Stakeholder Consultation Workshop Report

Forecast Based FLOOD Preparedness in Nepal - 23rd December 2016

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Introduction

Climate change poses a serious risk to poverty reduction and threatens to undo decades of development efforts, hitting the poorest people the hardest. Those who are living in vulnerable areas often have the fewest resources to adapt or recover quickly from shocks. As the effects of climate change worsen, escaping poverty becomes more difficult. Among the direst issues we face because of climate change is its effect on food security. It affects all four dimensions of the latter: food availability, food accessibility, food utilization and food systems stability. It has an impact on human health, livelihood assets, food production and distribution channels, as well as changing purchasing power and market flow.

World Food Program (WFP) plays a significant role providing humanitarian assistance to those affected by climate change and it is expected that humanitarian needs might rise following the increasing trend of natural hazard occurrence due to climate change. WFP also plays a critical role in helping government and communities prepare and respond to shocks as well as reducing vulnerability and building lasting resilience. WFP is therefore developing innovative solutions to manage and mitigate risks to use financial resources more efficiently and effectively.

Nepal is one of the most disaster-prone countries in the world, owing to its unique geographic location. Frequent hazards include floods, drought, landslides and forest fires. The 2015 earthquake was the worst since 1934. In the 2011 Maplecroft Climate Change Vulnerability Index (CCVI), it ranks fourth among the top 10 countries facing the highest levels of risk to climate change. In 2015, WFP entered into a global partnership with the German Federal Foreign Office and the German Red Cross to develop new protocols or enhance existing ones to bridge early warning to early actions at the national and subnational levels. The project, Forecast based Financing and Emergency Preparedness for Climate Risks (FbF), builds on existing scientific capacity (or tools) to predict climate related risks and in-country disaster preparedness capacity. FbF is being implemented in five pilot countries (Nepal, Bangladesh, Philippines, Dominican Republic and Haiti).

This project focuses on understanding and improving climate risk analysis, developing and/or strengthening early warning systems based on indicators and thresholds, linking these indicators and thresholds to Standardized Operational Procedures (SOPs) for preparedness, thus strengthening core areas of response management capability in coordination with national government bodies or national institutes dealing with climate related risks. Early warning and preparedness systems will be tested through simulations at the national level and in each of the target areas, with improvements on identified gaps. SOPs for emergency preparedness for local governments will be complemented with WFP internal SOPs for preparedness activities as part of its Emergency Preparedness and Response Package (EPRP). WFP internal preparedness is in support of building national preparedness and response capacity and in alignment with the principle that national governments have primary responsibility for humanitarian action.

In Nepal, the project will focus on six priority districts—Dang, Banke, Bardiya, Surkhet, Kailali and Kanchanpur—in the mid-western and far-western development regions. Several major river basins, including the Mahakali River, Karnali River, Bheri River, West Rapti River, and Babai River, flow through these districts. These districts are historically prone to floods, with the last major event in August 2014. Synergies with existing flood forecasting, flood hazard mapping and community-based early warning systems in these districts, and the planned humanitarian staging area at the Nepalgunj airport in Banke district, will enhance the effectiveness and sustainability of this project.
Objectives

The objectives of the consultative workshop are highlighted below:

- Provide an overview of Forecast Based Financing (FbF) at the national and global level and the associated challenges and opportunities

- Orient participants regarding the existing Weather and Flood Forecasting initiatives of Nepal

- Identify gaps in the current policy framework at the national and district level for preparedness plans

- Discuss on how FbF can strengthen flood preparedness and early action in Nepal

- Have a discourse on Standard Operating Procedures (SOPs) specifically on the general framework for readiness, preparedness, early action and response
Session 1: Agenda, Presentations and Discussion

The introductory session provided an overview regarding the concept of Forecast Based Financing (FbF) which was later followed by presentations from the Meteorological Forecasting Division (MFD), and Flood Forecasting Division from the Department of Hydrology and Meteorology (DHM), Government of Nepal on existing tools and techniques available for weather and flood forecasting together with the status of early warning system in Nepal. In this session two videos on FbF were shown to the participants that described how it has been used in Africa and how the NGOs perceive it with the aim to make the session interactive and engaging. The agenda of the workshop is presented in Annex 1.

Presentations:

1.1 Overview of Forecast based Financing (FbF): Concept and Practices at National, Regional and Global Levels: Opportunities and Challenges

Madhab Uprety, DRR Consultant, Practical Action Consulting (PAC)

The presentation provided insights regarding the concept of Forecast based Financing (FbF) which is a new concept in humanitarian sector that links forecast information with preparedness actions including defined roles and responsibilities of related DRR actors and stakeholders. The need of such noble concept in disaster risk and resilience approach is further stressed by availability of credible forecast information and integration of early action in preparedness. Similarly examples from global initiatives in FbF were discussed together with challenges and opportunities regarding the application of this niche approach in Nepal.

1.2 Meteorological Weather Forecasting in Nepal

Barun Paudel, Meteorologist, Meteorological Forecasting Division (MFD), Department of Hydrology and Meteorology (DHM), Government of Nepal

The presentation focused on the existing capabilities of the Meteorological Forecasting Division (MFD) of Nepal which produces daily updates based upon observation via satellites and the recently launched Numerical Weather Prediction (NWP). Challenges concerning communication and understanding of forecasts were highlighted together with the constraints posed the macro and micro variation in weather due to complex topography and terrain of Nepal. Nevertheless, with available resources MFD is providing services to the end users who are availing the facilities via www.mfd.gov.np

1.3 Flood Forecasting and Early Warning System in Nepal

Binod Parajuli, Hydrologist, Flood Forecasting Section, Department of Hydrology and Meteorology (DHM), Government of Nepal

Current status of flood forecasting and early warning system was discussed in line with recent advances on flood forecasting such as Global Flood Awareness System (GLoFAS), Probabilistic and Deterministic flood forecasting during 2016 monsoon. Constraints of human resources to deliver effective services during the monsoon were highlighted but DHM managed to pilot mass SMS in 2016 in Kankai, Narayani and West Rapti Basin. From real time observation perspective, rainfall and river watch are critical for observation and can be viewed via www.hydrology.gov.np
Discussion:

Q: What is the difference between early preparedness and response before and after flood? Is the activity to be undertaken similar? (IWMI, TU and ADRA)

A: The activity is more or less similar but the contribution varies in terms of effectiveness of the response. If the community is prepared ahead of any disaster event then, it is more effective as the people are well prepared and the response team are in high alert and thus prepared to respond to the event based upon forecasts which was not the case earlier during the floods in 2013 and 2014.

