoUM and technical and development agencies, as well as interviews with members of GoUM's national and state level departments, UN agencies, and NGOs, document analysis, and multiple consultations. The mapping exercise was conducted in cooperation with the DRRWG to contribute to the implementation of its strategic framework. Two consultative workshops were held in 2013 and 2014, the first with DRR Working Group members from UN agencies, the Myanmar Red Cross Society, the Myanmar Engineering Society, and international and local NGOs, and the second with the MAPDRR Task Force Working Groups 1 and 2. Feedback received during these consultations has been incorporated into the report.

Limitations of this study included restricted access to documents, their availability in English or limited access to their Myanmar versions, difficulties in translation, and the availability of agencies and partners,. In addition, full consultations with all GoUM departments did not occur until July 2014, and only six of the WRRWG members participated, due to the voluntary nature of the exercise.

Analysis of EWS stakeholders, their mandates and functions

This mapping exercise identified 160 national and international stakeholder organizations involved in EWS in Myanmar, in a total of 11 categories under 3 clusters. These are listed below:

Cluster A: National stakeholders in GoUM with mandates and functions derived from their membership to the National Disaster Management (NDM) system and its EWS sub-system which allocates daily responsibilities. These are codified in the Natural Disaster Management (NDM) Law of 2013, Standing Orders on Natural Disaster Management of 2009, and under Presidential Orders.

Cluster B: National stakeholders from professional associations, NGOs, and Community-Based Organizations (CBOs) that play roles based on their capacity and on specific requests from GoUM stakeholders, in particular state/regional governments who have a mandate to make such requests.

Cluster C: International stakeholders working in Myanmar who do not have independent functions in EWS but operate as development partners support-

Table 1: List of 69 national and international stakeholders and their roles and functions under the four EWS pillars

Category of stakeholder and name		Four pillars of EWS			
Sr. No.	List of stakeholders under each category	Risk Knowledge	Monitoring & Forecasting	Warning Dissemination / communication	Preparedness & Response Capability
A)	National Stakeholders : Government (national & sub national), Technical Institutions, Auxiliary				
A.1	National Mechanisms (5)				
	National Disaster Preparedness Central Committee (NDPCC)		X	X	XX
	National Natural Disaster Preparedness Management Work Committee (NDPMWC)		XX	XX	XX
	Subcommittees of NDPMWC (3 relevant to EWS)		X	XX	XX
	MAPDRR Task Force	XX	XX		XX
	NAPA implementation Task Force		X	X	
A.2	National Ministries (9) and Depts. (10)				
	Min. Soc. Welfare, Relief & Resettle (MSWRR)		X	XX	XX
	Relief & Resettlement Dept. (RRD)	X	X	XX	XX
	Ministry of Transport	X	XX	X	
	Dept. of Meteorology and Hydrology (DMH)	X	XX	XX	
	Dept. Water Res & Improvement of River Systems (DWRIRS)		X		X
	Ministry of Home Affairs			XX	XX
	General Administration Dept.		X	XX	XX
	Fire Department	X		XX	XX

Myanmar Police			X	XX
Ministry of Defense, Myanmar Army,			X	XX
Min. of National Planning & Economic Development (MNPED)	X	X		XX
Ministry of IT and Communications		X	XX	X
Ministry of Information				
Info & Public Relations Dept. (IPRD)		X	XX	X
Ministry of Agriculture				
Irrigation Department		X	X	X
Dept. of Agricultural Planning and Irrigation	X	X		X
Ministry of Health		X	X	XX
A.3 Myanmar Red Cross Society (MRCs) (1)	X	XX	XX	XX
A.4 Sub national Stakeholders (6 types)				
State/Regional Governments, S/R DM Committee	X	X	XX	XX
District Officials, Dist DM Committee			X	X
Township Officials, Tsp DM Committee	X	X	XX	XX
City Dev Corporations (YCDC,MCDC)	X	X	XX	XX
Village Tract Officials, DM Committees		X	XX	XX
Village officials, Village DM Committees	X	X	XX	XX
B) National stakeholders - professional associations, NGOs and CBOs,				
B.1 Professional Associations (3)				
Myanmar Engineering Society (MES)	XX	X		X
Myanmar Geophysical Society (MGS)	XX	X		
Myanmar Earthquake Committee MEC	XX	X		X
B.2 National NGOs	X (HVCA)		XX	XX
B.3 Local NGOs /CBOs	X "		XX	XX
C) International stakeholders - UN agencies, multilateral organizations, regional organizations and donors, and International and regional NGOs				
C.1 UN and Multilateral Agencies (14)				
UN Resident & Humanitarian Coordinator	X	X	X	X
UNDP	X		X	XX
UNOCHA	X	X		XX
UN Habitat	XX			XX
IOM				X
UNESCAP		XX	X	X
UNICEF, WFP, UNESCO/IOC	X	X	X	XX
Non Resident: WMO, UNISDR, GFDRR		X		XX
World Bank		XX	X	
ADB			X	XX
C.2 International NGOs	X		XX	XX
INGO Consortiums	X		X	XX
C.3 Donors (12)				
Japan		XX	XX	X
USA	X	X		XX
EU	X		X	XX
Germany				
Norway	X	XX	X	XX
Korea		X		
Netherlands		X		
China		X		
Thailand		X		

World Bank	X	XX	X	
Asian Development Bank (ADB)				XX
UNESCAP (as donor)	X	XX	XX	X
C.4 Regional/Technical Institutions: (7)				
ASEAN AHA Center and ACDM	XX	X		X
Mekong River Commission (MRC)		X		
Regional Integrated Multi-Hazard Early Warning System (RIMES)	X	XX	XX	X
Asian Disaster Preparedness Center (ADPC)	XX	XX	XX	X
BIMSTEC Regional Hydromet Center		XX		
JICA/JMA		XX	XX	XX
Norwegian Technical Institutions		XX	X	

Code: Blank – no involvement, x – limited involvement, xx – substantively involved²



ing improvements to the EWS, within the context of their respective organizational mandate and resources, through specific initiatives. They have limited mandates according to the description of their roles in the NDM Law and other legal instruments.

Main Findings

Mechanisms for collaboration among EWS stakeholders

Section 5 of the report maps out the mechanisms for collaboration among EWS stakeholders. These include the National Disaster Preparedness Central Committee (NDPCC) whose duties involve outlining policies and guidelines, formulating basic principles of coordination for disasters that require international assistance, distributing state funds, and issuing orders and directives. Another mechanism is the National Natural Disaster Preparedness Management Work Committee (NDPMWC) which systematically undertakes DRM and preparedness measures, including providing aid and implementing policies and directives on managing local aid set by the NDPCC. The NDPMWC has 10 subcommittees including an Emergency Communication Subcommittee and a Search and Rescue Committee. A third

mechanism is the MAPDRR Task Force and Working Groups. Although the existence of these committees is positive, there is significant room for improvement, as they do not meet regularly during non-emergency times to discuss planning, programming, and system development.

In an indication of GoUM’s serious concern with DRR and EWS, laws, plans and programs have been implemented. Forefront among these is the Natural Disaster Management Law which addresses the implementation of DRM programs and coordination between GoUM departments and national and international organizations. Standing Orders on DM have been drafted to ensure the effective execution of emergency relief and rehabilitation operations and the timely mobilization of resources. A Myanmar Action Plan for Disaster Risk Reduction (MAPDRR) has been developed and an Inter-Agency Emergency Response Preparedness Plan and a Myanmar NGO Contingency Plan drafted.

Myanmar has a multi-level governance structure with five levels (region/state, district, township, village tract and village), which extends into disaster management. Many of their committees have an early warning task force.

National mechanisms of partnership and information-sharing have been developed. Foremost among these are the DRR Sub-Sector Working Group, which is the government-donor partnership group, and the DRR

² These criteria have been developed and the rating done by the author based on interviews, consultations, and the documents studied.

Working Group, which was set up as one of the priority components of the Post Nargis Recovery Preparedness Plan (PONREPP). The DRRWG meets monthly, and serves as a platform for information sharing and strengthened coordination among its 50+ members. It engages in policy and advocacy work focusing on strengthening DRR institutions, community-based disaster preparedness and mitigation, building DRR knowledge and awareness, and mainstreaming DRR into development.

Local and international NGOs have established their own networks for information-sharing and synergy. These include two consortia under the Building Resilience Against Climate Extremes and Disasters (BRACED) program of DfID. The Global Network of NGOs in DRR (GNDR) lists multiple Myanmar-based NGOs as active collaborators, as does the Asian Disaster Response and Reduction Network (ADRRN). The Myanmar NGO Network has a DM committee, and the Myanmar Consortium for DRR (MCDRR) is a national NGO network which unites 23 local organizations.

Initiatives to enhance the effectiveness of EWS

Section 6 reviews findings from a 2009 stock-taking exercise, then maps these initiatives, providing some details of the past, ongoing and planned initiatives implemented by international and national stakeholders. Projects listed in this section include MRCS' Community based Disaster Risk Management Program, spanning 11 years and 7 regions and 5 states, the United Nations Development Program (UNDP) initiatives on climate change risks on water resources and food security in the Dry Zone, and others by UN Habitat, the World Meteorological Organization (WMO), and the UNESCO International Oceanographic Commission (UNESCO/IOC). It also reviews the Regional Integrated Multi-Hazard Early Warning System for Asia and Africa (RIMES), which has been involved in strengthening and upgrading Myanmar's EWS through a number of projects. Programs by the Asian Disaster Preparedness Center (ADPC), Japan International Cooperation Agency (JICA), the USAID Office of Foreign Disaster Assistance and local NGOs are also detailed.

Projects fall into various categories. Projects aiming to develop guidelines and policies address issues like Standard Operating Procedures (SOPs) for early warning action, township disaster management plans, tsunami exercise guidelines, and institutionalizing safer construction practices. Other projects on knowledge-building include multi-hazard risk assessments and baseline surveys. Capacity-building constitutes another important category, and includes establishing an emergency operating center in Nay Pyi Taw. Technical support is another key category, with projects ranging from improving technical communications networks to eliminate delays in EWS and conducting simulation exercises.

Strengths and weaknesses of initiatives regarding four Pillars of EWS

Section 7 presents an analysis of the strengths and weaknesses of the organizations and initiatives. It provides an overview of the current status of each Pillar, and identifies gaps and needs to be addressed in each. Below are the strengths and weaknesses for each Pillar.

Pillar 1: Risk Knowledge through hazard, vulnerability and risk assessments

Strengths:

- Having undertaken multi-hazard risk assessments with composite risk maps in sub-national jurisdictions. Using at least two methodologies in geographical areas provides a baseline.
- National institution and regional counterpart partnerships result in valuable capacity-building.
- MAPDRR represents a significant effort between GoUM departments to assess their own needs and identify a joint agenda to guide further action and investment.

