MEMBER REPORT

ESCAP/WMO Typhoon Committee
Training Courses/Workshops on
Mechanism of Establishing and Preparing
SSOP for Coastal Multi-hazards EWS

(Lao PDR)

Nanjing, China
24 - 26 October 2017

Lao PDR Synergized Multi-Hazard Early Warning System SOP

1. Background

Lao PDR is geographically located in the heavy rainfall area in the Indo-China Peninsula where very moist southwesterly winds blow from the North Indian Ocean and tropical storms come from the Northwest Pacific. These natural events or occurrences frequently bring various kinds of inherent disasters to the country (DMH, 2010). Flood and drought are the main hazards in Lao PDR and both are dependent on the amount of rainfall. Tropical cyclones are not a direct hazard since their force is normally diminished once they have reached Lao PDR from the South China Sea; but they can produce floods as a consequence of heavy rainfall. Up to three cyclones hit the country annually, while floods, drought, forest fires, heavy rains, thunderstorms and landslides occur from time to time.

Currently Lao PDR is in the process of Operationalization of Strategic Plan for Disaster Management (OSPDM) and one of the components is to strengthen the multi-hazard early warning system in Lao PDR. In this backdrop, a country wide early warning strategy has been developed within a framework on how to bring science, institutions and society together for proactive preparedness and response to potential hazards and disasters. The early warning system should be strengthened to bridge the communication gap between the national and community level. This Standard Operating Procedure document provides clear roles and responsibilities for each stakeholder directly and indirectly involved in the early warning system.

2. Aim

To establish how Lao PDR will manage and operate its early hydro-meteorological warning system to protect life and property.

Objectives of Standard Operating Procedures (SOPs)

- To provide, in a concise and convenient form, a list of major executive actions involved in respective hazard early warning systems;

- To ensure that all concerned Ministries, Departments, Organizations of the Government and all the tiers of the Administrative system are informed clearly about their respective roles and responsibilities;
- To ensure that a systematic early warning system is clearly outlined for all major hazards in Lao PDR and early warning system SOPs are integrated into the overall disaster risk management SOPs of Lao PDR.

3. Scope

This SOP will address most significant hydro-meteorological hazards in Lao PDR which include flooding (both flash and riverine), heavy rains from tropical cyclones and thunderstorms and landslides.

Instructions contained in this SOP should be regarded as the generic procedures for multi-hazard early warning systems. This should not be considered as exhaustive for all the sectors and all the geographic areas in Lao PDR. Further sectorial SOPs or geographically specific SOPs should be developed in line with this synergized multi-hazard early warning SOP and incorporate the key points signified in this SOP.

4. Identification of Partners

This SOP is mainly developed for the Department of Meteorology and Hydrology (DMH) and the Disaster Management Offices (DMOs) from national to village levels. Key users of this SOP have been explained as follows:

- **Department of Meteorology and Hydrology (DMH)**

This SOP is mainly developed for DMH to ensure the effectiveness of Early Warnings reaching the end users in a timely manner and in an understandable language in order for the most appropriate action to occur with the responding organizations. The role of DMH is vital in generating the early warning, in this sense it is equally important that DMH also ensures that early warning messages are relevant for the community or end users to take any further action based upon the message received. The SOP provides a clear cut

understanding of roles and responsibilities within DMH and outside organizations as well, especially with DMOs.

National Hydrological and Meteorological Services (NHMSs) are mandated to observe, understand and predict weather and climate for their respective countries. These services provide meteorological, hydrological and EW information which contributes to the protection of life, property, socio-economic benefits and welfare of communities by reducing the impact of natural hazards. Figure 1 shows organizational structure of the Department of Meteorology and Hydrology (DMH).