Q: The concept of forecasting based finance is very good from climate perspective. But climate data can only be retrieved through stations so what about the area where the stations are not established? There are many small tributaries which can be prone to flooding with no established stations in those areas. So how is the climate data going to be retrieved for those areas to safeguard the vulnerable communities out there? (ICIMOD)

A: The NWP model has a spatial resolution of 4*4 km and we can ascertain how much precipitation will occur in any particular area on an hourly basis. So there is not much issue of retrieving rainfall forecasts for the small tributaries as model covers those areas as well. But the main issue can be the reliability of the forecasts retrieved which needs to be verified.

Comment: The concept of FbF is good but how can it be integrated in the planning done by different agencies? There is confusion between the agencies which needs to be cleared and the planned strategy needs to be aligned integrating this concept for effective delivery. This concept needs to be mainstreamed and the first step towards this can be integrating this concept in the planning system of 6 major flood prone areas of Nepal. We need to integrate the lessons learned from this in all the planning system so as to mainstream the concept. (UNFPA)

Remarks from WFP and PAC:

- We need to focus on no regret investment. For now, six districts in West Nepal which are prone to floods are being prioritized, and the action/resource allocation based preparedness needs to be done in other areas as well, once we generate learning from the initial pilot.

- This concept and work to be carried forward differs compared to the cluster who are located for emergency response in the given area in terms of the given delineation of the roles:
  
  - The roles and responsibilities to be carried forward by the team are predetermined before the disaster as opposed to the cluster team who act after the occurrence of the disaster event.
  
  - For the action plan, Standard Operating Procedures (SOP) document needs to be developed that would determine the set of actions to be carried forward in event of disaster forecast based upon the data available.

- For instance, for the flood event that occurred in 2014. The precipitation data recorded was analysed after the flood event but if the data was interpreted beforehand - the impact of the disaster could have been forecasted thus resulting in better and effective response for the event.
Session 2: Forecast Based Financing (FbF) & Standard Operating Procedure (SOP)

Session 2 was focused towards discussion on integrating FbF into SOPs and analysing the existing policies and plans at the national and district levels. Examples from Peru and Uganda were highlighted via videos and presentations to give the participants a general idea regarding the piloting on FbF. Similarly, the role of FbF in strengthening existing flood preparedness and early warning in Nepal was presented. Fundamentals of Standard Operating Procedures (SOPs) was discussed in detail to provide insights on the process that needs to be adopted later at the district level.

Presentations:

2.1 Preparedness Plans and Response Framework at District and National Levels

Dayaram Shrestha, Section Officer, National Emergency Operation Centre (NEOC), Ministry of Home Affairs (MoHA)

DRR Initiatives in Nepal from government perspective was discussed that highlighted the existing plans and policies and policy instruments at the national, sub-national and local level. The role and responsibility of NEOC and DEOC was discussed in terms of coordination as a single door for collection of overall information during a disaster. Existing SOPs for NEOC was discussed and gaps were highlighted. The presentation provided a basis to understand the challenges and complexities in the current socio-political spectrum to integrate scientific forecast based tools for enhanced preparedness.

2.2 How can FbF strengthen Flood Preparedness and Early Action in Nepal?

Sumit Dugar, Research Associate, Practical Action Consulting (PAC)

Current status of disaster management in Nepal was described together with the existing initiatives in forecasting that encompassed forecasts, lead time and indicators essential for FbF in terms of triggers, actions and timeline. Opportunities for Nepal in flood preparedness and early action by incorporating FbF was floated building from the example of Peru. Synergy with existing preparedness plans was highlighted as critical to achieve the goals of FbF in Nepal.

2.3 Standard Operating Procedures: General Framework for Readiness, Preparedness, Early Action and Response

Madhab Uprety, DRR Consultant, Practical Action Consulting (PAC)

The general framework for standard operating procedure (SOPs) was discussed in context of readiness, preparedness, early action and response. Similarly SOPs were viewed with the lens of integrating forecast based financing as a tool where triggers based upon forecasts would lead to automatic actions at the ground level with predefined roles and responsibilities together with flexible funding mechanism. Dynamic SOPs can provide a unique opportunity to test preparedness actions in light of scientific forecasts.
Session 3: Group Discussion, Presentation & Closing

In session 3 participants were divided into three groups where stakeholders from government, humanitarian agencies, INGOs, national hydro-met services and research institutes were paired to discuss on topics mentioned below. The groups specific questions on FbF that guised their discussions. Summary of discussions has been presented below together with action points from each group discussion that would be later utilised during SOP formulation.

Discussion:

Group 1: Integrating FbF in Current Preparedness Actions

Guiding Questions

- What are the current government instruments and procedures for disaster preparedness and early action in place?

- How can FbF be incorporated and integrated in existing emergency preparedness and response plans that anticipate future disaster risks? What are the challenges and opportunities while integrating FBF into existing plans?

- What level of detailed information is needed in existing forecast information? Does our current forecasting and early warning system address to those information needs?

- How can we translate and communicate the scientific forecasts and predictions into early actions and preparedness?

- Should forecasts/warnings information be based exclusively on hazard or should it contain impact assessment as well? Will FbF require an impact based early warning system?

- How can we Incorporate Monitoring & Evaluation (M&E) in SOPs? How to ensure there is effective feedback loop in SOP for its periodic update?

Current government procedures and instruments in preparedness and early action includes National Disaster Response Framework (NDRF) at national level, Disaster Preparedness Response Plan (DPRP) at district level and local disaster risk management planning guideline (LDRMP) at VDC level.

Effective co-ordination between DHM and MoHA in translating forecast into action is very essential in implementing forecast based financing in Nepal. The existing NDRF requires update and modification based on the scientific forecasts. There is a need of strategic planning and development of action plan related to forecast based financing. The main challenge of integrating FbF into existing plans is the lack of technical and human resources
for DHM that is likely to hinder the generation of reliable and specific forecast information for the users. Forecast being the main basis for FbF mechanism has to be credible in order to convince the stakeholders to facilitate its integration in the existing plans and procedures. Also the limited coverage of existing early warning system constrains FbF scale up at the national level. There is a great challenge to identify the thresholds and triggers levels for resource allocation and finalize those on the consent of all the related stakeholders. Making the system sustainable is also a major issue. Apart from the preparedness actions, the response mechanism also needs adjustment as per the forecast timeline. Despite all such challenges, FbF brings us several opportunities in the DRR sector of Nepal. Every action is scientific and objective which at the end makes our response more efficient and cost effective.