Weaknesses:

- The scope of the multi-hazard risk assessment studies is limited to 3 of the 14 states and regions and is therefore insufficient to provide a holistic assessment of needs across Myanmar.
- There has been limited dissemination of study results to relevant authorities and communities.
- The ability to use these studies for administrative action planning remains limited because of insufficient technical capacity to produce maps of the district, township and village tract levels.
- The MAPDRR Task Force Working Group on Risk Assessment and Early Warning Systems is the only focal point which oversees risk assessment, but has not met in the last two years.
- The proposed Government-led initiative to standardize risk assessment methodologies is not harmonized with existing MAPDRR mechanisms or across agencies.
- Local knowledge of hazards, valuable for infrequent but high-severity events like tsunamis, is insufficiently recognized in risk assessments.
- Efforts to conduct vulnerability assessments are insufficient.

Pillar 2: Observation, Monitoring, Forecasting and Warning

Strengths:

- DMH's Forecasting and Warning Services has numerous observation stations, including 155 full-time basic stations, 157 part-time measuring/monitoring stations, and 8 special stations which contribute to regular data collection on rainfall, temperatures, humidity, wind force and direction, atmospheric pressure, water level, temperature and discharge, sediment discharge and soil temperature, and sea level data for tsunami and earthquake monitoring.

- This data collection enables DMH to issue warnings for storms, storm surges, strong winds, heavy or untimely rainfall, floods, fog, tsunamis and special or significant weather for aircrafts.

Weaknesses:

- The quality of monitoring stations and telemetric systems for transmitting field data is poor.
- Language utilized in warning bulletins is often highly technical and poorly understood.
- The DRR Sub Sector Working Group under the Social Protection WG initiated a review of progress of MAP-DRR Components and found that priority projects have yet to be completed.
- The MAPDRR TF WG led by DMH has not met since 2011.
- MAPDRR Components were created by the Government's Task Force Working Groups and provide a basis for the desired effective synergy among donors. No framework has yet been developed in elaboration of these proposed components.
- RIMES was intended to facilitate coherent, integrated, and efficient engagement with donors, but the project does not seem to have been completed. Multiple other assessment reports and initiatives have not been completed.
- There remain numerous gaps in local DRR capacities. These include inactive Disaster Management Committees (DMCs), weak linkages between schools, villages, village tract and township DMCs, and limited coordination between key social actors.
- Simulation exercises and drills are not held regularly, and guidelines for the frequency, scope and scale of these exercises are yet to be developed.
- No plan refers to the special vulnerabilities related to gender, disability, age and ethnicity.
- There are limited financial resources for local level DRR implementation, resulting in weaknesses in coverage and inconsistency of tool use and program methodologies.
- The revised Standing Orders do not include clear roles for DMCs at township, village tract, village and school levels, and members aren't always fully aware of their expected roles.
- DM Committees at township and village tract levels do not always have DRR sub-committees.
- The trainings for village tract and village level DMCs are not standardized.

Pillar 3: Dissemination and Communication

Strengths:

- There are significant improvements in EW dissemination since Cyclone Nargis, as demonstrated by the preventative actions taking during Cyclones Giri in 2010 and Mahasen in 2013.
- The MRCS system has been improved, including with the installation of telephone lines and/or the purchase of portable telephones for several Red Cross township branch offices.

Weaknesses:

- There remains a need for clear SOPs on EW dissemination.
- Horizontal and vertical communication and the quality of technology networks are poor.
- Public media messages, especially on early warning of extreme weather, are poor.
- There is a significant digital divide caused by poor internet and telephone connectivity.
- There is limited public awareness of EWS and corresponding actions to take.

Pillar 4: Preparedness and Protection

Strengths:

- Guidelines for Township Disaster Management Plans were developed and launched in 2010, with the support of various UN agencies and technical support partners.

Weaknesses:

- The roles of key ministries, national departments and entities should be further detailed in national Standing Orders.



Gaps in scope, hazard coverage, geographical distribution, and stakeholder engagement

Section 8 reviews the gaps in scope, hazard coverage, geographical distribution, and stakeholder engagement of the Four Pillars of EWS. Myanmar Information Management Unit (MIMU) data from 2013 shows that DRR activities are being undertaken in only 3% of village tracts, demonstrating the need for significant up-scaling nation-wide. Disaggregating data by sub-sector³ shows that the number of townships doing Community-Based Disaster Risk Management (CBDRM) work represents just 16% of townships. However, this figure obscures the fact that only a small percentage of villages and village tracts in each township are involved in CBDRM activities. Analyzing coverage by sub-sector shows that there is less emphasis on the core EWS areas of preparedness, risk assessment and early warning (which are more technical), and a distinct bias towards projects dealing with the softer component of public awareness. Data visualization and DRRWG situation assessments show that CBDRM work on hazards is still focused on cyclones and the Delta region. Systematically addressing risks and up-scaling DRM projects that prioritize the most at risk areas has not yet begun.

Recommendations to enhance effectiveness of EWS and coordination among stakeholders

Improving EWS systems in Myanmar will require that the gaps and needs identified in Section 7 be systematically addressed. Section 9 provides recommendations on priority EWS actions.

Risk Knowledge

- Increase the dissemination of completed studies to the authorities and communities concerned and to address issues of scale, technical capacity and ability to use them for DM.
- Identify specific focal point department or mechanism in Government to undertake and oversee risk assessment.
- Establish a suitable task force on risk assessment in both the DRRWG and the donor coordination forum to have mechanisms for harmonization across agencies working on DRR.
- Expand vulnerability assessments and link them to other social or poverty analysis activities.

Observation, Monitoring, Forecasting and Warning

- Improve coverage of observation, monitoring, data analysis, prediction and forecasting systems to bring them in line with WMO and UNESCO/IOC standards.
- Provide real time monitoring of water levels, and establish/upgrade EWS communication systems along flood protection embankments and dams.
- Install CCTV, remote monitoring, telemetry and early warning and flood forecasting in large dams for dam

safety and establish a main control center in the Irrigation Department.

- Simplify language of the warning bulletins to make them more understandable.
- DMH needs to expedite the capacity building program framework being developed under the RIMES project as a framework for coherent, efficient and effective engagement with donors.

Dissemination and Communication

- Produce clear SOPs on early warning dissemination and communication in both national and local Standing Orders and departmental manuals of DMH, RRD, GAD, MPT, MoI.
- Improve horizontal and vertical communication networks and the quality of technology networks.
- Establish and upgrade communication systems along the flood protection embankment to establish a more real time monitoring of water level.
- Improve public media messages on forecasts and early warning of extreme weather.
- Address the digital divide hampering EW communication in the seven Border States.
- Conduct public information campaigns among at risk communities to raise awareness about the types of warning that could be received and their corresponding actions.
- Include DRR modules in school curricula.

Preparedness and Response Capability

- The national Standing Orders should further detail the roles of key ministries and national departments and entities at all levels, in respect to DM overall, and more especially EWS.
- Address gaps in local DRR capacities by activating inactive DMCs, strengthening linkages between DMCs, and enhancing coordination between various actors.
- Ensure periodic simulation exercises and drills, and develop guidelines on the frequency, scope and scale of these exercises.
- Revise plans at all levels to be more inclusive and address the special needs and capacities of gender, disability, age and ethnicity.
- Create a DRR Sub-Committee in DMCs at township and village tract levels.
- Standardize village tract and village DMC trainings and use a common handbook.
- Enhance communication between each level of DMC with the ones above and below.
- Finalize guidelines for DM Committees and recommend holding 2 annual meetings, one before cyclone season to improve preparedness and one after to assess lessons learned.
- Scale up the construction of protective infrastructure for evacuation needs in the Delta Region and in other states and regions which face high to medium risk of cyclone and storm surges.

3 Corresponding to the 7 MAPDRR components

Introduction

Combating the risks to life and livelihoods caused by climate change and increasing numbers of natural hazards has become a global challenge, of particular concern in Asia. Malteser International has been working in Myanmar since 2001 with a focus on humanitarian assistance in disaster-prone areas. Since Cyclone Nargis hit in 2008, prevention and risk reduction have been significant components of Malteser International's work nationally.



To this end, Malteser International is collaborating with the Government of the Union of Myanmar (GoUM) at multiple levels and the Disaster Risk Reduction Working Group (DRRWG) in enhancing early warning capacities. Early warning systems are defined by the United Nations Office for Disaster Risk Reduction as “The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.”⁴

The Global Initiative on Disaster Risk Management (GIDRM) was launched by the German Federal Ministry for Economic Cooperation and Development. It brings together a wide range of stakeholders from Germany and the Asia-Pacific region, and provides a forum for new ways of collaborating in DRM. The GIDRM backs the implementation of exemplary, replicable projects and facilitates the exchange of know-how, experiences and competence. It also supports the development of strategic guidelines, international standards and leads global agenda setting in the

field of Disaster Risk Management (DRM). The GIDRM now includes seven Asian countries (Bangladesh, China, India, Indonesia, Myanmar, Philippines, and Thailand)

Early warning systems are defined as “The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.”

⁴ UNISDR website <<http://www.unisdr.org/we/inform/terminology#letter-e>>

and is coordinated by GIZ, the German Federal Enterprise for International Cooperation. Optimizing disaster preparedness and response structures is of particular interest for GIDRM, including the expansion and harmonization of effective and efficient Early Warning Systems (EWS) for various hazard types, and the strengthening of civil protection/defense structures, which are a joint duty of governmental institutions, civil society and the private sector.

During GIDRM's September 2013 fact-finding mission, senior GoUM officials showed interest in engaging with GIDRM, in particular on issues around early warning and civil protection. Subsequently, this mapping exercise was commissioned by Malteser International under GIDRM to inform the current status of early warning systems and allow for optimal harmonization with existing initiatives in Myanmar. This report was presented at a meeting of the MAPDRR Task Force Working Groups 1 and 2 on 30 July 2014, and will be used in further planning of Myanmar's EWS.



Scope and Objectives

The key objective of the study was to identify and analyze national and international stakeholders and their EWS initiatives in Myanmar. The study aims to identify gaps in the system, prioritize those that need to be addressed by all stakeholders, and identify which should be dealt with by the GIDRM.

This mapping was presented by Malteser International as a first step towards supporting GoUM in its information gathering exercise for various components of the MAP-DRR, and in implementing *Component 3: Multi-hazard Early Warning System*, and in particular its *Sub-Component 3.4: Enhanced Flood Monitoring and Forecasting Capacities at Township Levels*. The study's scope is derived from a broad view of EWS based on the 2006 UNISDR/PPEW⁵ approach for people-centered EWS. It addresses four pillars, namely: Pillar 1) Risk Knowledge, Pillar 2) Monitoring and Warning Service, Pillar 3) Dissemination and Communication and Pillar 4) Response Capability. The study thus has a wider scope than the *MAPDRR Component 3: Multi Hazard Early Warning Systems*, and required data gathering and analysis for the other components as well. Correspondingly, this report uses a broad interpretation of the term “early warning systems” and includes risk assessments and response preparedness.



