

Study on Existing Early Warning System & Informal Practices of Communities

**In the context of Flood Risk Management
Bahraich District of Uttar Pradesh, India**



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“People centered Early Warning System (EWS) empower communities to prepare for and confront the power of natural hazards. How ever the efficiency of such system is to be measured in terms of lives saved and reduction in losses, which is directly related to the execution of an anticipated response by the people once a warning, is issued. This paper addresses the existing early warning system of government of Utter Pradesh and community traditional EWS practices in Behraich district, and what needs to be done to transform them into efficient, people centred system.”

The real time flood forecasting is one of the most effective non- structural measures for flood management. For formulating the flood forecast in the real time, the observed meteorological and flow data are transmitted to the forecasting station through the different means of data communication which include telephone, wireless and network of telemetry stations etc. The collected meteorological and flow data in real time are then used into the calibrated & validated real time flood forecasting model to forecast the flood flow and corresponding water levels for different lead periods varying from few hours to few days depending on the size of catchments and purpose of the forecast. The structure of the model should be simple and it should not have excessive input requirements, but at the same time the forecasted flood must be as accurate as possible.

1. Introduction:

Some time immemorial, floods have been responsible for loss of crops and valuable property and untold human misery in the world, India has been no exception. An area of more than 40 million ha. in India has been identified as flood prone. India, which is traversed by a large number of river systems, experiences seasonal floods. It has been the experience that floods occur almost every year in one part or the other of the country. Flood occurs due to natural as well as man made causes. Major causes of floods in India include intense precipitation, inadequate capacity within riverbanks to contain high flows, and silting of riverbeds. For minimizing the losses due to floods, various flood control measures are adopted. The flood control measures -which should more correctly be termed as “Flood Management”.

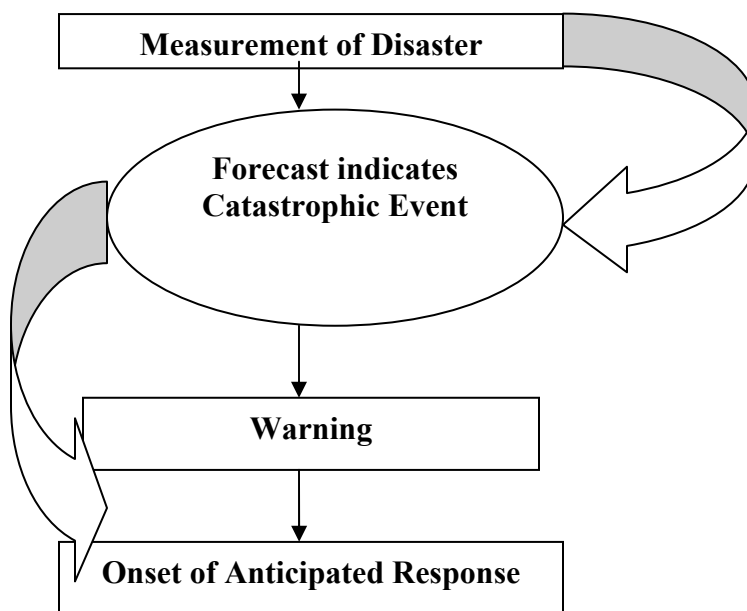
Real time flood forecasting systems are formulated for issuing the flood warning in real time in order to prepare the evacuation plan during the flood. Experience has shown that loss of human life and property etc. can be reduced to a considerable extent by giving reliable advance information about the coming floods. The people could be moved to safer places in an organized manner as soon as the flood warnings are received. Valuable moveable property and cattle could be saved by transferring them to places of safety. The effectiveness of real time flood forecasting systems in reducing flood damage would depend upon how accurately the estimation of future stages or flow of incoming flood and its time sequence at selected points along the river could be predicted. The rivers of alluvial plain exhibit the meandering, shifting of the course and unstable cross sections due to the problem of sediment transport. These hydraulic changes in the river behavior complicate the issue of adopting the suitable measures for flood management.