Location specific forecasts with defined impact level are required to plan and execute early actions. Vulnerable areas need to be identified beforehand and such information requires to be disseminated among the humanitarian organizations and relevant stakeholders well in advance. Impact based early warning system can facilitate the implementation of forecast based flood preparedness.

There should be a clear definition of local impact. The scientific information should be less technical as possible concurrent with its likely impact at the ground level. The probabilistic nature of the forecast should be well understood by community and decision makers. This can be done by increasing awareness among the communities and making them informed about the likelihood of event. Climate and Weather games could be entry points for such awareness programs.

Warning information should contain impact assessment as well. However these require capacity development at national, regional, district as well as community level for impact based early warning system. Periodic simulation and mock drills can help in such capacity building. Local level mapping of resources is necessary to identify impact and damage.
Group 2: Formulating SOP (Threshold Triggers, Preparedness Actions and Roles & Responsibilities)

Guiding Questions

• What timelines & hazard indicators need to be considered for flood preparedness and early actions in saving life, assets, crops and livelihoods?

• How can we set the thresholds (intensity and probability)? What is the responsibility of DHM in early warning processes and who shall disseminate the information to users?

• What are the corresponding early actions for each indicator at different timelines of forecasts?

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<tr>
<th>Timeline of Forecasts</th>
<th>Hazard Indicator</th>
<th>Threshold (Intensity &amp; Probability)</th>
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• How do we address uncertainty of weather and flood forecasts in SOP? How can be the likely costs incurred due to probable acting in vain or the false alarms made justifiable?

• How can we involve wider stakeholders (including communities) in SOP Development? Should we adopt Top down or Bottom up approaches?

• How can we Incorporate Monitoring & Evaluation (M&E) in SOPs? How to ensure there is effective feedback loop in SOP for its periodic update?

The timeline for the flood preparedness can be either short-term, medium-term or seasonal/long term. The short-term preparedness needs to be based on real-time monitoring and forecast of 24 hour lead time, while medium-term can use the 3-day rainfall forecast from RIMES and DHM. GLoFAS and other seasonal outlook model forecast can be used for the longer-term preparedness planning. Since, the forecast based financing is focussed on the flood preparedness and flood is usually rainfall induced, the indicators are rainfall thresholds and water level. However, there can be a concern whether to include other factors such as flooding due to landslide blocking, damming of the river, GLOFs etc.

Threshold development for Forecast based financing is dependent upon risk assessment that determines the likely intensity of the natural events. Depending upon the scale of the disasters, thresholds can vary. Therefore, it is critical to link scale and intensity of natural hazards such as floods and the areas that are likely to be impacted.

Threshold development needs to be scientific and based upon the hydrologic/hydraulic model which further needs to be verified from the local communities making the process...
participatory and inclusive. There is very important role of DHM in developing thresholds and trigger level for the project region as they are the key stakeholders to produce such information. Regarding the dissemination of thresholds level information and respective forecasts information to the vulnerable communities, the communication channel need to be as per the timeline of the forecast or the defined lead time. Two kinds of communication channel can be adopted for this purpose. For the short-time forecast i.e. 24 hours lead time, the information need to be rather straightforward. The usual long and lengthy formal channel for the flow of information need to be avoided; and warning information needs to be given directly to the vulnerable communities and relevant stakeholders. This can be done by linking DHM and DEOC to local early warning task forces and community based organizations. In case of medium-long term forecast, the usual communication channel can be adopted as there is sufficient time for all the stakeholders to prepare and execute defined early actions.

Since the short-term timeline is 24 hours before the event, much of the early actions need to be focussed on preparing for rescue and relief including cluster activation and resource mobilization. DHM need to provide specific forecast information while at the ground level, DDRC need to take the lead to make sure every resource is on the standby. Early actions that can be triggered by the medium-term forecast includes making sure the likely vulnerable households have go-bag stocks with them. They need to put all the important documents and assets in the safe place. Related humanitarian organization should aware the vulnerable people about the escape route and shelter houses. The long term/seasonal early action need to be more about the awareness program in the communities and trainings to the volunteers. This has to be co-ordinated by the local NGOs and community based organizations.

The forecast information also needs to stress on the uncertainty associated with it. This can be done by forecasting uncertainty as well. Forecast error model should be used to quantify the uncertainty. Interpretation of the uncertainty to the end user is a major challenge. So proper trainings on the same is essential to build confidence level on the triggered actions and avoid any potential backlash due to acting in vain. Further data assimilation approach can also be used in addressing uncertainty of weather forecasts. In order to make any likely costs incurred due to false alarms justifiable, there need to be a provision of action plans in SOP.

Workshops on forecast based financing need to be organized at national, district and community level in order to bring wide range of stakeholders in the SOP development process. Learnings from the community and district level workshops will be pertinent in finalization of SOP rather than the inputs from the national level. A bottom up approach is rather effective for the piloting and implementation of forecast based financing. However, communicating this noble concept to the end-user can be a major challenge.

There need to be monitoring and evaluation committee at different levels at least at national and district level to ensure there is an effective feedback mechanism. Such kind of provision should be clearly mentioned in the SOP.
### Guiding Questions

- Is it necessary that NDRF and DPRPs be revisited to incorporate early preparedness actions based on weather forecasts? If yes, when and how? If not, what should be done?

- Can we make the contingency plans forward looking- anticipatory of flood events based on weather and flood forecast? Should we institutionalize participation of DHM and forecast information providers in contingency plan development process?

- What aspects are pertinent to integrate new partners (such as private enterprises, insurance companies etc.) and advocate for FbF?

- How can FbF be integrated into longer term DRR and resilience building activities of national and local partner organizations?

- What are the preparations required to advocate to the government and development partners to make sure that preparedness funds are available based on weather and flood forecasts?

NDRF being a policy document needs to be updated and made a dynamic document; however the decision regarding the update needs to come from a policy perspective. DPRPs on the other hand are updated annually and when revisited use of weather forecasts needs to be incorporated in the existing cluster-wise preparedness plans. There is a challenge of having consistency in documentation process which arises from having documents and guidelines such as LDRMPs, DPRPs and NDRF, therefore mainstreaming is required when integrating scientific forecasts based upon evidence.