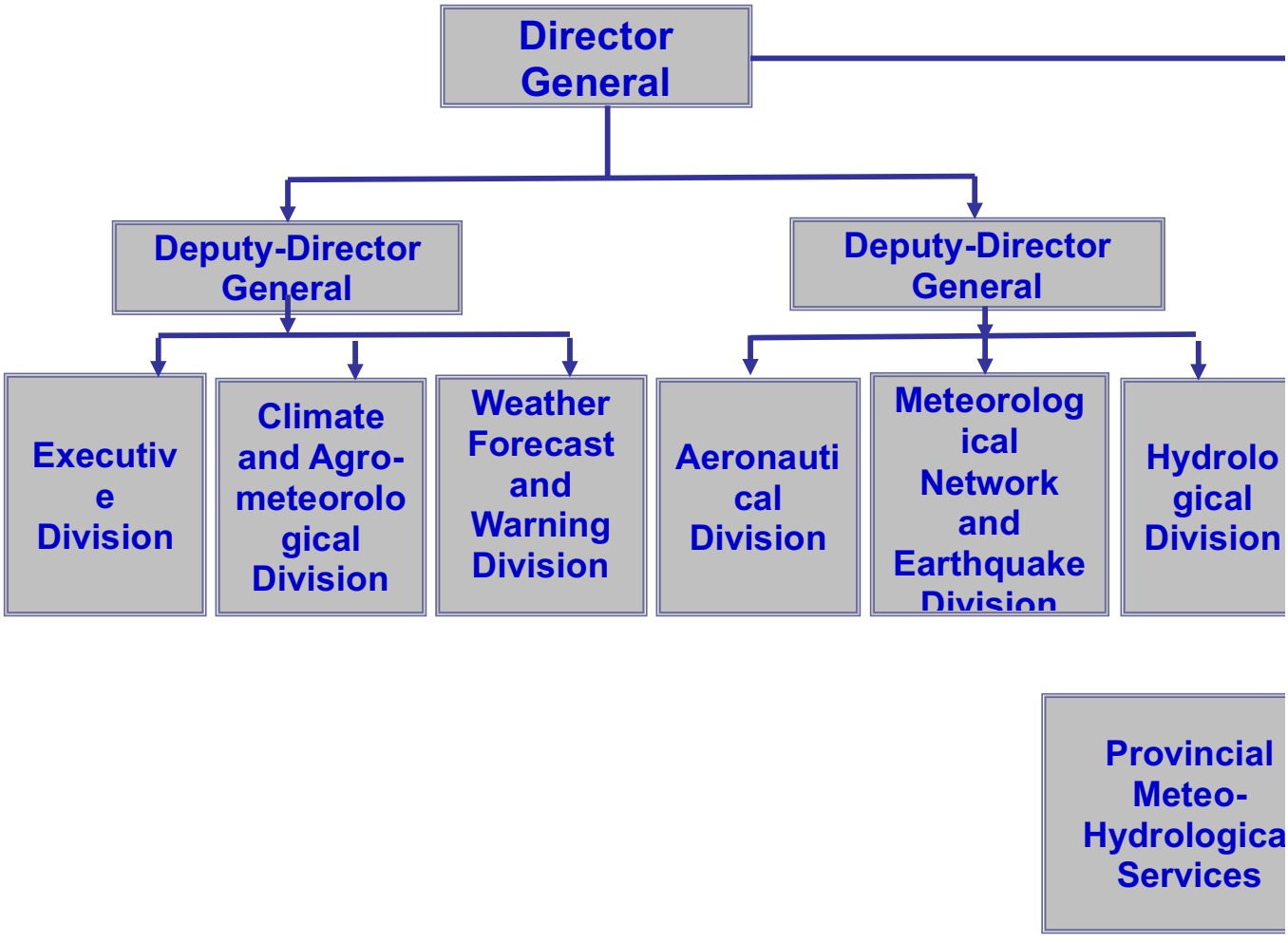

Figure 1 Organizational Structure of Department of Meteorology and Hydrology (DMH)

- **Disaster Management Offices (DMOs)**

Disaster Management Offices (DMOs) are the primary agencies from national to village level in addressing disaster risk management in Lao PDR. This SOP specifically emphasizes how to bring DMH and DMOs together so appropriate actions can be taken place in response to early warnings. This SOP provides clear cut roles for each DMO from national to village level (**NDMO, PDMC, DDMC and VDPU**) on how to respond and prepare for to the impending disaster risk.

The Disaster Management Organizations (DMOs) are the focal point and responsible for Disaster Risk Management in Lao PDR. The National Disaster Management Committee (NDMC) chaired by the honorable Vice Prime Minister and group of Ministers provide the strategic guidance for disaster management. The National Disaster Management Organization (NDMO) at the national level and provincial, disaster management committee, district disaster management committee and village disaster protection units have been established at provincial, district and village levels respectively. The organizational structure of DMOs is shown in Figure 2.

- **Provincial Authorities and focal units**

During the consultative stage, ***it was found that there was a common consensus to give high priority to provincial authorities in this SOP***. Provincial authorities will require much guidance in terms of the utilization of early warning messages as well as timely dissemination of warnings to the district level. As per the institutional arrangements are concerned both DMH and DMO are well established at the provincial level and this SOP will make communication of EWS much easier and more effective. The SOP describes clearly the roles and responsibilities of provincial authorities, focal units and PDMC, in all three different time scales; normal, alert and warning times for early warning.