2. Need for Flood Forecasting:

Warning of the approaching floods provides sufficient time for the authorities and communities to act upon

- To evacuate the affected people to the safer places.
- To make an intense patrolling of the flood protection works such as embankments so as to save them from breaches, failures, etc.
- To regulate the floods through the barrages and reservoirs, so that the safety of these structures can be taken care of against the higher return period floods.
- To operate the multi-purpose reservoirs in such a way that an encroachment into the power and water conservation storage can be made to control the incoming flood.
- To operate the city drains (out falling into the river) to prevent bank flow and flooding of the areas drained by them.

2.1 Three Phases of Early Warning Systems:



2.2 Four Elements of People centered Early Warning System:

A complete and effective early warning system comprises four elements, spanning knowledge of the risks faced through to preparedness to act on early warning. Failure in any one part can mean failure of the whole system. The intervention in EWS would be success by following these four elements.

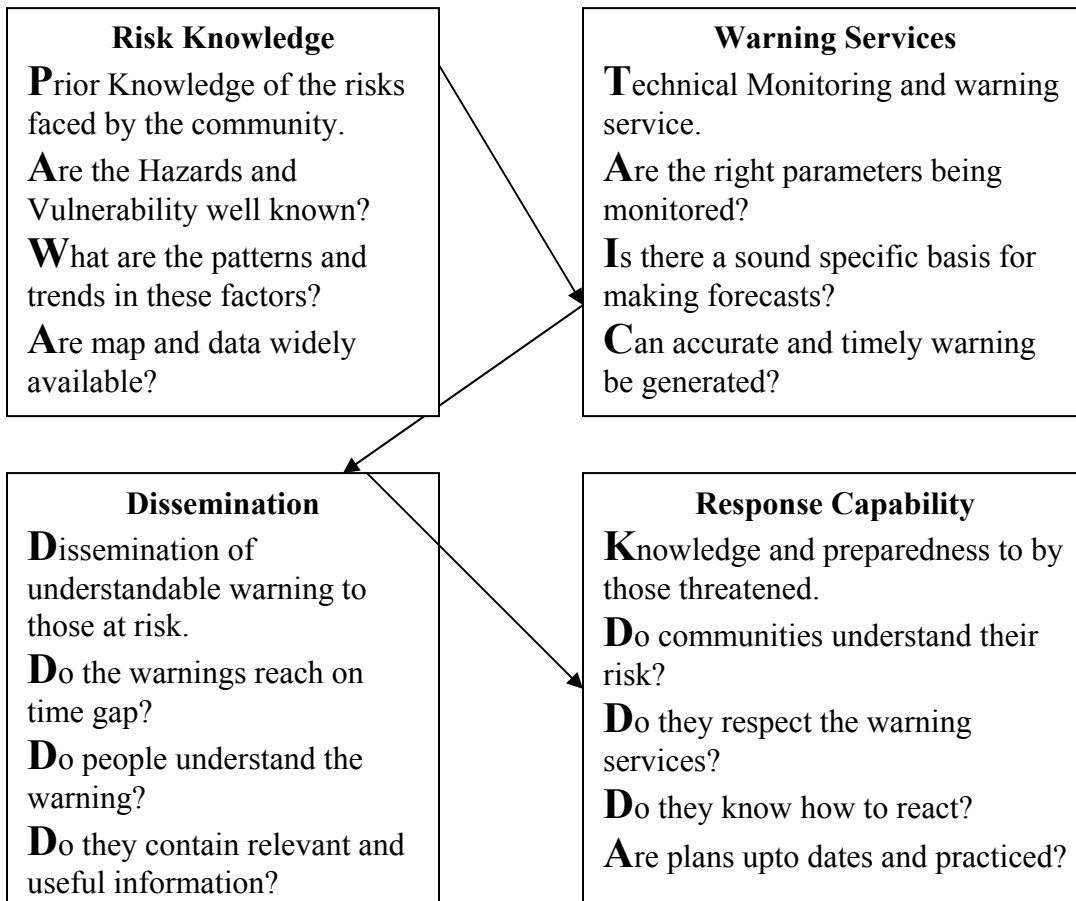


Diagram-2

3.0 About BAHRAICH:



Bahraich got its name from the Arabic Word 'bahr' which means a large body of water. Situated on the bank of river Ghaghra, it was named Bahraich. Although a small town, Bahraich happens to be a very old town of India. It was inhabited around the 10th century.