Current contingency plans are based upon the average risk conditions and can be made forward looking by identification specific thresholds and validating it as well with support from National Hydro-Met Services, Thresholds need to trigger actions automatically with clear guidelines on who shall do what within a specified timeframe. In summary, scientific information regarding weather forecasts is being used to streamline preparedness. However, actions on preparedness need to be practical to be implementable.

Private Sector can be engaged in FbF process by working with them to use CSR funding in preparedness to enable vulnerable communities better prepare for floods. Benefits for the private sector in terms of tax rebate and other subsidies needs to be clearly delineated by the government to encourage their engagement for which orientation, advocacy and awareness is critical. Crop insurance linked with livelihood activities are currently in pilot phase, learnings from which can be utilised in FbFs. However, forecast uncertainties hinder implementation of niche interventions, and are stakeholders are reluctant to accept these inherent challenges.

Role of academia in DRR and Resilience research is seldom acknowledged by the government, which needs to change. Localised research is required that might help us identify tools, techniques and technologies to manage disaster risk. Action research should lead to implementable actions. However, there was no consensus on how FbF can be
integrated in local and national platforms. It was recognised that FbF simply links weather forecasts to existing preparedness actions with a dedicated funding mechanism that is triggered automatically when certain thresholds are crossed in the short, long and medium term. Therefore, where and how FbF fits in needs to be discussed at the national and district levels. FbF SOPs as part of annex of DPRP plans was deemed the logical choice.

For FbF to be effective, funding is critical and DRR Trust Fund is envisioned where funding might come from government, donors, civil society and private sector and later distilled at the national and regional level when thresholds are triggered and actions are taken based upon SOPs. However, the funding matrix must be clear on which agency contributes what and when and fund disbursement must be based upon activity. Monitoring would be crucial to ensure that the funds are used for preparedness activities based upon weather forecasts. Overall, reliable, consistent and Integrated Climate Services is the missing link to operationalise FbF for Nepal. Funding is critical to make FbF SOPs active and operational.
**Action Points**

Timeline of forecast need to be mainly into three categories: 24 hours, 3 days, and 15 days. DHM should play active role in threshold development process including their validation at ground level by the NGOs and CBOs. Uncertainty needs to be also forecasted and people need to be made aware about such. Workshops need to be more focussed on the ground level in order to develop specific and effective SOP. There need to be a clear provision in SOP about Monitoring and Evaluation committees at different levels.

Matrices needs to develop in context of Nepal where Threshold, Triggers along with Activities, Cost and Responsibility are clearly delineated for each working areas after long, medium and short term weather forecasts are made available (who does what and when). Each district needs to have a workable and dynamic matrix where thresholds for river levels and rainfall are clearly specified and actions are doable.

Need to have a 2-4 pager document for NEOC/DEOC regarding available tools on weather and flood forecasts, how to interpret and use forecasts and take necessary actions. This is necessary to have an institutional memory due to government staff turnover at the district level. Similarly, awareness and education together with training is required for district level stakeholders, government agencies, local NGOs, Red Cross Chapters and User Groups regarding these issues such that information does not remain only in silos. However, the challenge remains regarding ‘who’ shall update the new staffs at the government offices on these issues.

There is need of strategic planning and action plan related to FbF. Location specific forecast information with defined impact level is necessary for implementation of forecast based financing. Impact based early warning system can complement FbF.

**Way Forward**

The presentations, subsequent discussions and group works provided valuable inputs to the development of Standard Operating Procedures for Forecast based Flood Preparedness and Response. The following recommendations could be taken as a way forward in developing SOP:

1. There should be an effective co-ordination between DHM and MoHA in translating early warning into early action.
2. The existing NDRF, DPRP and LDRMP require update and modification to link the preparedness and response with the scientific forecasts.
3. The technical, financial and human resources for DHM need to be strengthened.
4. The coverage of existing early warning system needs to be expanded.
5. It is necessary to identify the thresholds and triggers levels for resource allocation.
6. Location specific forecasts with defined impact level are required to plan and execute early actions.
7. The probabilistic nature of the forecast should be well informed to the community and decision makers.
8. The SOP should be developed considering the actions corresponding to the short-term, medium-term and seasonal/long term forecasts.
9. The funding mechanism must be clear on which agency contributes what and when and fund disbursement must be linked with the activities based on different range of forecasts.
10. The SOP should also consist of monitoring and evaluation mechanism. In conclusion, FbF brings us several opportunities in the DRR sector of Nepal. Every action is scientific and objective which at the end makes our response more efficient and cost effective.
APPENDIX
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<td>Neera S Pradhan</td>
<td>ICIMOD</td>
<td><a href="mailto:neera.pradhan@icimod.org">neera.pradhan@icimod.org</a></td>
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<td>Suchita Shrestha</td>
<td>SIAS</td>
<td><a href="mailto:suchita@sias-southasia.org">suchita@sias-southasia.org</a></td>
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<td>Sumer Tripathee</td>
<td>Oxfam Nepal</td>
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<td>ASHA</td>
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<td>Ram K Gurung</td>
<td>ADRA</td>
<td><a href="mailto:ram.gurung@adranepal.org">ram.gurung@adranepal.org</a></td>
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<td>Gangadhar Chaudary</td>
<td>World Vision</td>
<td><a href="mailto:gangadhar_chaudhari@wol.org">gangadhar_chaudhari@wol.org</a></td>
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<td>Jyotshna Thapa</td>
<td>LWF</td>
<td><a href="mailto:plm@lwf.org.np">plm@lwf.org.np</a></td>
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<td>Care Nepal</td>
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<td><a href="mailto:kalpana.aryal@planinternational.org">kalpana.aryal@planinternational.org</a></td>
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<td>Ashish Sharma</td>
<td>Tearfund</td>
<td><a href="mailto:nepal_logs@tearfund.org">nepal_logs@tearfund.org</a></td>
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<td>Red Cross</td>
<td>Narendra Chand</td>
<td>Samaritan’s Purse</td>
<td><a href="mailto:nchand@samaritan.org">nchand@samaritan.org</a></td>
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<td>Alisha Ghimire</td>
<td>Danish Red Cross</td>
<td><a href="mailto:alisha.ghimire@redcross.dk">alisha.ghimire@redcross.dk</a></td>
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<td>UN Agencies</td>
<td>Anjan Acharya</td>
<td>Nepal Red Cross Society</td>
<td><a href="mailto:anjan.acharya@nracs.org">anjan.acharya@nracs.org</a></td>
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<td>Hari Karki</td>
<td>UNFPA</td>
<td><a href="mailto:nkarki@unfpa.org">nkarki@unfpa.org</a></td>
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<td>Mahendra K Yadav</td>
<td>FAO</td>
<td><a href="mailto:mahendra.yadav@fao.org">mahendra.yadav@fao.org</a></td>
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<td>Dhiraj Gyawali</td>
<td>WFP</td>
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<td>Sumit Dugar</td>
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<td><a href="mailto:sumit.dugar@practicalaction.org.np">sumit.dugar@practicalaction.org.np</a></td>
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<td>PAC</td>
<td>Madhab Upreti</td>
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<td><a href="mailto:madhab.upreti.pac@gmail.com">madhab.upreti.pac@gmail.com</a></td>
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<td>Dilip Gautam</td>
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<td>PAC</td>
<td>Rakshya Shah</td>
<td>PAC</td>
<td><a href="mailto:rakshya.shah@practicalaction.org.np">rakshya.shah@practicalaction.org.np</a></td>
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# Agenda for Workshop