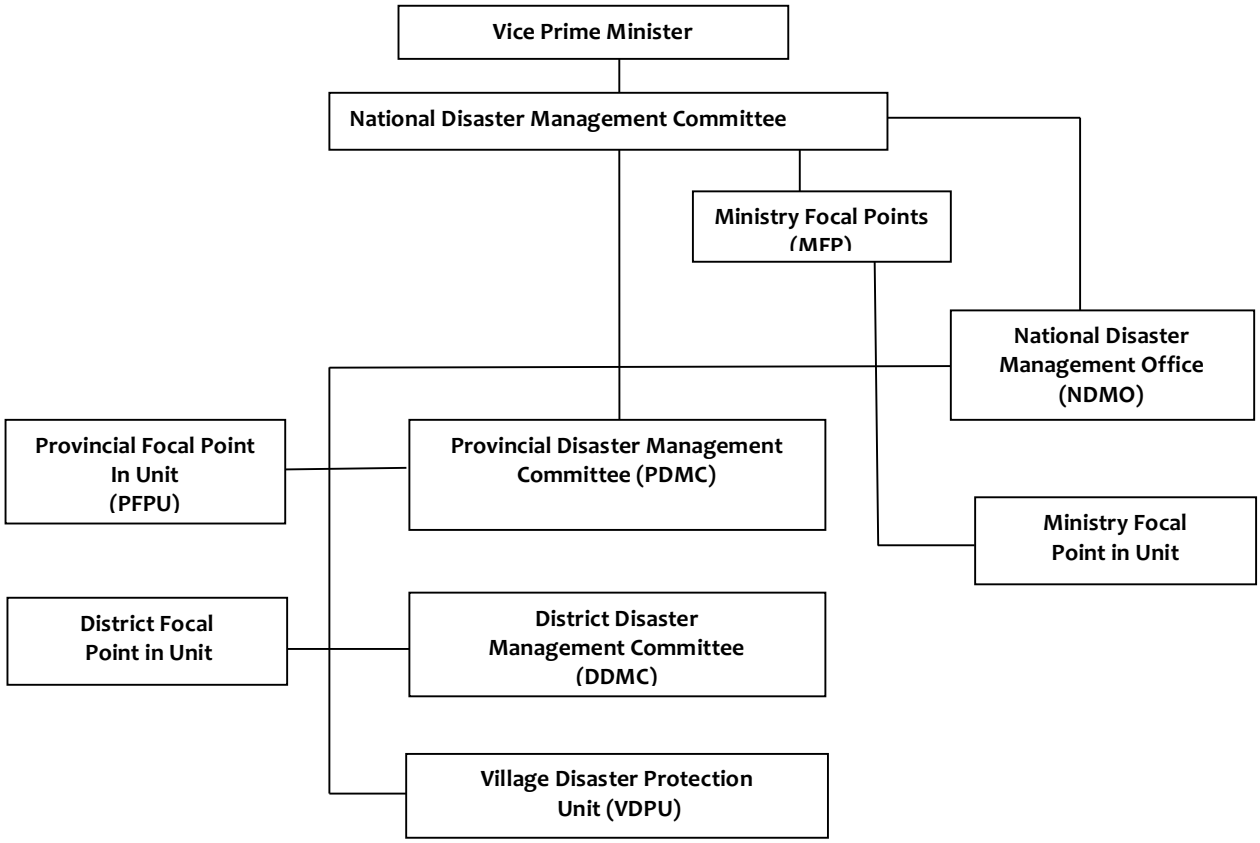

Figure 2 Organizational Structure of Disaster Management Organizations (DMOs)

- **District Authorities and focal units**

After getting the early warning message from provincial authorities, it is time for district authorities and focal points to take necessary actions. The SOP describes clearly the role of district level agencies in all three different time scales as mentioned above.

- **International Non-Government Organization/Non-Government Organization (NGOs)**

As an important stakeholder, I/NGOs have given high priority in this SOP to facilitate community, government agencies and other relevant stakeholders to respond to the early warning messages. The most important role that I/NGO would play under this SOP would be in terms of assisting provincial authorities to activate the disaster management

plans, provide resources, as well as translate the early warning messages for different stakeholders.

- **Public and Private Telecommunication companies**

The public and private telecommunication companies would play a key role in dissemination and communicating the early warning message from the national to village level. During the gap assessment, it was evident that in many cases there are limitations and constraints in disseminating early warning message to remote areas of Lao PDR. At this moment, mass media such as radio and television have only been utilized to disseminate and communicate the early waning messages. This SOP provides guidance to the public and private telecommunication companies on how to act during all three stages of early warning.

- **Vulnerable Community**

At the village level, Village Disaster Prevention Unit (VDPU) along with relevant community based organizations has been made responsible agencies to disseminate early warning messages and at the same time organize appropriate response.