Demography: As of 2001 India census, Bahraich had a population of 168,376. Males constitute 53 percent of the population and females 47 percent.

At least 15 percent of the population is under 6 years of age.

Geography: District Bahraich is situated in North eastern part of Devipatan Division. It is situated between the 28.24 and 27.4 latitude and 81.65 to 81.3 eastern longitudes. According to census of 1991, the area of the district is 4,696.8 sq km which is 31.99 percent of the Devipatan Division. District Bahraich has an international border with Nepal on the northern part. Districts Barabanki and Sitapur are in south, Khiri in west, and Gonda and Sravasti are in eastern side of the district Bahraich. In the northern part of the district is the Tarai region which is covered by the dense natural forest. Chakia, Sujauli, Nishangara, Mihinpurwa, Bichia and Baghauri are the main forest areas of the district. Sarju and Ghaghra are the major rivers of the district.

Cause of Flooding:

Uttar Pradesh every year reels under the impact of floods with the water released from the dams on the rivers in Nepal being cited as the main cause of flooding of large areas on this side of the border. With the Sharda, Ghagra, Rapti, Budhi Rapti and Gandak in spate, several villages in Lakhimpur Kheri, Bahraich, Balrampur, Maharjganj and Kushinagar districts of UP have been marooned.

The following section discusses the meeting held in the villages with the communities and the government officials of local district

administration for gathering information about the existing EWS in the district and their suggestions.

4.0 Traditional Practices of EW by the Community: Behraich District

Gram Panchayats - Matrepur, Bhagaiya, Chulambha, Kohali and Kandauli of Kaiserganj Block experience frequent flash flood due to Ghagra River, usually with insufficient lead time to affect adequate mitigate response. Since 80 years, 4 major floods have occurred in the same GP of Kasierganj Block (1946, 1984, 2008 and 2009). More than 12000 thousand people are annually affected by flooding fatalities and economic losses.

As flooding continues to affect a greater portion of the growing population in Kaiserganj, communities with persistent flood problems or with risk of great losses, are continually seeking methods to mitigate flood losses. Their traditional early warning systems are an attractive solution because of their low cost of operation and because they can enhance the operation of other flood mitigation methods. Since our intervention in the target area, we had limited scope to do detail analyses of the outcomes emerged through their traditional early warning practices this is probably the first findings of this type, so more analyses have to be carried out to systematize the findings.

4.1 Traditional believes and observations as flood EW:

- I. The major factor which community considers being the most important indicator of flash flood is the continuous rise of water level in the water channel called *Bhakosa Nala*, which flows near to their hamlets as its one end is connected to Ghagar River.
- II. When the Bhakosa Nala over flows, the water starts entering nearby hamlets. People fix Bamboo stick (as a scale to measure water level) at a distant place from their hamlet and vigil the Bamboo stick time to time. This way they are able to find:
 - i. Water level
 - ii. Volume of water
 - iii. Expected time of entering flood water

- III. Getting time to time updates of water level in the Ghagra River from the people residing near the river, who usually visit these floods affected areas due to their family bonding.
- IV. Some of the active citizens of the respective hamlets and Pradhan collect information from Block office and daily newspapers and disseminate the information through loud speaker installed at temple and mosque and through mobile loud speakers.
- V. Radio plays an important role, but people feel that the flood forecasting messages broadcasted by local AIR station are more general and have little information for these areas; to make the information more vivid and informative sequential information of the river situation at upstream with adequate information of the embankment should be included.
- VI. People have their own calculation that if it rains continuously for three to four days in the adjacent areas and in the Nepal region (come to know through radio transmission), water will reach the low lying areas within 12 to 24 hours.
- VII. Even important festival like Nag Panchmi, Raksha Bandhan, Janmashmi, tija act as a time to experience a flash flood. This is what they have experienced in past years, so along with festival preparation they also plan for flood mitigation.