**FORECAST BASED FLOOD PREPAREDNESS IN NEPAL**  
Consultative Workshop  
December 23, 2016 | Dhokaima Café, Lalitpur

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Description</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>Remarks</td>
<td>Registration and Tea</td>
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<tr>
<td>9:00 AM</td>
<td>Session 1</td>
<td>Introduction and Agenda for the Workshop</td>
<td>WFP</td>
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<tr>
<td>9:10 AM</td>
<td></td>
<td>Videos on FbF</td>
<td></td>
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<tr>
<td>9:20 AM</td>
<td></td>
<td>Overview of Forecast based Financing (FbF): Concept and Practices at National, Regional and Global Levels: Opportunities and Challenges</td>
<td>PAC</td>
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<tr>
<td>9:40 AM</td>
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<td>Meteorological Weather Forecasting in Nepal</td>
<td>MFD</td>
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<tr>
<td>9:55 AM</td>
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<td>Flood Forecasting and Early Warning System in Nepal</td>
<td>DHM</td>
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<tr>
<td>10:10 AM</td>
<td>Session 2</td>
<td>Preparedness Plans and Response Framework at District and National Levels: How can FbF strengthen Flood Preparedness and Early Action in Nepal</td>
<td>NEOC</td>
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<td>10:30 AM</td>
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<td>Standard Operating Procedures: General Framework for Readiness, Preparedness, Early Action and Response</td>
<td>PAC</td>
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<td>11:00 AM</td>
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<td>Tea/Coffee Break</td>
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<tr>
<td>11:15 AM</td>
<td>Session 3</td>
<td>Group Divisions for Inputs on SOP Formulation</td>
<td>All</td>
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<td>Group 1: Integrating FbF in Current Preparedness Actions</td>
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<td>Group 2: Formulating SOP (Threshold Triggers, Preparedness Actions and Roles &amp; Responsibilities)</td>
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<td>Group 3: SOP Formulation and validation process including Institutionalization</td>
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<td>12:15 PM</td>
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<td>Group Presentations</td>
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<td>12:45 PM</td>
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<td>Way Forward and Closing</td>
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<tr>
<td>1:00 PM</td>
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<td>Lunch</td>
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Photos of Workshop

Workshop Start

Presentation by MoHA

Presentation by PAC

Presentation by DHM

Presentation by Group 1

Presentation by Group 3
Presentation Slides

The slides for Session 1, 2 and 3 are presented in chronological order.
Forecast Based Financing (FbF)

Changing the Paradigm, Acting Faster

December 23, 2016

**Why Forecast Based Financing**

- Number of Disasters and need for humanitarian assistance increasing, due to Climate Change Impact
- Forecast Information & increased likelihood of extreme weather events are available
- Preparedness Actions could be implemented in the window between forecast and extreme weather event
- Lack of clear linkage between early warnings and early action
- Humanitarian organization might not be resourced to act before disaster, due to Inadequate funding mechanism

**Opportunities of FbF Approach**

- Saving Lives and Reducing Costs of Disaster Response
- Reducing Disaster Risks as well as Disaster Losses (Concurrent with the Sendai Framework)
- Increasing investments in preparedness
- Testing and improving of existing early warning systems
- Enhancing the capacity of National Meteorological and Hydrological Services (NMHS)
- Making early use of early warning systems and other monitoring systems
- Enhancing Disaster Resilience

**Challenges and Way Forward**

- General lack of adequate funding for preparedness
- Forecasts need to be credible, skilful and reliable, Verification & Validation required
- Forecasts are uncertain, There is a risk of acting in vain
- Requires flexible budget management & clear funding procedures. Accountability of Funds?
- Need of Dynamic SOPs that links worthwhile actions to fund disbursement after the credible forecast is issued
- New Concept-Still in Pilot Phase, May need further improvement

**Ongoing Projects on FbF**

GRC & WFP Pilot Projects (Climate Risks)
Peru, Uganda, Bangladesh, Nepal, Mozambique, the Dominican Republic, Haiti and the Philippines

FoodSECuRE-Pilot Countries (Drought, Food insecurity)
Guatemala, Niger, Philippines, Sudan & Zimbabwe

FAO-Early Warning Early Action (Food insecurity)
Ethiopia, Somalia, Mongolia & Papua New Guinea

**Concept**

- Information of worthwhile actions (Forecasts/Thresholds Triggers)
- Forecast Based Financing
- Available Funding
- Preparedness Actions/Roles & Responsibilities (SOPs)
- FbF in Action

Current Approach
FbF Case Example - Peru

- Can you relate similar kind of scenario for Floods in Nepal
- What we are doing now
- What are the Forecasts currently available
- What could be the FbF timeline
- What could be the sensible preparedness actions in response to forecast for different lead time
- How to identify Danger Levels & thresholds
- Potential Theme areas for intervention

FbF Priority Districts in Nepal

Thank You
Overview on Weather Forecasting in Meteorological Forecasting Division of Nepal

Dhokaima Café, Lalitpur
23rd December 2016

Presented by:
Barun Paudel
Meteorologist
Meteorological Forecasting Division
Department of Hydrology and Meteorology
Paudel_barun@yahoo.com

Outline

• Forecasting Services
• Forecast Process
• Forecast tools/systems-NWP

Forecasting Services

– Public Forecast
  • General forecast (twice a day-24 hrs forecast)
  • City forecast (twice a day for five cities) Dhankuta, Kathmandu, Pokhara, Birendranagar, Dipayal
  • WMO city forecast (once a day for KTM only)
  • Fog monitoring (Dec-Feb)
  • Special bulletin, weather advisory (Occasional as per required)

– Aviation forecast
  • Landing and take-off forecast (wind, visibility, temperature, pressure, significant weather)
  • Provide observation data and forecast for international Airport as per need.
    • Trend forecast in METAR (if needed)
    • TAFs
    • SIGMETs

Forecasting Services...