5 United Nations Office for Disaster Risk Reduction (UNISDR) and its Platform for the Promotion of Early Warning, which is hosted by the Government of Germany

Methodology and Limitations



The methodology included a literature review of key documents, as well as interviews with informants in GoUM's national- and state-level departments, UN agencies, and NGOs, document analysis, and partner consultations. Consultations on the objectives of the study, and its purpose and use in the national context were held with RRD and DMH in December 2013. The mapping exercise was done with the DRR Working Group (DRRWG), to benefit from its experience and contribute to the implementation of its strategic framework. Briefings and/or extracts of the report were circulated to DRRWG members, government agencies, and other actors throughout 2013 and 2014. Presentations of the report were made in consultation meetings with the DRR Working Group and the MAPDRR Task Force Working Groups 1 and 2, and actors including Malteser International.

Limitations: Full consultation with all government departments did not occur until July 2014. Other challenges included access to the Myanmar versions of documents, their availability in English, and challenges in translation. The availability of agencies and partners for meetings and consultations, as well as queries from partners on the purpose of the study and its availability for wide circulation also posed challenges. Ultimately, the study was able to gather responses from just six of the DRRWG members, perhaps due to the voluntary nature of the exercise.

Analysis of EWS Stakeholders, their mandates and functions

Analysis of national and international stakeholders

This study provided a conservative estimate of 160 national and international stakeholder organizations, 66 of which have been identified by name, which have been organized into eleven categories under three clusters as follows:

- a. National stakeholders in the GoUM, technical institutions, national and sub-national DM committees at 5 levels (state/region, district, township, village tract and village);
- b. National stakeholders from professional associations, NGOs and CBOs,
- c. International stakeholders from UN agencies, multilateral organizations, regional organizations and donors, and international and regional NGOs



Table 1: List of stakeholders and their roles and functions in the Four Pillars of EWS

Category of stakeholder and name		Four pillars of EWS			
Sr. No.	List of stakeholders under each category	Risk Knowledge	Monitoring & Forecasting	Warning Dissemination / communication	Preparedness & Response Capability
A) National Stakeholders : Government (national & sub national), Technical Institutions, Auxiliary					
A.1 National Mechanisms (5)					
	National Disaster Preparedness Central Committee (NDPCC)		X	X	XX
	National Natural Disaster Preparedness Management Work Committee (NDPMWC)		XX	XX	XX
	Subcommittees of NDPMWC (3 relevant to EWS)		X	XX	XX
	MAPDRR Task Force	XX	XX		XX
	NAPA implementation Task Force		X	X	
A.2 National Ministries (9) and Depts. (10)					
	Min. Soc Welfare, Relief & Resettle (MSWRR)		X	XX	XX
	Relief & Resettlement Dept.. (RRD)	X	X	XX	XX
	Ministry of Transport	X	XX	X	
	Dept. of Meteorology and Hydrology (DMH)	X	XX	XX	
	Dept. Water Res & Improvement of River Systems (DWRIRS)		X		X
	Ministry of Home Affairs			XX	XX
	General Administration Dept.		X	XX	XX
	Fire Department	X		XX	XX
	Myanmar Police			X	XX
	Ministry of Defense, Myanmar Army,			X	XX
	Min. of National Planning & Economic Development (MNPED)	X	X		XX
	Ministry of IT and Communications		X	XX	X
	Ministry of Information				
	Info & Public Relations Dept. (IPRD)		X	XX	X
	Ministry of Agriculture				

Irrigation Department		X	X	X
Dept. of Agricultural Planning and Irrigation	X	X		X
Ministry of Health		X	X	XX
A.3 Myanmar Red Cross Society (MRCs) (1)	X	XX	XX	XX
A.4 A.4 Sub national Stakeholders (6 types)				
State/Regional Governments, S/R DM Committee	X	X	XX	XX
District Officials, Dist DM Committee			X	X
Township Officials, Tsp DM Committee	X	X	XX	XX
City Dev Corporations (YCDC, MCDC)	X	X	XX	XX
Village Tract Officials, DM Committees		X	XX	XX
Village officials, Village DM committees	X	X	XX	XX
B) National stakeholders - professional associations, NGOs and CBOs,				
B.1 Professional Associations (3)				
Myanmar Engineering Society (MES)	XX	X		X
Myanmar Geophysical society (MGS)	XX	X		
Myanmar Earthquake Committee MEC	XX	X		X
B.2 National NGOs	X (HVCA)		XX	XX
B.3 Local NGOs /CBOs	X "		XX	XX
C) International stakeholders - UN agencies, multilateral organizations, regional organizations and donors, and International and regional NGOs				
C.1 UN and Multilateral Agencies (14)				
UN Resident & Humanitarian Coordinator	X	X	X	X
UNDP	X		X	XX
UNOCHA	X	X		XX
UN Habitat	XX			XX
IOM				X
UNESCAP		XX	X	X
UNICEF, WFP, UNESCO/IOC	X	X	X	XX
Non Resident: WMO, UNISDR, GFDRR		X		XX
World Bank		XX	X	
ADB			X	XX
C.2 International NGOs	X		XX	XX
INGO Consortiums	X		X	XX
C.3 Donors (12)				
Japan		XX	XX	X
USA	X	X		XX
EU	X		X	XX
Germany				
Norway	X	XX	X	XX
Korea		X		
Netherlands		X		

Analysis of roles, mandates and functions

Actors in Cluster A – governmental and national stakeholders and their auxiliaries – have mandates and functions which reflect their membership and roles in the national DM system and its EWS sub-system. So too, national stakeholders in Cluster B play roles based on their capacity and on specific requests from GoUM actors, in particular state/regional governments with legal mandates to make such requests. This national system is relatively new and in a state of evolution.

International stakeholders in Cluster C operate as development partners in supporting improvements to EWS system, each within the context of their respective organizational mandate and resources, through specific initiatives. This set of initiatives is mapped and analyzed in Section 6 of this report, and their strengths and weaknesses are assessed in Section 7.

National stakeholders (Cluster A and B): mandates and functions

National Ministries, Departments and Auxiliary

National mechanisms (A.1, Table 1) are described in the Section 5. The roles and functions of national ministries and departments and MRCs derive from their assigned roles and responsibilities in daily life and development. These roles are codified in the NDM Law of 2013 and Standing Orders on Natural Disaster Management from 2009 as well as Presidential Orders assigning responsibility through chairmanship or membership of Committees, Sub-Committees and Taskforces. Four departments and one entity play major institutionalized roles in disaster management, and are described below. Fifteen other ministries and departments have minor roles and are not described here.

China		X		
Thailand		X		
World Bank	X	XX	X	
Asian Development Bank (ADB)				XX
UNESCAP (as donor)	X	XX	XX	X
C.4 Regional/Technical Institutions: (7)				
ASEAN AHA Center and ACDM	XX	X		X
Mekong River Commission (MRC)		X		
Regional Integrated Multi-Hazard Early Warning System (RIMES)	X	XX	XX	X
Asian Disaster Preparedness Center (ADPC)	XX	XX	XX	X
BIMSTEC Regional Hydromet Center		XX		
JICA/JMA		XX	XX	XX
Norwegian Technical Institutions		XX	X	

Code: Blank – no involvement, x – limited involvement, xx – substantively involved⁶

Relief and Resettlement Department (RRD)

RRD is under the Ministry of Social Welfare, Relief and Resettlement (MSWRR). RRD’s responsibilities include overseeing the administrative work of the National Natural Disaster Preparedness Central Committee (NNDPCC). Its main functions in relation to EWS include: a) coordinating with GoUM departments, UN agencies, international and local NGOs, and donors on disaster prevention, preparedness and disaster risk reduction measures and recovery programs, and (b) providing emergency assistance for disaster victims, those affected by famine as a result of climate events, and Internally Displaced Persons (IDPs). RRD employees include 591 staff in national and State/Regional offices, who serve as focal points for DM and DRR. In early warning, RRD is one of the primary recipients

of forecast information and a key link in the dissemination of early warning through the township level focal points. RDD also has a lead role in capacity building, and is currently working to establish a DM Training Center. It is Chair of the MAPDRR Task Force and the primary Myanmar focal point for the ASEAN Committee on Disaster Management (ACDM).

Table 2: Categories of national and international stakeholders of EWS, their roles and functions and source of their mandate

Category of EWS Stakeholder	Role and function in EWS Source of mandate provided for each stakeholder category in italics
A National stakeholders in GoUM technical institutions, national and sub-national DM committees	Undertaking risk assessment, monitoring, generating, issuing and acting on early warning, and organizing preparedness and protection
A.1 National Mechanisms and Sub-Committees	DM Law, Presidential Orders, Standing Orders, MAPDRR
A.2 National Ministries and Departments	DM Law, Presidential Orders, Standing Orders, MAPDRR
A.3 Myanmar Red Cross Society (MRCS)	RC Law, DM Law, Standing Orders National and State, MAPDRR, presence in all S/R, districts and townships, volunteer capacity
A.4 Sub-National DM Committees at 5 levels	DM Law, Presidential and CM orders, State Standing Orders, Planning Guidelines
B National stakeholders from professional associations, NGOs and CBOs	Local hazard, capacities and vulnerabilities assessment (HVCA), receiving and acting on early warning and ensuring sub-national and community preparedness
B.1 Professional Associations	Capacity, organizational charter, tasks assigned in MAPDRR, special responsibilities assigned under special orders
B.2 National NGOs and CBOs	Capacity, organizational charter, authorizations to work at approved level and location, requests and approvals from GoUM bodies, resources
C International stakeholders from UN agencies, multilateral organizations, regional organizations, donors, international and regional NGOs	Supporting the Governments at multiple levels and communities in improving all Four Pillars of EW systems in Myanmar
C.1 UN and multilateral organizations	Organizational mandate, GoUM request, role approved in UNCT strategy, MoU and specific approval to work
C.2 International and regional NGOs	Capacity, organizational charter, authorization to work at approved level and location, requests and approvals from GoUM bodies, resources
C.3 Donors	Government request, MoU, country strategy, project approval
C.4 Regional and national technical institutions	Myanmar’s membership of relevant regional mechanism and agreement, organizational mandate, GoUM Request, MoU and specific approval to work

Department of Meteorology and Hydrology (DMH)

DMH is a state organization under the Ministry of Transport, which provides technical services to promote safety, takes precautionary measures against natural disasters, and promotes sustainable food production without risk of hazard-related loss. DMH functions in the EWS context include: a) information-sharing, b) safeguarding the loss of lives and property by issuing early warnings and bulletins, c) increasing public awareness of natural disasters, d) monitoring climate change, underground water resources, air and water quality, and e) providing meteorological, hydrological and seismological information to assist other authorities in development planning. DMH established the National Multi-hazard Early Warning Center (NMHEWC) in 2006 and is the GoUM focal point responsible for issuing early warnings for weather, geological and maritime-related hazards. It telecasts daily and monthly weather news and reviews and provides updated information on its website.