4.2 Time based Strategies to mitigate disaster:

Traditionally, it is not always clear when disaster preparedness and response ends and prevention, mitigation and recovery begin. There is no distinct point at which these phases change from one to the other, as there is a lot of overlapping depending on the intensity of the disaster.

Under Bahraich District 7 Blocks including Kaiserganj Block are the worst flood affected areas, due to their location along the Ghagra River, and their landscape consists of plains and lowlands. Annual rainy season commences in July, with flooding occurring between August to September. During the monsoon season, Kaiserganj experiences flash flood usually after heavy rainfall in Nepal (bordering Bahraich District), it turns in to be a curse disaster if it rains heavily in Bahraich District. The Gram Panchayats - Matrepur, Bhagaiya, Chulambha, Kohali and Kandauli of Kaiserganj Block are regularly hit by flash flooding. The major factor which community considers being the most important indicator of flash flood is the water channel called *Bhakosa Nala*, which flows through these GPs and its one

end is connected to Ghagar River. Most of the agricultural land in the village is surrounded by embankment, which cause the land to become waterlogged during heavy rains. The people residing in these floods prone areas have their own time based strategies to mitigate the disaster. At times a slight change in the predictability of flood can seriously disrupt livelihoods and food security.

In the month of July, the vulnerable community stands to begin their preparation according to the past experiences of flash flood. At the time of flood, food security is the major concern for villagers, so they start with raising the platform (2-3 ft) of the food grain containers in their houses and raised structures (for e.g. bamboo) are built to keep dry wood pieces, *Gobar kanda* as fuel and for keeping food grain for animals. After a heavy rain in the region, the second thing they do is to decor their boats which is usually kept in Bhakosal nala as a preparation for rescue in case of major flood. During the period of heavy rain, hamlets and agriculture fields becomes waterlogged for one to two months. Almost half of the villagers (mostly men) move towards embankment to settle with their animals, which they say is the safer place and where they get relief items distributed during flood. And the people (mostly women and old aged) who are staying in the hamlet live either on the roof of the house (in case of pakka house) or on the raised platforms.

Livelihood

Agriculture is the main occupation in these GPs. During monsoon season their main cultivation crop is rice which usually gets destroyed due to flash flood. As a part of mitigation method, they cultivate rice which grows longer in height (up to 4-5 ft), so that during flood if water level don't rise more than 4 ft their crop is safe. And even in some cases, people sell their cattle before monsoon so that risk of loss can be decreased, if their cattle die due to some disease during flood. In addition to farming, residents of these GPs (especially landless) are engaged in daily wages labour like hair-cutting, cycle-repairing etc.

Migration is a popular way of adapting to floods in the region. In the last several years, the search for jobs outside of the villages has increased significantly due to consecutive flash floods.

Health

One community health centre is available at the block level which does function comparatively well and people are satisfied with its services. This centre is distant from the villages, however, in an emergency, no good quality services are available locally and the situation gets worse during flood. The only facility available are the free health camps organized before, during and post flood. At hamlet level people have identified some untrained doctors and ojha, whom they give more priority in any emergency situation due to their availability.

The strategy involves the participation of local people, particularly vulnerable communities, who actively work to identify causes of vulnerability and actions to mitigate the impact of vulnerability from disasters. In so many years, people have inculcated in their regular practices to reduce the effect of disaster like

- Apart from plinth rising of their own houses, they are now in practice to jointly raise the height of the whole hamlet.
- Raised Hand pumps are now installed in the hamlets. During flood hand pumps installed in the hamlets get submerged in the water, due to which they have to travel far to get drinking water.
- Identified places other side of the embankment to be able to settle down with their animals to reduce risk of loss during flood.

Communities were dependant on their believes and act upon these bias once the disaster approaches. The mitigation strategies were different from time to time and frequency of flood and volume of water. The strategies adopted due to unavailability of any communication channels or resources. The main purpose of adopting these strategies to evacuate early to a safer [place and to save lives, property and all their domestic animals.