5. Technical and Administrative Context

The Early Warning System revolves around four key elements which are explained in the Annexure C. They are risk knowledge, monitoring and warning, dissemination and communication, and response capacity. In order to understand the processes of early warning system from risk knowledge to response capacity, it would be better to first explain all four components through schematic diagram as shown in Figure 3 to give the users an understanding about early warning systems. Furthermore an explanation will be provided on how SOP works as a system to carry the early warning from national to village level. Figure 3 explains how all four elements of early warning systems interact with each other and where the SOP becomes engaged. SOP is initiated after monitoring a hazard and an early warning needs to generated, which requires the channeling of a warning to different users through different medium.

The schematic diagram in Figure 9 (Annex C) allows DMH and DMOs to understand the integration of early warnings systems and SOP. Currently DMH generates an early warning bulletin and sends it to different stakeholders through various medium. However, there are no clear cut roles and responsibilities defined for both DMH and end users on how to receive and respond to the early warning at different levels. The integration of early warning and SOP would provide clear cut responsibilities and improve coordination with stakeholder involved.

In Figure 3, DMH is intensively engaged in data observation and data collection related to hydro-met. These two activities capture the first element of early warning system which is RISK KNOWLEDGE. Monitoring hydro-met hazards and generating warning covers the second element of EWS which is MONITORING and WARNING.

The remaining two elements have been shown in the diagram as DISSEMINATION AND COMMUNICATION as well as RESPONSE CAPACITY. DMH's role extends to dissemination and communication to the relevant recipients of early warnings, recipients respond based upon the early warning status. In this case, DMOs would act as response agencies by transferring the warning from national to village level as well as provincial/district authorities and focal points to evacuate vulnerable communities.

Figure 4 displays two key components in regards to early warning; first-the technical component of early warning which is tended by DMH, whilst the administration component of early warning lies with DMOs. In the same manner, SOP which is entirely an administrative process would be attended by DMH and DMOs at national level, and then by DMOs and others from provincial to village level.