General Administration Department (GAD)

GAD is under the Ministry of Home Affairs, and its main objectives are to ensure the rule of law, promote regional development and serve public interest. It is the bureaucratic core of Myanmar's vertical sub-national government structure and heads township administration, providing support down to the village level. GAD plays a key role in EWS and DRR, by actively participating in Disaster Preparedness Committees (DPCs),

including as chair at the district and township levels. It is responsible for producing and distributing DP plans, conducting DM trainings and drills, and creating shelters and safe locations. During alert/warning stages, it is responsible for disseminating early warnings down to the district and township levels and arranging evacuations. During disasters, GAD ensures vertical communication, operates relief camps, makes arrangements to evacuate property to designated locations, and coordinates with local administrations and NGOs.

Fire Services Department (FSD)

FSD is the department for fire hazards under the Ministry of Home Affairs. Its main duties are: fire safety including prevention and extinguishing, disaster prevention, search and rescue, and public welfare. Its Fire Brigade is comprised of three groups, namely Government Fire Brigades, Auxiliary Fire Brigade and Reserve Fire Brigade. It plays a specific role in the dissemination of early warning, especially through its auxiliary Fire Brigades. It runs a program with DMH in 272 townships, which has trained 100 volunteers in each brigade to disseminate early warning up to the village level. FSD is interested in better access to hazard and risk maps to facilitate better evacuation planning.

Myanmar Red Cross Society (MRCS)

MRCS is an auxiliary of the GoUM and is the leading humanitarian organization in Myanmar. Its role is recognized in the NDM Law and its mandate is further defined through the Standing Orders of 2009. It has 17

⁶ These criteria have been developed, and the rating done by the author based on the documents studied, interviews and consultations.



state and region level branches, each with a Red Cross Supervisory Committee and Emergency Response Team (ERT) comprised of staff and Red Cross Volunteers (RCVs). MRCS is not operational at the district level but has 330 township branches. ERTs, supported during responses by a National Emergency Response Team (NERT), provide water and sanitation, public health and psychosocial support.⁷ MRC's greatest advantage is its network of systematically-trained RCVs, which counts over 120,000 lifelong members and more than 200,000 Youth. MRCS Headquarters Emergency Operations Center (EOC) receives early warnings from DMH. MRCS and its RCVs are responsible for communicating warnings to the public and appraising whether evacuation is needed. If so, it coordinates with village tract authorities. During the cyclone season, MRCS operates two radio stations with alerts and precautions. It also undertakes township, community- and school-based DRR activities. It is a member of two national committees on disaster management and is on the Taskforce for MAPDRR and the Inter Agency Standing Committee (IASC) Contingency Plan.

Sub-national Government authorities and DM Committees: mandate and functions

Myanmar's sub-national administrative structure

The Republic of the Union of Myanmar is composed of seven states and seven regions, six self-administered zones or divisions, and one union territory containing the capital and surrounding townships. The smallest formal administrative unit is the village, with several grouped together into village tracts. Urban wards, towns and village tracts are grouped into townships, where the lowest levels of government offices are generally located. Collections of townships are districts, which in turn form the region or state. Myanmar has 330 townships in 67 districts in its 14 states and regions. By mid-2013, most villages and village tracts had, or were in the process of indirectly electing, village heads to replace centrally appointed administrators. Townships administrations are headed by a senior official of the GAD and do not yet have a body of elected representatives. Many key government functions take place at the township levels. Districts form a middle tier of administration connecting state/region governments to townships, and are also headed by a senior GAD official. Each state or region's Chief Minister and cabinet are appointed by the President. State and regional parliaments are directly elected by the citizens of that state or region. Each level has a DM or DP committee. The most important from a government perspective, and for the purpose of this study, are the State, Region and Township DM Committees. The structure and role of each is explained in Section 5.3 of this report.



National stakeholders from Professional Associations and NGOs: mandates and functions

Professional Associations

These three professional associations are lead national agencies in activities related to Pillar 1 of the EWS, namely Risk Knowledge and Assessment, as described in Section 7.1.1.

Myanmar Engineering Society (MES) is the largest professional association of practicing engineers in GoUM and the private sector. Its mandate derives from its articles of association, professional competence and track record. MES is active in hazard and risk assessment, building code development and preparedness, and is a serving member of the MAPDRR Task Force (MAPDRR TF).

Myanmar Geophysical Society (MGS) is a professional association of practicing geologists and geophysical specialists from GoUM and the private sector. Its mandate derives from its articles of association, professional competence and track record. MGS is active in geological hazard and risk assessment, building code development and preparedness. It is a serving member of the MAPDRR TF.

Myanmar Earthquake Committee (MEC) is actively involved in earthquake risk assessment and the development of a building code for Myanmar.

National NGOs and CBOs

A large number of Myanmar NGOs and Community Based Organizations (CBOs) are active in disaster management, climate change adaptation, water and natural resource management, environment, peace building and community development. Prominent among these are the Community Development Association (CDA), Swanee Development Foundation, Karuna MSS, Lanthit Foundation, Ashoka Social Development Foundation, Metta Development Foundation, and Myanmar Professional Social Workers Association. There are also state/region-specific NGOs and CBOs. Myanmar NGO networks are reported on in Section 5.5 and their activities listed under Section 6.15 and 6.16.

⁷ Based on interviews with Head of DM Division, MRCS and DM delegate, International Federation of Red Cross and Red Crescent Societies (IFRC)



International stakeholders

This chapter includes UN agencies, multilateral organizations, regional organizations, donors, and international and regional NGOs involved in the Four Pillars of EWS in Myanmar.

Distinguishing role of international stakeholders in the NDM law

This section describes and analyzes the mandates of international stakeholders according to the roles prescribed in the 2009 NDM Law and their own organizational mandate, as well as in relation to their MoUs, capacities and resources. Two types of international stakeholders are defined in the NDM Law, namely “(h) **International Organizations** being the United Nations and its agencies, inter-governmental organizations and non-government organizations in other countries; and (i) **Foreign Regional Organizations** mean the Association of South East Asia Nations (ASEAN) and the Associations formed among Asia and other Regions in which Myanmar is a member”. International organizations need to be screened and supervised by the National Committee while foreign regional organizations can contribute to the National NDM Fund.

United Nations agencies and multilateral organizations

The UN Country Team is currently working within its 2012-2015 Framework. UN agencies in Myanmar are transitioning towards a common UN Development Assistance Framework (UNDAF) and One UN thematic programs. The four resident UN agencies in Myanmar are:

- UNDP: Involved in risk assessment, early recovery, CBDRM, DM institutional strengthening, and reconstruction

- UN Habitat: Involved in resilient urban development, shelter rehabilitation and reconstruction, earthquake risk assessment, mainstreaming DRR and CCA into sector development, disaster preparedness plans, capacity building and human resource development on DRR
- UN OCHA: Involved in coordination in disaster monitoring and response, disaster response preparedness and contingency planning
- IOM: Involved in addressing the special needs of migrants in disaster preparedness and DRR

International and Regional NGOs

A large number of INGOs are active in CBDM and CBDRM in Myanmar. These include ActionAid, World Vision, CARE, Malteser International, Save the Children, ACTED, SEEDS Asia, CWS, ACF, Plan, and OXFAM. They collaborate with the Ministries of SWRR, Agriculture, Education and Health and partner with local NGOs. They sometimes serve as donors or act through project holders. In the context of the Four EWS Pillars, INGOs work at the village and township level in activities including hazard, vulnerability and capacity assessments, public awareness, supplying emergency response kits and warning dissemination equipment, and action planning. Some NGOs have focused on specific aspects of inclusion, in the context of the Myanmar Consortium on Community Resilience Project and beyond. These include advocacy and programming on age-sensitive CBDRR (Helpage), school-based or child-centered DRR (Plan), and gender sensitivity in DRR (Oxfam). A complete list of their initiatives is beyond the scope of this study but listing and further analysis could be undertaken with improved access to information in a follow up study.

Donors

In Myanmar, the biggest humanitarian aid donors are Japan, UK and Australia, and the European Commission Humanitarian Office (ECHO). Donors operate in the contexts of their bilateral cooperation programs with GoUM and specific longer-term priorities articulated in country partnership strategies. Donors are committed to the principles of the Nay Pyi Taw Accord of 2013 for improved cooperation and coordination in support of GoUM’s Framework of Economic and Social Reform (FESR).

Priorities vary among donors. For instance, ECHO prioritizes ‘people-centered’ preparedness measures while the DRR policy of AusAID expresses Australia’s commitment to reducing vulnerability and enhanced resilience. Donors involved in supporting early warning projects are the World Bank, USAID, the EU, and the governments of Norway, Japan, Korea, Germany, the Netherlands, and Thailand. This report provides details of some World Bank, JICA and USAID projects in Sections 6.10, 6.13, and 6.14, as their information was available. Most of the projects related to EWS financed

by Norway and the EU are delivered through initiatives of other implementing agencies.

Regional and national technical institutions

Sub-cluster C.4 includes several types of regional and technical institutions which Myanmar works with. ASEAN and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) are foreign regional organizations according to the NDM Law. Myanmar is a signatory to the 1999 ASEAN Agreements on Trans-Boundary Haze Pollution Control and the Disaster Management and Emergency Response (AADMER-2005). It currently chairs both BIMSTEC and ASEAN, and was chair of the ASEAN Committee on Disaster Management (ACDM) in 2009. It is also a participant in the implementation of the AADMER Work Program and is co-lead for the Recovery Working Group.

Myanmar is connected to the ASEAN Humanitarian Assistance Center (AHA Center), which has an operational disaster monitoring system. DMH cooperates closely with the Regional Integrated Multi-Hazard Early Warning System (RIMES) and is a full member of the ADPC Governance Mechanism, the Regional Consultative Committee on Disaster Management (RCC). Myanmar is chairing the RCC from 2014 until 2015, and has observer status in the Mekong River Commission and in the International Center for Integrated Mountain Development (ICIMOD). DMH was closely linked to RIMES, which delivered advance warnings of the approach of Cyclone Nargis. Myanmar's DMH has sent staff on secondment and training with RIMES, ADPC and the AHA Center. Under bilateral cooperation programs, the technical agencies of certain donor governments become active partners of the GoUM. This is the form of collaboration with Japan, the US and Norway, and their coordination and technical agencies are accordingly actively involved in Myanmar.