5.0. Interaction with Communities/Villagers:

As per importance to the study, the views of the communities on the effectiveness of the existing early warning are vital. So meeting was conducted in Bich Purwa hamlet of Matrepur Panchayat and Chamaran Purwa of Kandauli Panchayat. Villagers kept saying on the ineffectiveness of the government machineries in disseminating early warning regarding flood. So their losses in property and lives increase. They advocate for an improved EWS, so that they would be informed early to evacuate to a safer place. They were insisting the SSK team to discuss this matter with the concerned government officials who are responsible for dissemination of early warning.

5.1 Findings:

- They confirmed that they have been vulnerable to natural disaster which is Floods since the last 50 years.
- Frequent flood devastated everything of their life.
- No prior information they received about coming risk.
- Government machineries came to the village after flood water recedes.
- Early information about flood disseminated by SSK staffs.
- The Village has its own coping mechanisms-which is they receive information from their own sources
- They are interested to know the volume of water rather flood timing.
- They are all well informed about the causes of flooding.
- Communities were advocating for a useful EWS in every village.
- They were interested in EWS with their participation.

6.0. Interaction with Local Administration:

As per the prime requirement for the study, meeting with different local government officials, who plays vital role in dissemination of early warning? The meeting with them was fixed. The meeting was held with two officials, i) chief of DDMC, Bahraich and ii) BDO of Kaiserganj. The following findings and suggestions came out from this meeting as the status and working of existing EWS in Behraich district. The process of dissemination of EW started from the gate keeper of these barrages to the communities at risk.