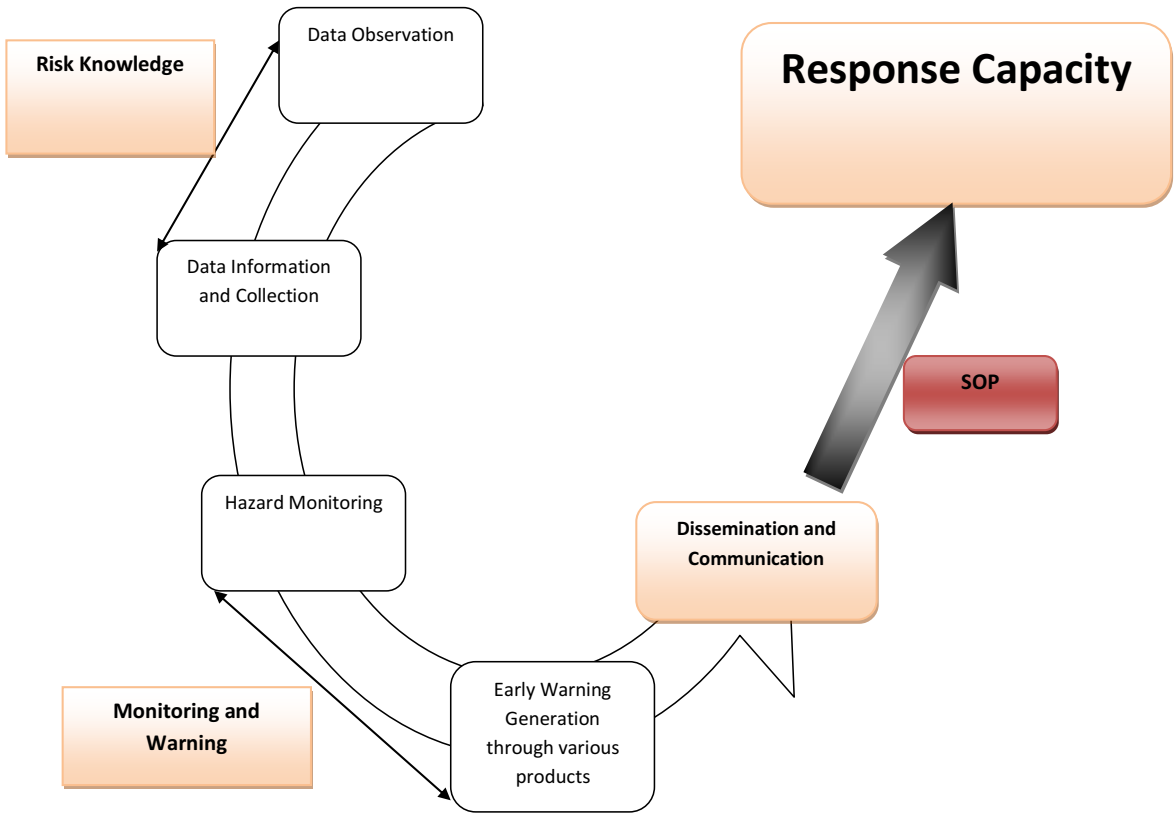

Figure 3 Process of Early Warning and SOP

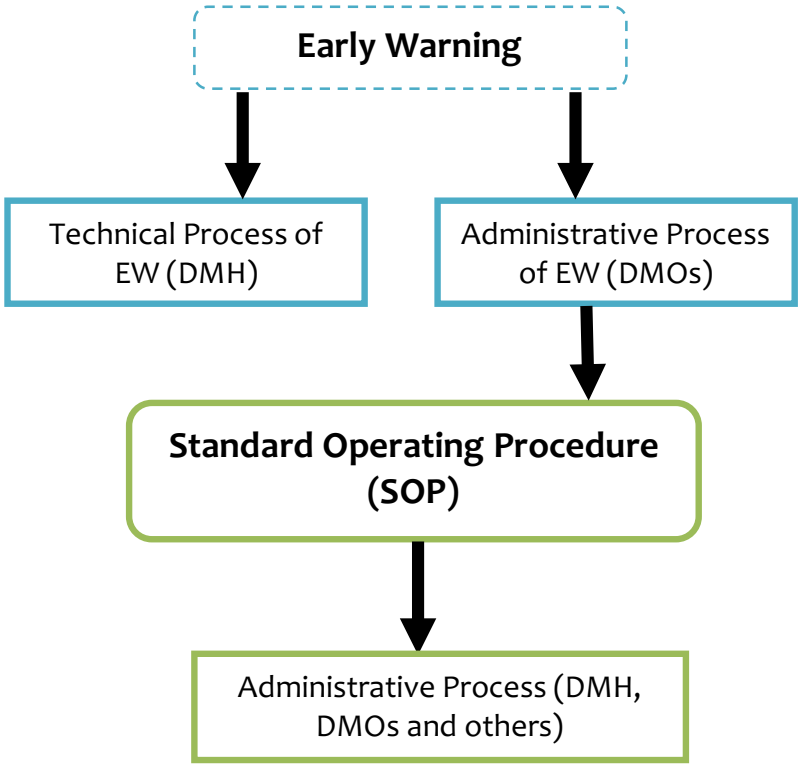

Figure 4 Technical and Administrative Parts of EWS and SOP

6. Lao PDR Warning Service

Warnings are issued in the Lao language with English versions available on the DMH website.

- **Flood Warning**

The warning stage of early warning systems and SOP provide guidance under which SOP to be operational. Warning stage differs from place to place and different stations have different warning level depending on the local flood characteristics and river conditions. During the consultation of SOP development, three different warning stages were discussed with DMH and the following stages for flood early warning and SOP have been suggested:

- **Normal Stage**: water level at the station is expected to be 0.50 meters below warning level
- **Alarm Stage**-: water level at the station is expected to exceed warning level

- **Flood warning**: water level at the station is expected to be 0.50 meters below the dangerous level heavy rainfall is forecasted exceeding 100 millimeters per next 24 hours

The flood forecasting procedure shown in Figure 6 explains how an early warning bulletin as final product generated by DMH is built at the national level. The Hydrological division of DMH collects and analyzes information and then passes it on to the weather forecasting division and finally the early warning bulletin is generated and issued to the relevant agencies. The forecasting procedure shown in Figure 6 demonstrates the responsible unit within DMH as well as time and process of generating the early warning bulletin.

DMH issues three types of information according to water level and forecasted rainfall.

- Urgent Warning – In case water level at the station is expected to be 0.50 meters below Dangerous Level AND heavy rain is forecast exceeding 100mm over the next 24 hours. The color Red is used to reflect the level of warning.
- Flood Warning – In case the water level at the station is expected to exceed Warning Level. The color Yellow is used to reflect the level of warning.
- Flood Advisory – In. case water level at the station is expected to be 0.50 meters below Warning Level. The color Blue is used to indicate Flood Advisory.

Urgent Warnings and Warnings are issued every 12 hours in the format shown in the examples at Annex A. Flood Advisories are appended to the routine forecast.

During the consultative stage of SOP development, representative of DMH, DMOs and others strongly felt to include the feedback mechanism in order to evaluate the early warning message from national to village level. In the strategy paper of early warning system (Reference C), a feedback checklist (appended in Annex D) has been provided for provincial to village level to improve the early warning message.

- **Flash Flood Warning and Heavy Rain Warning**

Flash Flood Warnings and Heavy Rain Warnings are issued once a day when Heavy Rain is expected with at least 100mm within 12 hours. These warnings include reference to landslides where appropriate. The heavy rain could be produced by the monsoon trough and/or thunderstorms. Examples of a Flash Flood Warning and Heavy Rain Warning are shown in Annex A.