– En-Route forecast
  • Kathmandu Aerodrome Forecast and Terminal forecast for destination
  • En-route/alternate aerodromes
  • En-route weather conditions such as significant weather chart
  • Different levels wind and temperature chart

– Mountain Forecast
  • Issued daily including wind and temperature data at 3000, 5500, 7000 and 9000 m with weather forecast

– Seven Day Weather outlook for Agriculture issued every Thursday on clusters basis

– Special weather forecast as and when needed

Forecast Process

A. Data/Information Collection/Exchange

– SYNOP
– METAR from various aero synoptic stations
– AWS Data—Through internet/telemetry system
– Satellite
  • FY3E and FY2G
  • Himawari-8

SYNOP
44454 41450 62002 10286 20198 38627
48467 70522 83211 333 58002

METAR VNKT
031050Z 28005KT 5000 TS FEW020
FEW025CB SCT030 BKN100
26/17 Q1013 TEMPO TSRA
CB TO NE AND N=

TAF VNKT
031100Z 0312/0412 29006KT
5000 HZ FEW020 BKN100 TEMPO
0312/0318 VRB12KT 4000 TSRA FEW025CB
OVC090 BECMG 0400/0402 VRB02KT 3000
HZ FEW020 SCT100 PROB40 0400/0403
1500 HZ BECMG 0404/0405 14004KT 4000
HZ FEW020 SCT100 BECMG 0407/0408
23007KT 6000 FEW020 BKN100 PROB40
0408/0412 VRB10KT 4000
- TSRA FEW025CB
OVC090

SIGMET 01 VALID
031005/VKPT VNSM KATHMANDU FIR
EMDB CB OBS N OF 28 N
INTSF
B. Analysis/Interpretation

- Surface and Upper air at different levels (850, 700, 500, 300 hpa etc)
- Synoptic features, regional features
- Low/Depression/Cyclone
- Pressure Patterns
- Temperature Patterns
- Rainfall Patterns

C. Forecast Generation

- Public
- Aviation
- Mountaineering
- Others...
Outlook of MFD website

En Route Forecasts/Prognostic Charts

Forecast Tools/Systems
• Existing technology/tools
  – Digital atmosphere (Visualizing metar and synop data from around the world)
  – CMACast & MICAPS System
  – HimawariCast System
  – NWP output
    • WRF
  • WRF EMS
  – Satellite images - FengYung 2E Satellite images - Himawari 8 satellite images
  – For References → NWP products from various meteorological agencies, IMD, PMD, JMA, TMD, ECMWF (meteograms)

Himawari 8 Visible Channel

FY 2E Visible Channel

Numerical Weather Prediction
• A technique of generating weather forecast with the help of computing technology and computer model.
• Complex computer programs, also known as forecast models, run on any powerful computer or supercomputer.
NWP Model-WRF

Types of Forecast Models Used in MFD

1. **WRF 3.2 installed by RIMES**
   - Spatial resolution: 9 km
   - Generates 24 Hour Accumulated Rainfall for three day
   - Initial Condition: GFS data with resolution of 1° X 1°

2. **WRF – EMS installed by FMI**
   - Spatial resolution
     - Domain 1 (Parent): 12Km
     - Domain 2 (Nested): 4 Km
     - Initial Condition: GFS data with resolution of 0.5° X 0.5°
     - Runs 4 times a day

NWP Outputs

- Hourly Precipitation
- Accumulated Precipitation
- Total Cloud cover
- Surface Temperature (2 m)
- Surface Wind (10 m)
- Wind Gust
- Dew point (2 m)
- CAPE
- Sounding
- Meteograms
- Vertical Meteograms
- Others
Weather forecasting is a challenging job. Due to its complex topography, weather forecasting in Nepal is more challenging.
Presentation Outline

I. Introduction and Background
II. Forecasting and Warning Services
   - Flood Forecasting and Early Warning System
III. Challenges
IV. Future Plan
V. Way Forward

Introduction and Background

DHM

- Mandated for all kinds of hydrological and meteorological activities and services in Nepal
- Have 4 divisions
  - Hydrology Division
  - Weather Forecasting Division
  - Meteorological Network Division
  - Meteorology Division

Hydrology Division

1. River Network Section
2. Flood Forecasting Section
3. Data Section
4. Snow, Water Quality and Environment Section
5. Technical Section

Major Objective

1. Database Management for River Water, Lakes and Snow Nationwide
2. Flood Forecasting and Early Warning

Regular Activities

- River Monitoring
- Lake Monitoring
- Flood Monitoring/Forecasting and Warning
- Hydrological Modelling
- Snow and Glacier Monitoring
- Data Publication and Dissemination
### Disasters in Nepal

**Losses 1990-2015**

![Graph showing losses due to various types of disasters in Nepal over the years.](image)

### Common type of flood in Nepal

**Seti River Flood, 2012**

![Images of flood before and after](image)

### Flash flood/Debris flow

**Sunkoshi LDOF, 2014**

![Images of flash flood and debris flow](image)

### Hydrometric Stations under Hydrology Division

- **River Hydrology**
  - P1/P2 stations = 83
  - P3 stations = 67
  - Flood forecasting P1 stations = 25

- **Snow**
  - Hydrometric Stations = 11
  - Meteorological Stations = 7

Total: 175

![Map showing distribution of hydrometric stations](image)

### New Approaches in Hydrometry

- **Technical Approach**
  - Telemetric Stations with Real Time Data
  - Flow Modelling and Forecasting

- **Service Approach**
  - Early Warning Information of Flood and Drought to Community
Flood Hazard Management

TWO APPROACHES

Take the Flood away from people
Engineering Structures

Take the People away from flood
Early warning system/ Awareness

Early Warning System!

“A system of data collection and analysis to monitor people’s well-being (including security), in order to provide timely notice when an emergency threatens, and thus to elicit an appropriate response.”