Mechanisms and Ways of collaboration among EWS stakeholders



This section maps out the mechanisms for collaboration on DM and within the Four EWS Pillars.

National mechanisms and ways of collaboration in Government sector

This sub-section covers the National Committees and their key Sub-Committees which deal with the subjects of early warning and dissemination.

National Disaster Preparedness Central Committee (NDPCC)

Since 2005, GoUM has established institutional arrangements for DM through national and corresponding local bodies, with defined roles and responsibilities. In May 2013, NNDPCC was reconstituted by the President⁸, to include 17 Union Ministers and the Chief Ministers of the 14 States/Regions. Its duties and responsibilities include laying out policies and directives for the use of domestic forces during natural disasters,

formulating basic principles of coordination for disasters that require international assistance, distributing state funds, and issuing orders and directives to provide relief.

National Natural Disaster Preparedness Management Work Committee (NDPMWC)

NNDPMWC has 10 sub-committees and which deal with information, hotlines, search and rescue, the collection of preliminary damage, news and emergency aids, the confirmation of damage and losses, transport and route clearance, DRR and building emergency tents, healthcare, rehabilitation and reconstruction, and security. Committee members include the Union Minister of the MSWRR, Deputy Ministers of the Ministries of Home Affairs and MSWRR, and numerous Deputy Ministers from the 14 State and Regional Governments. Its duties and responsibilities including implementing natural disaster preparedness management, managing local and foreign aids for relief and reconstruction, encouraging mass participation in preparedness education programs, setting up forecasting and EWS and disseminating early

8 Notification no 45/2013 issued by the Office of the President

warnings down to village level, and assigning duties to departments and organizations.

Sub-committees of NDPMWC dealing with EWS

Of the NDPMWC's 10 sub-committees, two, are most directly concerned with early warning namely a) information and communication and b) emergency communication. Their details are given below.

Information and Communication Sub-Committee

Its roles and responsibilities include educating people on DP through the production of curricula and through newspapers, broadcast television and radio, disseminating information on hazard-prone areas and forecasts, overseeing IEC activities, and arranging for the timely communication of disaster news to people in disaster-prone areas.

Emergency Communication Sub-Committee

Its roles and responsibilities include setting up an emergency communication system and conducting regular drills and communication trainings for concerned organisations, maintaining records of communication facilities and contact numbers and sharing them with relevant persons, arranging for immediate communication as soon as early warning is received, and setting up auxiliary communication systems to receive continuous weather forecast from neighbouring countries.

Myanmar National Search and Rescue (SAR) Committee⁹

The SAR Committee is linked to SAR-Committee of the NDPMWC and includes members from relevant departments and selected CSOs. Its roles and responsibilities include updating the National Disaster Prevention Plan, taking preparedness measures including making an inventory of necessary equipment, identifying evacuation routes and safer areas, facilitating the formation of special SAR troops, and coordinating and conducting search and rescue drills, including through coordination with special SAR expert teams from neighboring countries.

MAPDRR Task Force and Working Groups

Three of MAPDRR's 7 Components focus on EWS. Its four Working Groups were established to develop the following components: (I) Hazard, vulnerability and risk assessment and multi-hazard EWS, (II) Policy, institutional arrangement and development and preparedness and response programs at all levels, (III) Mainstreaming DRR into development, and (IV) Community-based preparedness, DRR and public awareness, education and training. RRD, chairs of relevant Working Groups and lead agencies have recognized that there are multiple needs which would enable the accelerated implementa-

tion of MAPDRR. Task Forces have been established to address these, which include finalizing the list of priority projects and producing a plan for project, setting up a working secretariat to lead agencies and build partnerships.



Conclusion

The operation of the three committees needs improvement. These coordination mechanisms are high level and function in times of emergency when there is serious attention from the highest levels of GoUM. However, there are apparently no regular meetings during non-emergency times, and therefore planning, programming, system development, the holding of drills and the review of progress does not happen consistently. One immediate need is the establishment of periodic meetings and programming. The emerging Emergency Operations System and Centers, being developed with support from the US Government, and new rules, regulations and Presidential Orders will contribute to this and also to establishment more visible and organized meetings at the technical level. There is also need for greater transparency in communicating the outcome and content of GoUM decisions, so that international technical assistance can be oriented more clearly in this direction. Effective implementation of MAPDRR also requires full linkage of the MAPDRR Task Force with the NDPMWC.

Despite these shortcomings, there is some indication of change. The full NDPMWC met in April 2014 and undertook a serious review preparedness levels. Although little has been shared regarding the content and actions of the meeting, the Vice-President subsequently made a visit to the Delta regions in his capacity as NDPMWC Chair, and a DRR Volunteers Scheme was launched by RRD.

⁹ Established by Order of the Office of the President No 17/2012 in April 2012

National Government Law, Plans and Programs

This sub-section features the national legislation, the Standing Orders dealing with preparedness and response, and the DRR and climate change adaptation programming arrangements of the GoUM, with a focus on the programmatic aspects related to early warning.

Natural Disaster Management Law (NDM Law)

The NDM Law was drafted by RRD in 2012 and adopted by Parliament in July 2013 as the Pyidaungsu Hluttaw Law no 21 of 2013.¹⁰ Its objectives are to a) implement NDM programs systematically and expeditiously; b) form the National Committee and local bodies responsible for implementing NDM programs, c) coordinate with national and international actors in carrying out NDM activities, d) conserve and restore the environment affected by natural disasters, and e) provide health, education, social and livelihood programs to provide better living conditions for victims.

Important provisions in the law with respect to early warning systems are as follows:

- Relevant Duties and Powers of the NDMC: a) establishing a NDM Center for monitoring and screening information relating to disasters and prompt dissemination of early warnings, b) coordinating with relevant local authorities and organizations for the timely evacuation of the population when early warning is received, c) taking necessary measures for emergency response including search and rescue, rehabilitation and reconstruction, and long-term protection against ND.

- Duties and Powers of the NDM Bodies of the State or Region Governments in relation to EWS: a) monitoring the potential for NDs and submitting information on imminent hazards to the NDPCC promptly, b) implementing emergency responses promptly to reduce damage and losses, and c) directing the local population to leave at-risk areas and making arrangements for evacuation.
- Preparatory measures for DRR: a) carrying out improvements on EWS, b) identifying where ND is likely to strike and preparing the ND risk assessment and planning emergency management, c) increasing public awareness of NDs, d) providing guidance and promoting active participation in community-based NDM and DRR activities, and e) issuing early warning information to the public.

DM Rules and Regulations

As a companion to the NDM Law, draft rules and regulations are being drafted by RRD. To provide technical support to RRD in developing and later reviewing successive drafts of these rules, the DRR Working Group had constituted a Task Force on DM Rules and Regulations. A workshop was held in November 2013 to review the draft, with input from DM-legislation experts from the Philippines and Indonesia. A wider consultative meeting was held in March 2014 and a revised draft was prepared by UNDP with support from the DRRWG Policy Review and Implementation Support Task Force. The Ministry and RRD held further discussions with UNDP, finalized the draft and submitted it to the Attorney General's Office on 18 May 2014. This draft is currently under review.

National DM Plan - Standing Orders on Natural Disaster Management

The Standing Order on Natural Disaster Management was put into effect in January 2009 by NDPCC, to ensure the effective provision of emergency relief, execution of rehabilitation operations and timely mobilization of resources. It clearly defines the mandates, roles and responsibilities for national level institutions and committees and provides step-by-step instructions for each hazardous event, under the themes of preparedness, response, and recovery and rehabilitation. Following the establishment of a new constitution, the creation of new sub-national structures and the reconstitution of the NDPCC, a review of the Standing Orders was initiated, but the process is temporarily on hold. The RRD Director General clarified that the new regulations will not replace the Standing Order, but may lead to revisions and clarifications in line with the Law, regulations, and new sub-national structures.

Myanmar Action Plan for Disaster Risk Reduction (MAPDRR)

MAPDRR is Myanmar's national DRR strategic action plan that outlines priorities for DRR implementation



10 Source: Official bilingual version of the NDM Law published by the GoUM



from 2009 until 2015. It was developed by a Task Force led by DG, RRD, representatives of 14 GoUM Ministries, and received technical support from ADPC. UN agencies and professional associations were invited as observers. Its overarching goal is to *'make Myanmar safer and more resilient against natural hazards, thus protecting lives, livelihood and developmental gains'*. It has seven components which resonate with priority actions of the Hyogo Framework of Action (HFA) and the AADMER components: 1: Policy, institutional arrangements and development, 2: Hazard, vulnerability and risk assessment, 3: Multi-hazard EWS, 4: Preparedness/response programs at national, S/R, district and township levels, 5: Mainstreaming of DRR into development, 6: Community-based disaster preparedness and risk reduction, and 7: Public awareness, education and training.

Each sub-component and project has objectives, key activities, expected outcomes, as well as possible time frames and potential lead and partner agencies based on technical advantage, expertise and capacity. The

MAPDRR TF is the primary mechanism for facilitating sub-projects and overseeing their implementation. Chapter 4 of MAPDRR provides guidelines on implementing projects through the formation of task forces and technical support groups. It also advises further developing detailed concept notes for each project, mobilizing necessary resources, monitoring and evaluating the implementation process and synergies, and synchronizing these with existing DRR and development plans and programs. Twenty-one of 65 sub-projects have been identified as priorities for implementation.

Inter-Agency Emergency Response Preparedness Plan-Myanmar (IASC-Myanmar)

IASC-Myanmar developed its Contingency Plan in 2009, based on an analysis of potential emergencies and past responses and lessons learned. It was created with support from the IASC Contingency Planning Working Group headed by UNOCHA. Its overall goal is to mitigate the impact of disasters and save lives through effective and timely humanitarian assistance and response and early recovery activities. The Plan seeks to address the most common natural hazards, and develop strategies that make optimal use of available resources, while complementing the DRM plans of individual agencies. It recognizes the responsibility of the GoUM to protect its citizens and acknowledges the existing institutional structures and protocols for disaster preparedness and response. It establishes operational clusters, namely: Food, Health, Nutrition, Water and sanitation, Protection, Logistics, Emergency telecommunication, Shelter, Early recovery, Education, Agriculture, and Coordination.

In February 2014, the Myanmar Plan was re-aligned with the new Emergency Response Preparedness Guidelines and the National and Rakhine Response Plans were revised. A national ERP IASC working group was created and two workshops were held in March in Yangon and Sittwe. A simulation exercise to test the plan was held on 3rd and 4th September 2014.