- **Tropical Cyclone Warning**

Three categories of warnings are issued depending on the tropical cyclone location.

  - Urgent Warning – Issued every 6 hours when TC is located west of 110 degrees east.
  - Near Warning – Issued once a day when TC is located between 110 and 115 degrees east.
  - Far Warning – Issued once a day when TC is located between 115 and 120 degrees east.

Urgent Warnings will include reference to Heavy Rains and Landslides when the Tropical Cyclone is expected to directly impact the country. An example of a Tropical Cyclone Warning is shown in Annex A.

7. Joint Undertakings

Communication and dissemination Channels for EWS

The internal and external communication channels provide an understanding to both DMH and DMOs with regards to operationalizing SOP from national to village level. Figure 6 depicts the communication channel through which DMH operates with other relevant agencies in regards to flood and weather forecasting. The diagram also provides an overview for internal and external communication within and outside DMH. Maintaining the existing communication system will assist in making SOP operational.

End to end early warning communication and dissemination is all about operationalizing the SOP. Since this SOP is dedicated to DMH and strengthening its coordination with DMOs, it is extremely important that experts at DMH understand the process of operationalizing the SOP from national to village level. Figure 7 explains how SOP developed for DMH would be operated from national to community level. As per the current practice, DMH sends the early warning bulletin to several agencies, the diagram in Figure 7 highlights the responsible agencies required to send early warning bulletin in all three different warning stages (normal, alert, warning).

Disaster Management System Response

The disaster management system and response needs to look at from provincial to village level. Provincial Disaster Management Committee (PDMC) can take the lead role of COMMAND to delegate the roles and responsibilities (as per SOPs) to the respective agencies at province level and District Disaster Management Committee (DDMC). The provincial agencies such as Provincial Focal Unit (PFU), Social Welfare Department, Provincial Search and Rescue Unit would communicate and provide information for following action to their counterpart at district level. The District level Disaster Management Committee (DDMC) can take the COMMAND role and delegate the roles and responsibilities (as per SOPs) to the respective agencies at the district level. At the village level, VDPU would COMMAND the relevant organizations such as Youth/Women union, CBOs and others to mobilize community based on Early Warning Actions. Schematic Diagram in Figure 8 shows the detailed process of Disaster Management System and Response from province to village level.