Evolution of Flood Monitoring and EWS in Nepal

1990s

Evolution of Flood Monitoring and EWS

UN Frameworks

- UN World Conference on Disaster Risk Reduction (UN-WCDRR) 18-22 January 2005,

- UN-WCDRR March 14 to 18, 2015

Telemetric Stations

Automatic Rainfall Stations: 90+
Automatic Water Level Station: 45+

http://www.hydrology.gov.np
Weather Information for Flood Forecast

Flood Forecasting Using Hydrological Model
DHM-Lancaster University-Practical Action-Zurich collaboration

- The probabilistic model is being run in 6 major river basins
- 5 years of real time hourly data used for the calibration and validation of the model

Flood Forecasting Using Hydrological Model
DHM-ICIMOD Collaboration

Mike 11 model is being run in 5 river basins using GFS rainfall forecast and WRF Rainfall forecast.
Data Assimilation part is also included in the model

Flood Forecasting Using Hydrological Model
DHM-RIMES collaboration

Calibration, validation, Model Error Correction and testing is completed in 3 major river basins: Karnali, Babai and Narayani

Preparing for Operational Flood Forecast using Delft- FEWS Platform

Flood Forecasting Using Hydrological Model
GLOFAS Outlook

8 Reporting points in Nepal

Data Transmission and Communication
Flood Early Warning Dissemination

Web Based Telemetry: Rainfall Watch

Web Based Telemetry: River Watch

Note: warning level for rainfall <3mm in 1 hr, >30mm in 3 hrs, >100mm in 6 hrs, >120mm in 12 hrs, >140mm in 24 hrs - potential landslide in steep slopes and high flood in local areas.
DHM-NCELL-NTC Collaboration for Mass SMS

Rainfall Watch, 26 July 2016

14 rainfall stations recorded more than danger level rainfall at almost same time

River Watch 26 July 2016

Challenges in FEWS

• Less Priority!!
• Human Resources deficiency
• Coordination among stakeholders
• Hydro-met Monitoring in remote Area
• Financial Constraint!!
• Forecast Uncertainty
Future Plans
3 Doppler Weather Radar within 2 years
(Udaypur, Palpa and Surkhet)

• End to End Flood Early Warning System in Koshi and West Rapti
• Development of High Resolution Digital Elevation Model in Koshi

Way Forward

• Identification of flood zones and development of flood risk maps
• Identifying/Establishing Monitoring Stations in Transboundary Rivers
• Re-evaluation of danger and warning levels
• Development of real-time data management system
• Development of flood forecasting models
• Development of impact assessment tools and impact based forecasting-Risk Based Warning
• Development of decision support systems for various application
• Strengthening bilateral cooperation with China and India to reduce the impact of flood and inundation

Thank You!
**Forecast Based Financing (FbF)**

How can FbF strengthen Flood Preparedness & Early Action in Nepal?

- *December 23, 2016*

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**Current Status of Disaster Management in Nepal**

- Response and Recovery Focussed Actions
- Unaware of Available Forecast Tools and difficulties in Interpreting Forecast Information
- Early actions seemed to be confined to table talks, revisiting of DPRP, NDRF and other contingency plans, resource prepositioning and potential risk mapping
- Reaching to the vulnerable only during and after the disasters
- Huge resource and investments in post disaster phase, inadequate funding in preparedness

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**Current Status**

- We know key areas vulnerable to floods (hazard and risk maps)
- We have Forecasts (Rainfall & River Discharge/Levels)

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<tr>
<th>Forecasts</th>
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<th>Indicators</th>
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<tr>
<td>Seasonal</td>
<td>Months</td>
<td>Rainfall</td>
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<tr>
<td>GLOFAS</td>
<td>Two weeks</td>
<td>River Discharge</td>
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<td>RIMES-NWP</td>
<td>3 Days</td>
<td>Rainfall</td>
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<tr>
<td>Probabilistic Model</td>
<td>Few Hours</td>
<td>River Level</td>
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<td>1-3 Days</td>
<td>Rainfall</td>
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<tr>
<td>Rainfall and River Watch</td>
<td>Real Time Observation</td>
<td>Accumulated Rainfall Water Level</td>
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*If we know the likelihood of event, why need to wait till it happens? Why not to incorporate Forecasts in Preparedness Actions*

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**What We Can Do!**

Identify Key Areas of Intervention!!

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**Opportunities for Nepal in Flood Preparedness**

- Define the threshold for a specific hazard
- Identify the critical character, mapping vulnerability and the technical model, in the area of intervention
- Correlate institutional capacity to risk
- Use of national and international tools
- Taking into consideration the probability, intensity and time prior to the occurrence of an event

Such as:
- Awareness raising campaign on hygiene or safe drinking water
- Strengthening of houses

---

**FBF TIMELINE**
Thank You
Role of Ministry of Home Affairs in Disaster Management and NEOC Operating Procedure

Daya Ram Shrestha
Section Officer
National Emergency Operation Center, Ministry of Home Affairs

Cont...DPR Initiatives
- Guidance Note for preparing the Disaster Preparedness Plan;
- 83 Open Spaces and more evacuation site;
- 45 District Level DEOCs, 5 Regional REOCs;
- Rubble Removal plan - ongoing by MOFALD
- Prioritization and use of 83 Open Spaces
- Dead Body Management Guidelines;
- Disaster Management Training Centre at APF;
- DRR Focal Points in different Ministries and Agencies;
- Ten Clusters and one Early Recovery network have prepared Contingency Plan;

Policy Initiations
- National Strategy on Disaster Risk Management 2009;
- GoN and UN has jointly signed an Model Agreement (Customs Procedures);
- Risk Reduction/Flagship Programs - Five Flagships;
Guidance Note
Disaster Preparedness and Response Planning
2011

Institutional Framework (in line with 1982 Act)

Cabinet
- Policy, Budget and Emergency Declaration

Central Natural Disaster Relief Committee
- (chaired by Home Minister)
- Coordination, Response, Relief, Search

Regional Natural Disaster Relief Committee
- (chaired by Regional Administrator)
- Coordination, Response, Relief

District Disaster Relief Committee
- (chaired by Chief District Officer)
- Execution, Rescue & Relief, Data collection

Emergency Response Mechanism (GoN)

UN Resident / Humanitarian Coordinator
- UNDAC / USAR

Clusters Activated
- INGOs & others

Government Line Agencies
- GOA Declares Disaster
- NEP
- CNERC meeting held
- NDMA / NEOC