The proposed NAMA priority adaptation projects under Early Warning Systems

- 1st priority: Improving weather observation capacity through mobile weather radar system for providing early warning against extreme weather events
- 2nd priority: Developing a flood EWS to reduce the vulnerability of local communities
- 3rd priority: Assessing the hydrological impact of climate change on river systems.
- 4th priority: Developing a drought EWS to reduce the vulnerability of local communities

Myanmar NGOs Contingency Plan

Myanmar's Local NGO Contingency Plan was developed based on lessons learned from the response and recovery to Cyclone Nargis. Its main goal is to reduce the impact of disasters through the adoption of preparedness and proactive measures. The plan was to be updated in 2014, but further support was required for the exercise. MNGO CP has recently expanded its scope, reflected in its new name, Myanmar NGO Consortium for Preparedness and Response (MNGO CPR).

EWS priority projects under National Adaptation Program of Action (NAPA) to Climate Change

NAPA has 32 urgent Priority Adaptation Projects for effective climate change adaptation under eight main themes ranging from agriculture to public health to water resources.

Myanmar Agenda 21 and Myanmar National Sustainable Development Strategy (NSDS)

Following the Earth Summit of 1992, Myanmar was among the few Asian countries to develop its own national Agenda 21 in 1997. It later developed a National Sustainable Development Strategy for 2007 to 2009. The NSDS has three overarching goals and 26 thematic areas, namely a) Sustainable management of natural resources, (11 thematic areas), b) Integrated economic development, (9 areas), and c) Sustainable social development (6 areas). Thirteen of the 26 areas

are linked to DRR and offer opportunities for alignment and mainstreaming of DRR into development.¹¹

Sub-national mechanisms in Government sector

DM Committees at five levels: mandate and functions

Myanmar has a multi-level governance structure at five levels (region/state, district, township, village tract and village), which extend even in relation to disaster management.

State/Region DM Committee

Each State and region has its own high-level DM/DP Committee. Each DM committee has a sub-committee structure which is similar to the national NDPMWC structure with 13 sub-committees.

District DM Committees (DDMC)

District-level DM Committees have been formed and issue district level Standing Orders for DM.

Township DM Committees (TDMC)

Township DP Committees have 9 sub-committees similar in function to those at the national level. Members include township administrators and department heads, and fire department officials.

Village Tract DM Committees (VTDMC)

Village Tract DM Committees are headed by the GAD chairman of the village tract and include an MRCS and auxiliary fire brigade member, the head of the police sub-station, representative of village¹² elders, the Myanmar Women's Federation, and primary school teachers. The generic guidelines for these committees are quite focused, and allow for a feasible and effective structure.



11 Paper on "Building linkages between DRR, Climate Change Adaptation and Sustainable Development communities of practice and action plans in Myanmar: Reflections and suggested next steps" presented at the MRCS DRRWG Workshop on 7 March 14 by Loy Rego, Learning Practitioner, Mainstreaming Adaptation, Resilience and Sustainability into Development

12 As confirmed by representative of GAD on 30 July 2014



Village Development / DM Committees

Under CBDRR programs MRCS and NGOs work at this level to establish village level DM committees with task forces addressing specific functions such as early warning, first aid, or evacuation. Most organizations follow the six step CBDRR process Myanmar manual prepared by UNDP and ADPC.

National mechanisms of partnership and information-sharing across national and international stakeholders

DRR Sub-Sector Working Group

This is the GoUM-Donor partnership-led group under the FESR process, which is co-chaired by DG RRD and UNDP and described in the context of MAPDRR in Section 5.2.4 of this report.

DRR Working Group (DRRWG)

The DRRWG was created as a follow-up to the Early Recovery Working Group of the IASC and to implement one of the eight priority components of PONREPP. It is co-Chaired by UNDP and ActionAid and its mission is to provide the forum for “collective efforts of a diverse mix of partners for disaster resilience through sharing, learning and working together”. It meets on a monthly basis, and has evolved from a DRR-focused sharing platform to a 50+ agency network involved in policy and operational issues through various sub-groups. Malteser International has been a member since 2010. DRRWG focuses on strengthening DRR institutions, CDBP and mitigation, building DRR knowledge and awareness, and mainstreaming DRR into development initiatives.

The political reform process has been an important driver of DRRWG’s evolution as it has provided the opportunity to engage with GoUM. Successful areas of joint work, such as the DRM Law regulations, attest to the DRRWG’s potential to harness its collective power for a greater impact on DRR.

DRRWG facilitated a multi-stakeholder process, including consultations with key DRR stakeholders like GoUM and donors, to develop its Strategic Framework for 2013-2018 with 6 strategic outcomes:

Outcome 1: A policy and legal framework on DRR that is inclusive, responsive to the needs of hazard-prone communities and takes into account climate change

Outcome 2: Government partners at different levels have increased capacity to implement the DRR framework and mainstream DRR into development processes

Outcome 3: Communities and CSOs have access to information on the DRR framework and tools and resources to strengthen their resilience

Outcome 4: Local organizations have the capacity to take on leading roles in the DRR sector

Outcome 5: Effective partnerships are established with the private sector, professional bodies and other relevant stakeholders

Outcome 6: The DRR WG is effective and accountable and provides the Government with tools, experiences and capacities to coordinate the broader DRR Sector



DRRWG is governed by an 11 member Steering Committee and has formed technical task forces to work on joint initiatives: Policy review and implementation support, Capacity development, Advocacy and public awareness, Local NGO capacity development, and CBDRR programs and partnerships. One suggestion that emerged from this study is that it would be beneficial to have an EWS-focused sub-task force. Membership to DRRWG is voluntary and some agencies are non-resident and do not attend meetings regularly. These concerns have been framed into a recommendation in Section 8.

Partnerships and networks across NGOs

Modalities of collaboration across stakeholder consortia

One modality of collaboration encouraged in calls for proposals from international funders is the formation of consortia to implement donor-funded projects. For example, in 2012, a large joint project was awarded to the Myanmar Consortium for Community Resilience (MCCR), to implement “Safer Coastal and Urban Communities through DRR in Myanmar” under the European Commission’s Humanitarian Aid Disaster Preparedness Program (DiPECHO) 8 Action Plan for South East

Asia. MCCR consisted of six partner agencies, 5 INGOs (Oxfam, Malteser, Plan, HelpAge and Action Aid), a UN Agency (UN Habitat), and 2 local NGOs (ASA and KDN). DfID also made establishing consortia a near conditionality in their September 2013 call for proposals for BRACED, as did the Office of Foreign Disaster Assistance (OFDA) of USAID in its March 2015 call for proposals.

NGO Networks

Myanmar’s involvement in regional and international NGO networks is also increasing. The Global Network of NGOs in DRR (GNDR) includes several Myanmar-based INGOs and MNGOs as active collaborators, as does The Asian Disaster Response and Reduction Network (ADRRN). Nationally, the Myanmar NGO Network (MNN), a membership-based network of all NGOs in Myanmar, has a DM Committee. There is also the Myanmar Consortium for DRR (MCDRR), a national NGO network set up in 2012, which unites 23 local organizations, many of which are also members of the DRRWG. In addition the Myanmar NGO Consortium on Preparedness and Response (MNGO CPR) Network grew out of efforts to develop the first MNGO Contingency Plan. These activities fit under Pillars 3 and 4.

Past, on-going and planned strategies and activities to enhance the effectiveness of EWS

Past efforts at stocktaking

An earlier stocktaking exercise undertaken in 2009 during the development of the MAPDRR identified 35 projects under five components of MAPDRR related to the Four Pillars of EW.



Table 5: Numbers of past and ongoing DRR projects related to the Four EWS Pillars as of April 2009

MADRR Component number	Theme	Government	UN Agencies	NGOs/PAs	Completed	Ongoing	Total
2	Hazard, vulnerability and risk assessment	2	2	4	4	4	8
3	Multi-hazard Early Warning Systems	9	2	2	8	5	13
4	Preparedness and Response Programs at National, State/Division & Township levels	8	-	6	6	8	14
6	Community Based DP/RR	-	1	7	2	6	8
7	Public Awareness, Education & Training	9	2	5	5	11	16
TOTAL		28	4	22	25	34	54

DRRWG focuses on strengthening DRR institutions, CBDP and mitigation, building DRR knowledge and awareness, and mainstreaming DRR into development initiative.

It should be noted that this listing of initiatives was based on reporting by 58 agencies, including 24 GoUM Ministries/Departments, but was challenging to capture due to IT issues and lack of access. This mapping exercise has so far not captured project activities implemented by the Government with their own funds. Such information-gathering would require a GoUM-led exercise under the leadership of

RRD to ensure access to more complete and stronger data.

Myanmar Red Cross Society (MRCS) Activities

MRCS, whose role in early warning has already been explained in Section 4.3.6, works through various programs on DRR which include Early Warning, such as:

- Collaborating with DMH to improve EWS in 5 villages in Dedaye Township in the Delta area
- Supporting the establishment of MRCS Emergency Operating Center in Nay Pyi Taw and the development of SOPs for Early Warning action in collaboration with DMH



- Customizing mobile apps for First Aid demonstration and engaging in MRCS/DMH joint work with mobile phone companies

United Nations Development Program (UNDP)

UNDP is heavily involved in a variety of DRR and CCA projects including:

- Commissioning multi-hazard risk assessments in the Nargis-affected Delta Region in 2010 and Rakhine State in 2011
- Working with DMH to develop systems for the SMS messaging of EWS through mobile networks
- Developing a project to upgrade DMH flood monitoring capacity in Delta and Kayin states¹³

UN Habitat

UN Habitat has also been engaged in DRR activities throughout Myanmar:

- Establishing a national disaster loss and damage database and a national web portal for disaster information (www.drrdias.gov.mm)
- Conducting earthquake and flood risk assessments with UNDP in Hpa-An, Kayin State
- Producing a National Building Code and guidelines on land use and safer construction practices

UN Office for Coordination of Humanitarian Affairs (UNOCHA)

UNOCHA has established Preparedness and Response Coordination as its priority and engaged in projects to this end:

- Revising IASC and Rakhine response plans to help its Humanitarian Country Team to better coordinate and respond to NDs
- Conducting a simulation exercise at the national level in September 2014
- Supporting GoUM's capacity to reduce vulnerability to natural disasters

International Organization of Migration (IOM)

IOM is involved in a range of projects:

- Supporting GoUM and local authorities in developing two township DM plans, which include elements on strengthening dissemination of EW
- Providing financial and technical support to Township DM Committees to implement their Plans
- Strengthening DRR in Mon and Kayin States for populations vulnerable to flooding & other NDs

UNESCAP

UNESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries has supported multiple projects to improve EWS in Myanmar. These are mentioned in the list of projects in Sections 6.9, 6.11 and 6.12 and are not repeated here.