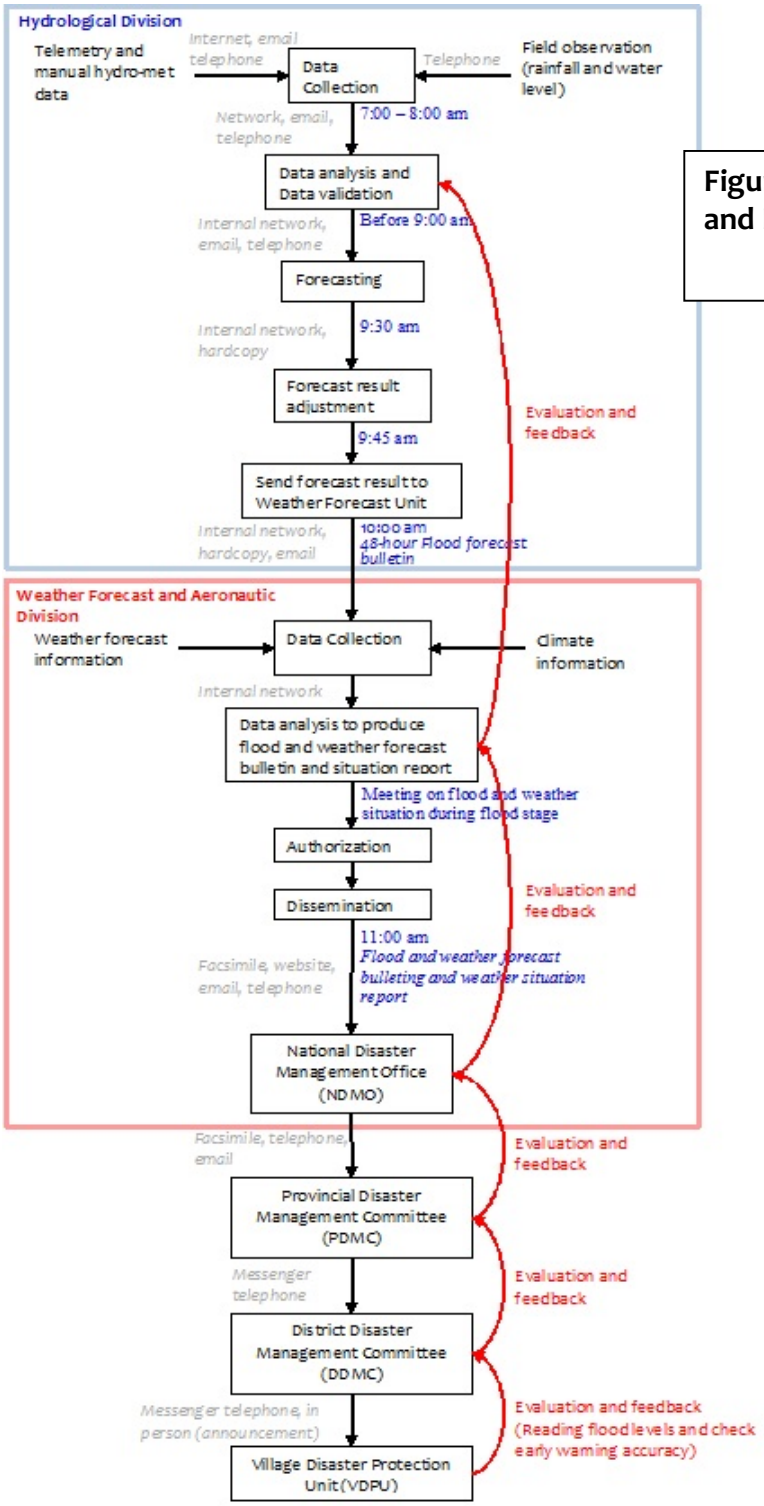

Figure 5: End to End Preparation and Dissemination of EWS

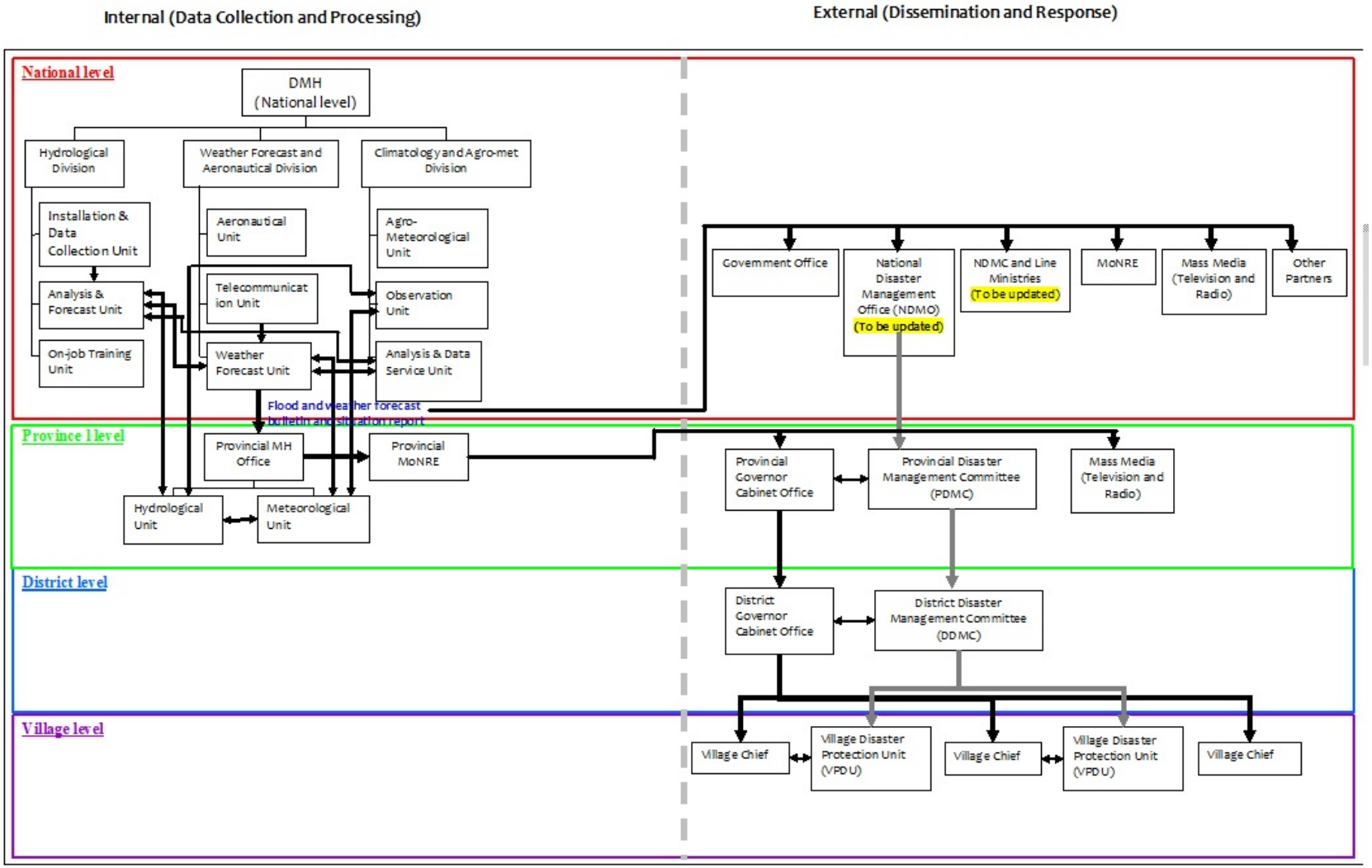