Search and Rescue (CDO, DDRC)

Situation Analysis (GO, GOSE)
- (Search, Rescue, Immediate Relief)

Rescue and Treatment Sub-Committee
- (chaired by Minister of Health and Population)

Supply, Support and Rehabilitation Sub-Committee
- (chaired by Minister of PP&W)

Regional EOC
- NEP
- NEOC
- District EOC

National EOC
- NEP
- NEOC
- District EOC

Central Natural Disaster Relief Fund
Prime Minister Natural Disaster Relief Fund

Key Challenges
1. Technical and financial capacity to successfully implement plans;
2. Difficult terrain or area and weak logistics resulting in delayed response;
3. Management of warehouses and Limited stockpiling;
4. Trained and consolidated Search and Rescue Team;
5. Communication equipment and infrastructures;
6. Implementation of National Building Codes;
7. Management of evacuation sites, open space;
8. Limited Fire Services;
9. Implementation of NSDRM;
10. Progress accordingly, HFA Priority

Gorkha Earthquake 2015
- Higher Government Authority Activation

Emergency Declaration
Household-776895+298998 death-8959, injured-22302

Appeal for International Assistance
International Search and Rescue Teams
Activation of Cluster
Relief Distribution
Relief Facilitation
Monetary Relief to Victims
Higher Government Authority Activation

Meeting of CNDRC after two hours, at 14.00 hrs, made several policy decisions including:

- Accelerate SAR and Relief operations timely and effectively
- Standby Medical free treatment
- Activation of all level government and non-government agencies
- Several consecutive CNDRC meetings were held on 27 Apr, 30 Apr, 3 May, 10 May and 12 May.

Cabinet Decision after four hours, at 16.00, made several policy decisions including:

- Emergency declared at severely damaged 14 districts
- International appeal for effective search, rescue and relief
- Expedite the Prime Minister Relief Fund
- Endorse the CNDRC Decisions

Secretaries Meeting, led by Chief Secretary, activate all level government machinery

Establishment of Central Command Post, headed by Home Secretary

Possible ways for improvements

- Develop standard operating procedures in customs clearance during disaster
- Centralized data entry/collection for victim identification and relief distribution
- Effective co-ordination for information collection from locals, civil society, crowdsourcing
- Better co-ordination with NGO/INGOs in relief distribution to avoid duplication

The way forward

- Mainstreaming DRR into development planning and implementation process
- Budget code for disaster management, both at central and local level
- National Search and Rescue Capacity, both at central and local level
- Prepositioning for effective response
- Sufficient storage for relief distribution, food and non-food items
- Reconstruction and recovery, build back better

Specific Ministries are assigned for the procurement of relief items.

- Tarps
- Food items
- Dry Food
- Health related equipment
- Import of relief items
- Management of heavy equipment
- Delivery of Food/NFI, medicine
- medicine
- shelter coordination

Thanks
**Standard Operating Procedures (SOP)**

**Forecast Based Financing (FbF) & Emergency Preparedness**

**What is SOP**

- Comprehensive and Guiding Document for all stakeholders (Strategic & Operational)
- Outlines precise executive actions in response to events

**SOP in context of FbF**

- Early Action Protocols linked to Response
- Scientifically based and objective
- Prior decision making process
- Linked to timeline & resources
- Linked to finance and communication

**Process of SOP Formulation**

- Understanding the Context
- Identify gaps & areas of improvement
- Define areas of work-risk, geographic area & specific action
- Develop the plan & implement
- Test through simulation exercise, validate & institutionalization

**SOP Framework for Forecast Based Financing [FbF]**

- Forecast Information
- Short, Medium, Seasonal
- Thresholds & Trigger Level (Probability/Intensity of Hazard)
- Preparedness Actions
- Stakeholder Roles & Responsibilities
- Timeline of Implications
- National & International Capacities
- Scenario & Classification
- Hazard Impact, Lead Time & Forecast Reliability
- Funding & Policy

**Key Considerations in SOP for FbF**

- Forecasts to use
- Threshold Development
- Linkage to Fund Disbursement
- Defining Activities beforehand
- Monitoring & Evaluation Aspect (Feedback Loop)
- Dynamic-Periodic Update
Group Discussion

Guiding Questions

December 23, 2016

Topic 1: Integrating FbF in Current Preparedness

- What are the current government instruments and procedures for disaster preparedness and early action in place?
- How can FbF be incorporated and integrated in existing emergency preparedness and response plans that anticipate future disaster risks? What are the challenges and opportunities while integrating FbF into existing plans?
- What level of detailed information is needed in existing forecast information? Does our current forecasting and early warning system address to those information needs?
- How can we translate and communicate the scientific forecasts and predictions into early actions and preparedness?
- Should forecasts/warnings information be based exclusively on hazard or should it contain impact assessment as well? Will FbF require an impact based early warning system?

Topic 2: Formulating SOP (Threshold Triggers, Preparedness Actions and Roles & Responsibilities)

- What timelines & hazard indicators need to be considered for flood preparedness and early actions in saving life, assets, crops and livelihoods?
- How can we set the thresholds (intensity and probability)? What is the responsibility of DNM in early warning processes and who shall disseminate the information to users?
- What are the corresponding early actions for each indicator at different timelines of forecasts?
- How do we address uncertainty of weather and flood forecasts in SOP? How can the likely costs incurred due to probable acting in vain or the false alarms made justifiable?
- How can we involve wider stakeholders (including communities) in SOP Development? Should we adopt Top down or Bottom up approaches?
- How can we incorporate Monitoring & Evaluation (MiE) in SOP? How to ensure there is effective feedback loop in SOP for its periodic update?

Topic 3: Policy & Financing for Institutionalizing FbF

- Is it necessary that NDMA and DPRPs be revisited to incorporate early preparedness actions based on weather forecasts? If yes, when and how? If not, what should be done?
- Can we make the contingency plans forward looking- anticipatory of flood events based on weather and flood forecast? Should we institutionalize participation of DNM and forecast information providers in contingency plan development process?
- What aspects are pertinent to integrate new partners (such as private enterprises, insurance companies etc.) and advocate for FbF?
- How can FbF be integrated into longer term DRR and resilience building activities of national and local partner organizations?
- What are the preparations required to advocate to the government and development partners to make sure that preparedness funds are available based on weather and flood forecasts?