World Meteorological Organization (WMO)

WMO initiatives focused on providing technical and financial support to DMH to strengthen EWS. Support included:

- Establishing the National Multi-hazard Early Warning Center in Nay Pyi Taw
- Installing a National Tsunami EWS in Yangon
- Installing an Earthquake Data Center Satellite Disc

13 Communication from Daw Lat Lat Aye, Head Pillar 2, UNDP Myanmar to the consultant

UNESCO International Oceanographic Commission (UNESCO/IOC)

UNESCO/IOC has conducted projects including:

- Improving the emergency response to ocean-based extreme events through coastal mapping capacity building in the Indian Ocean
- Enhancing tsunami risk assessment and management, strengthening policy support and developing guidelines for tsunami exercises in Indian Ocean countries including Myanmar

World Bank

The World Bank has developed an Ayeyarwady Integrated River Basin Management Project which covers three key areas:

- Building institutions, information and capacity for water resource management
- Modernizing hydro-meteorological services
- Enhancing navigation on the Ayeyarwady River

Regional Integrated Multi – hazard Early warning System for Asia and Africa (RIMES)

RIMES is a regional institution established in 2005, which has been actively involved in strengthening and upgrading Myanmar’s multi-hazard EWS. Projects include:

- Enhancing coastal hazard EW and response through tools and institutional strengthening

- Reducing risks of NDs like tsunami, storm surges, and large waves in low elevation coastal zones
- Establishing a network of 4 real-time seismic stations in Myanmar, the Philippines, and Vietnam

Asian Disaster Preparedness Center (ADPC)

ADPC is a regional institution which was established in 1986 to support capacity enhancement of countries and systems in the Asian region. Its EWS-related projects in Myanmar address:

- Providing technical support to strengthen human resources and institutional capacity in DMH
- Investigating and strengthening vulnerable flood protection dikes
- Providing technical assistance to enhance the capacity of end-to-end multi-hazard EWS

JICA

JICA has and continues to support four projects aiming to improve EWS and public awareness of hazards and risks:

- Enhancing response capacity at the national and community levels
- Installing equipment and infrastructure for improved storm observation and forecasting
- Conducting CBDRM and school preparedness activities in 60 villages in the Ayeyarwady Delta

USAID- Office of Foreign Disaster Assistance (OFDA)

OFDA supports DRR programs in Myanmar that build on MAPDRR, strengthen capacity and readiness from community to national level, and invest in strategic upgrades. Recent programs include:

- Encouraging safer land use in coastal communities
- Training local NGOs on DM and humanitarian practices
- Increasing resilience and disaster preparedness of communities

Local NGOs

EWS-specific activities of local NGOs include:

- Conducting baseline surveys on DM status, including access to EW, methods of dissemination, preparedness and protective capacities
- DRR and Preparedness Training for flood preparedness in cooperation with Save the Children
- Conducting an inclusive simulation exercises focusing on the disabled, young, elderly and women



Current system status, gaps and needs in all Four Pillars of early warning systems



Pillar 1: Risk Knowledge through Hazard Vulnerability and Risk Assessment

Current Status

Hazard and Vulnerability Risk Assessment (HVRA) was identified as a priority component of the MAP-PDRR, with eight sub-component projects identified. Since then, RRD has conducted two multi-hazard risk assessments in Nargis-affected areas of the Delta and in Rakhine state, earthquake risk assessments of Mandalay city, Bago, Taunggyi and Sagaing, and a tsunami risk assessment for Aung Hlaing village in the Ayeyarwady division. The National Disaster Loss and Damage Database was initiated using a multi-stakeholder approach. ADPC is proposing to support RRD in hosting a web portal for risk information sharing and Met Norway is supporting DMH in developing and maintaining a portal for meteorological and hydrological data archiving.

Strengths and innovations in the area of Risk Knowledge

Undertaking composite multi-hazard risk assessments with multiple risk maps is an innovation that not many countries in the region have yet done. Using at least two methodologies in two different geographical areas provides a baseline from which to compare and identify the strengths of each, while enabling progress towards the development of a standardized methodology for other regions. The use of national institutions to partner with regional counterparts results in a valuable,

intrinsic element of capacity-building. So too MAPDRR represents a significant effort from GoUM to assess its own needs and identify a joint agenda for further action and investment.

Gaps and needs in Risk Knowledge

- The coverage of multi-hazard risk assessments is limited to only 3 of 14 States and Regions
- Limited dissemination of completed study results to relevant authorities and communities
- Limited ability to use studies for district, township and village tract action planning because of issues of scale and lack of technical capacity to produce maps for each scale of administration
- The MAPDRR Taskforce Working Group on Risk Assessment and Early Warning Systems is the only focal point which oversees risk assessment, but has not met in the last two years.
- GoUM initiatives to standardize risk assessments are not harmonized with existing mechanisms
- Neither DRRWG nor donor coordination forums having any TF on risk assessment
- Local knowledge valuable for high-severity events is insufficiently recognized in risk assessments
- Efforts to conduct vulnerability assessments are insufficient and not linked to other efforts on social vulnerability analysis.

Pillar 2: Observation, Monitoring, Forecasting and Warning

Current status

DMH's Forecasting and Warning Services includes 155 full-time basic observation stations, 157 part-time measuring/monitoring stations, and 8 special stations which contribute to regular data collection on rainfall, temperatures, humidity, wind force and direction, atmospheric pressure, water level, temperature, sediment discharge and soil temperature, and sea level data for tsunami and earthquake monitoring. This data collection enables DMH to issue warnings for storms, storm surges, strong winds, heavy or untimely rainfall, floods, fog, tsunamis and special or significant weather for aircrafts.

Gaps and needs in Observation, Monitoring, Forecasting and Warning

- The coverage of observation and monitoring systems, and in data analysis, prediction and forecasting systems nationally are poor.
- The limitations of monitoring stations and telemetry systems for transmitting field data have been observed and commented upon.
- Language utilized in warning bulletins is often highly technical and poorly understood by the non-specialist actors who are required to use them.
- The DRR Sub Sector Working Group under the Social Protection WG initiated a review of progress of MAPDRR components and found that priority projects have yet to be completed.
- The MAPDRR TF WG led by DMH has not met since 2011.
- MAPDRR Components were created by the Government's Task Force working groups and provide a basis for the desired effective synergy among donors. No framework has yet been developed in elaboration of these proposed components.
- The capacity building program framework planned under RIMES was intended to facilitate coherent, integrated, and efficient, engagement with donors. However its interim report has not yet been made available; the project does not seem to have been completed.

Pillar 3: Dissemination and Communication

Current Status

When DMH receives inputs from the monitoring systems and creates forecasts, it sends these to GoUM authorities, GAD, NGOs and medias (FM radio and MRTV) through fax, phone and e-mails. Through different administrative and governmental channels, early warning is again disseminated to the different stakeholders at local level. At local level, GAD, RRD, Department of Health, MRCS, and Township DP Committee send early warning to communities through village tracts and village administrations, VTDMC and VDMC. At community level, VTDMC and VDMC send EW to the communities for effective preparedness, evacuation and response. They usually use hand speakers, loud speakers, colored flags and sirens.

Strengths in Warning Dissemination and Communication

Compared to Cyclone Nargis, there are significant improvements in the dissemination of early warning at multiple levels, as demonstrated by the early action taking during Cyclones Giri in 2010 and Mahasen in 2013. Technical content from DMH was simplified and made more user-friendly by the recipient MRCS staff at branch and township levels. The MRCS system has been improved, including with the installation of telephone lines and/or the purchase of portable telephones

for several township branch offices. Red Cross radio broadcasts, providing vital disaster preparedness advice, are played daily on Rakhine stations during the cyclone season.



Gaps and Needs in Dissemination and Communication

- Absence of clear SOPs on early warning dissemination and communication both in national and local Standing orders and DMH departmental manuals
- Horizontal and vertical communication and in the quality of technology networks are poor
- To improve early warning dissemination and effective preparedness, priority should be given to an active Plan of Action, communication equipment, emergency shelters and SoPs
- Public media messages, especially on early warning of extreme weather, need improvement
- The digital divide caused by poor internet and telephone connectivity in the Border States
- There is poor coverage of electricity, landlines and of mobile telephone is limited
- Public awareness campaigns need to be undertaken during non-emergency times with at risk coastal communities on the nature of warning that will be received and corresponding actions
- DRR modules should be included in School curricula



Pillar 4: Preparedness, response (and protection) capacity

Current status

State/Region DM Plans

Each State/Region DM Committee issues State / Region

DM Action Plans

District DM Plans

District DM Committees have been formed which issue district level DM Standing Orders.

Township DM Plans

Improvement to township-level DM planning was identified as one of the MAPDRR priorities and Guidelines for Township Disaster Management Plans were developed by RRD in 2010.¹⁴

Necessary components for a township disaster management plan

- Background information of the township including vulnerability, capacity and risk analysis¹⁵
- Detailed information on existing DRR committees locally with their roles and responsibilities
- SOPs on disaster preparedness, response and rehabilitation
- Timeframe for the monitoring, review and periodic updating of Plan
- Annexes (samples of data collection forms on damages and losses, contact details, etc.)

Since then, various UN agencies and Technical support partners have undertaken technical support projects to help the government develop township DM plans. In addition, several agencies have formed a TDMP technical working group under the DRRWG, which focuses on experience-sharing and exchange, to develop improved templates and process guidelines.

Village Tract DM Plans

VTDM Plans have not been done on a sufficiently large scale and require significantly more work..

Village DM Plans

Village DM Plans are prepared as part of the CBDRR projects.

¹⁴ TDMP Guidelines published by RRD in 2010.

¹⁵ Ibid



Capacity Assessments

UNDP and UNOCHA¹⁶ have both conducted preparedness and response capacity assessments in national structures as part of wider DM capacity assessments, and in preparation for the ERP and contingency planning exercises¹⁷

Cyclone Shelters

Availability and quality of cyclone shelters is crucial to the success of early warning systems. However, there are currently 358 shelters spread over 4,246 villages in 8 townships in the Delta region, which is approximately 1 shelter for 11.8 villages. Current shelter availability and capacity is therefore less than 10 percent of the needed number. A key recommendation therefore is “to identify and prioritize vulnerable communities which do not have access / adequate shelters, and construct new cyclone shelters or identify any strong community buildings in those villages, assess its safety and as required retrofit/strengthen existing structures to act as cyclone shelters.”¹⁸

Strengths and innovations of preparedness and response capacity

The country has made good progress by establishing institutional DM arrangements and initiating plans at all 5 levels of administration. Guidelines have also been created for preparedness planning at the township level, and are currently being improved. Plans are underway to develop DM planning guidelines at other levels. The regular biannual Monsoon Forum meetings over the past five years provide an innovative mechanism for establishing a working interface between met services and the user communities. There are additional plans to hold such forums in the States and Regions.