Figure 6: Internal and External Communication of EWS

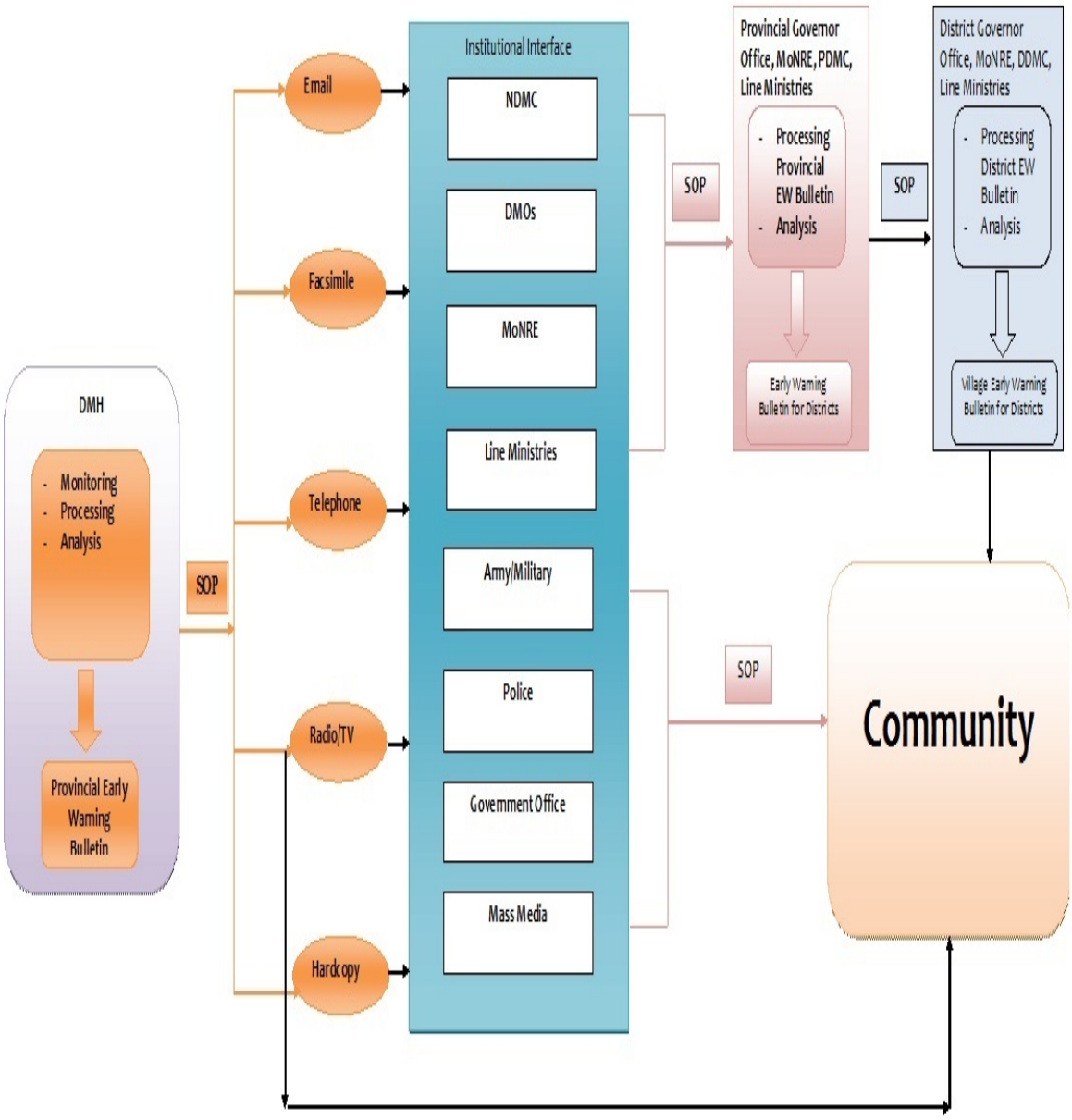

Figure 7: Operationalizing the SOP from National to Community Level