Gaps and needs in Pillar 4 (preparedness, protection and response capability)

- Roles of key ministries, national departments and entities should be further detailed in national Standing Orders
- Gaps in local DRR capacities include inactive DMCs, weak linkages between schools, villages, village tract and township DMCs, weakness in the availability and inclusion of risk information in DM plans, and the lack of specific hazard and warning information in DM plans at various levels¹⁹
- Local DM plans include weakly developed information on protective action to take upon receipt of early warning (warning levels, modes of delivery, location of shelters, evacuation routes)
- Simulation exercises and drills are not held regularly and guidelines for their frequency, scope and scale need to be established
- No plan refers to special needs, capacities and vulnerabilities related to gender, disability, age and ethnicity
- Financial resources for local level DRR implementation are limited, resulting in poor coverage and consistency in the use of CBDRM tools and methodologies
- Trainings for village tract and village levels DMCs are not standardized.
- Communication between each level of DMC with the ones above and below is poor.
- Guidelines for DM Committees should recommend 2 annual workshops, one before cyclone season to review and improve preparedness plans, and one after to assess lessons learned.

16 As part of the IASC review of the Myanmar Inter Agency Contingency Plan. See section 5.2.5 of this report.

17 Presentation of UNDP in DRRWG meeting in March 2014, and subsequent meeting with consultant doing the assessment

18 Ibid UN Habitat report

19 Recommendations of working group discussions in session on “Early Warning Systems, Preparedness and Response Activities” in national consultation on “Emerging DRR Needs in a changing context of Myanmar” in 2nd April 2012, jointly organized by MRCs, French Red Cross, ADPC and UNDP

Conclusion



This section presents the gaps in scope and content of projects, hazard coverage, geographical distribution, and stakeholder engagement in all Four Pillars of EWS.

Coverage of projects till 2009

The stocktaking exercise in MAPDRR undertaken in early 2009 identified 35 projects in five themes/components of MAPDRR as given in table 4 presented under Section 6.1 of this report.

Coverage of projects in 2013

As mentioned in Section 3, this study experienced challenges in accessing information, and the numbers and themes of projects represented in this study are therefore based on data extracted from the MIMU summary maps and gathered from participating actors. It must again be pointed out that these reported activities do not cover reporting by the Government and its agencies.

Table 6 shows that DRR activities are being undertaken in just 3 % of village tracts, however it must be noted that when an NGO or UN Agency reports DRR work in a particular village tract, it normally means they are covering only some villages within, and rarely more than 20-30%. Conversely, this means there have been no attempts to directly improve EWS in the other 97% of village tracts.

Table 7 indicates both a reduction in the number of organizations working on DRR (22) and possible non-reporting to MIMU by organizations involved in the DM/DRR sector.

Several conclusions can be drawn from Table 8. Regarding geographical spread, CBDRM work seems to account for the largest number of townships. However the 53 townships still represent fewer than 16% of the total townships

Table 6: Numbers of village tracts covered by DRR activities based on reporting to MIMU in 2013

	Nov 2013	May 2013
Total Number of village tracts nation-wide	13800	13800
VT with reported activities all sectors	7383 (54%)	6022 (44%)
VT with DRR activities	374 (3%)	NA

Table 7: Organizations reporting Who/What/where updates to MIMU in 2013

Type	Nov 2013 all	Nov 2013 DRR	May 2014 all*
INGO	74	14	63
NNGO	56	3	50
UN	13	3	12
Red Cross	3	2	3
CBO	3	-	3
Donor	2	-	2
Embassy	1	-	1
BBO (Border based organization)	7	-	14
Total	159	22	148

*No information on DRR in May 2013 update

Table 8: Types of DRR sub-sector activities reported to MIMU

	Sub-Sector (MAPDRR theme)	No. of Townships		No. of Projects*		No. of organizations*	
		Nov 2013	May 2013	Nov 2013	May 2013	Nov 2013	May 2013
1	Hazard, vulnerability and risk assessment	15	19	3	6	3	5
2	Multi-hazard Early Warning Systems	1	-	1	-	1	-
3	Preparedness and Response Programs	11	24	5	9	4	7
4	Community Based DP/DRR	53	46	31	34	17	18
5	Public Awareness, Education & Training	24	23	10	10	9	7

*A particular project may cover more than one sub-sector and more than one township. Similarly one organization can be working on several sub-sectors.

in Myanmar. Reporting that 16% of townships undertake CBDRR work obscures the fact that only a small percentage of villages and village tracts in each are involved.



Hazard coverage

A recent review of CBDRR work in Myanmar by the DRRWG observed that CBDRR remains Delta- and cyclone-centric.²⁰ This is confirmed by the spatial visualization of DRR projects and the low number of projects on Border States, flood-prone river basins, earthquake prone regions, or tsunami risks.

Trends in coverage of geographical area and sector

Data above confirms that DRR activities are undertaken in just 3% of village tracts and that CBDRRM is most prevalent. Furthermore, analyzing coverage shows that there is less emphasis on the core EWS areas of risk assessment and early warning (which are more hardware oriented) and preparedness, and a distinct bias for projects that address the softer components of public awareness. This data points to the need for significant up scaling of DRR and EWS activities in Myanmar.

There is also a DRR project bias towards the Delta region, partly as a consequence of Cyclone Nargis’ devastation. Cyclone Giri and, to a lesser extent Mahasen, have resulted in additional DRR programming in these geographical areas. However, systematically addressing risk by undertaking DM, DRR, and EWS programs needs to be done based on a prioritization of the most at risk and vulnerable states/regions, districts, townships and village tracts nationwide.



20 Situation Assessment of Disaster Management in Myanmar, 2013, DRR WG

Overall recommendations



Introduction

The section provides the stakeholders with a set of technical areas which need investment in, as well as a series of coordination and communication actions that will enhance collaboration and synergy in early warning processes. Many of these have been mentioned elsewhere in the report. As expected, this section became a focus of discussions during the consultation meetings with GoUM and DRRWG members in May 2014 and also reflect those on which there is an emerging consensus.

Recommended improvements per Pillar

This section provides a summary of the needs identified in each of the Four Pillars.

Risk Knowledge

- Increase dissemination of studies already completed to the relevant authorities and communities and improve technical capacity and ability to use them for DM planning at all levels
- Identify specific focal point GoUM department to undertake and oversee risk assessment
- Standardize Risk assessment methodologies and harmonize with existing mechanisms
- Establish a task force on risk assessment in both the DRRWG and donor coordination forum

- Use local knowledge of hazards in risk assessment
- Expand vulnerability assessments and link to other analysis of social vulnerability and poverty.

Observation, Monitoring, Forecasting and Warning

- Improve the coverage of observation, monitoring, data analysis, prediction and forecasting systems to bring them in line with WMO and UNESCO/IOC standards
- Implement real time monitoring of water level and establish/upgrade the EWS along flood protection embankments and dams
- Install CCTV, remote monitoring, telemetry and early warning and flood forecasting in large dams and establish a main control center in the Irrigation Department
- Simplify language of the warning bulletins to make it more understandable to non-technical users
- Expedite the capacity building program framework being developed under the RIMES
- Link the new MAPDRR framework to MAPDRR Component 3

Dissemination and Communication

- Establish clear SOPs on EWS dissemination and communication at the national and local levels
- Improve horizontal and vertical communication and the quality of technology networks for EWS
- Establish/upgrade communication systems along the flood protection embankment and install telemetry and EWS in large dams
- Improve public media messages on weather forecasts and early warning of extreme weather
- Tackle the digital divide caused by poor internet and telephone connectivity in the Border States
- Expand the coverage of electricity, landlines and mobile phones for better warning dissemination
- During non-emergency times, undertake public awareness campaigns among at-risk communities on the nature of warnings that could be received and corresponding actions to take.
- Include DRR modules in school curricula

Preparedness and Response Capability

- National Standing Orders should detail the roles of key ministries, national departments and other entities not adequately covered in the 2009 Standing Orders, including DMCs at all levels
- Gaps in local DRR capacities should be addressed by activating inactive DMCs, strengthening linkages between DMCs, and enhancing coordination between actors at various levels.
- DM plans should include risk information, specific hazard and warning information, and information on protective action to take upon receipt of early warning
- Hold periodic simulation exercises, and develop guidelines on their frequency, scope and scale
- Ensure that plans at all levels are inclusive and address special gender-, disability-, age- and ethnicity-specific needs and capacities.
- Expand coverage and consistency of CBDRM tools and methodologies, and financial resources for their local level implementation
- Create DRR Sub-Committee in DMCs at township and village tract levels
- Standardize trainings for village tract and village levels DMCs and produce a common handbook
- Improve communication between each level of DMC with the ones above and below.
- DM Committee guidelines should recommend holding 2 workshops per year, one before cyclone season to review and improve their preparedness plan, and one after to assess lessons learned
- Expand the number of shelters in all areas facing medium to high risks, and consider less frequent hazards like tsunamis

Recommended overall Actions to enhance EWS and improve coordination

There is a clear need to enhance DRR and EWS mechanisms with manpower, resources, capacity-building, technical assistance, and financial support from the national budget. International stakeholders should help GoUM to close the resource gap and help set up sustainable systems for technical support on an ongoing basis. However, GoUM also needs to systematically and consciously embrace partnerships with civil society and technical organizations that are interested and have capacity to work in EWS. This could be facilitated by increased and more structured stakeholder meetings, such as the national meeting of Ministry partners, convened by MSWRR in April 2014, on the eve of the NDMWC. Perhaps these meetings should address both social welfare and DP/DRR.

Enhancing coordination and achieving synergies

- Key recommendations for prioritized action are:
- Consolidate stocktaking of progress made against MAPDRR Components 2, 3 and 4 using data gathered under this exercise and supplemented by additional information on projects initiated/implemented by GoUM with national and external resources. This could be done within the framework of the DRR SSWG co-chaired by RRD and UNDP. The MAPDRR WG recommended including the Private sector as a partner in MAPDRR implementation.
- Activate the MAPDRR Working Groups 1 on Risk Assessment and Multi-hazard EWS and 2 on Preparedness and Response and hold periodic meetings to accelerate the implementation of MAPDRR Components 2,3 and 4.
- Hold a joint seminar to present various ongoing EWS projects, identify potential synergies, and coordinate future actions.
- Establish a working group for the Policy Review and Implementation Support Task-Force (PRIS) of the DRRWG to pursue and facilitate some of these actions.







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