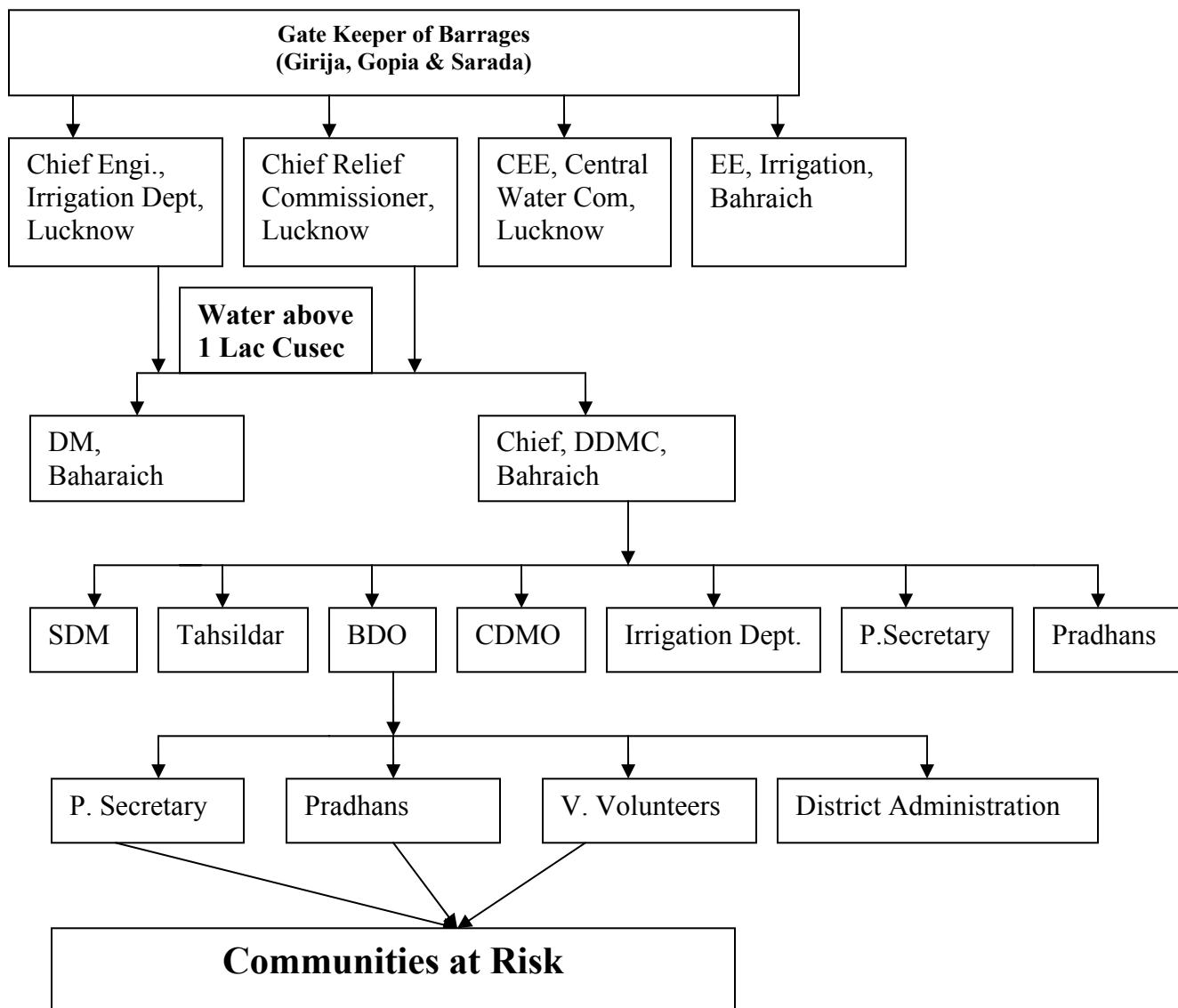


Diagram-3

CEE- Chief Executive Engineer
EE- Executive Engineer
DDMC- District Disaster Management Cell
DM-District Magistrate
SDM- Sub District Magistrate
BDO-Block Development Officer
CDMO- Chief District Medical Officer
P- Panchayat
V- Village

The Hierarchy followed by the district administration at the time of disaster for disseminating early warning.

6.1 Findings and Comments of the officials:

- The hierarchy followed by DDMC to disseminate early warning is framed by state administration 25 years ago.
- The information disseminate firstly by the gate keeper of Girija,Gopia,Sarad Barrage.
- Gate keeper informs the, State administration and irrigation department.
- The responsibility lies on the DDMC to disseminate information from district level to Panchayat level.
- DDMC provide information to all SDM,Tahsildar,BDO,CDMO, irrigation dept., Panchayat secretary, pradhans, and some villagers.
- DDMC also alert to the volunteers, flood post (Lekhpal)
- They also act according as directed by state authority at the time of flood.
- Officials admitted that the villagers don't get right time information.
- Gaps lies in the hierarchy as DDMC has limited communication numbers of pradhans.
- Change of mobile numbers creates problem in disseminating information.
- Time gap for evacuation to safer place is about 24 hrs.
- Officials advocated for review and needful changes in existing early warning system.

- Algin Bridge also monitored but the water level information received by DDMC from state capital.
- Information dissemination conducted as a duty not as a responsibility.
- DDMC does not collect information on the usefulness of the information disseminated.
- Villagers are made responsible for the casualty not the administration.
- As per BDO 12hrs to 24 hrs is sufficient to evacuate to a safer place.
- Changing of phone numbers of pradhans and some villagers.

Gaps:

- Gate keeper of the barrage didn't inform regularly to the District Magistrate
- DM waits for the instruction from the State Administration act on.
- District administration knows the gap but stays silent.
- Even order from the state to district takes 12 hours.
- Block officials are not equipped with high communication technology.
- Villagers are not timely informed

Conclusions:

There is a need for significant improvement of the real time flood forecasting systems in Bahraich. Efficient automatic communication systems are required to be established for transmitting the data in real time. The information about the flood has to be disseminated well in advance to the people likely to be affected so that an emergency evacuation plan may be prepared and properly implemented. The improved and proper managed EWS can save lives, property of the community in this part of India. So Bahraich needs an improved EWS for the community response. The following suggestions came out in this study to follow.

- Early Warning can empower communities threatened by impending disasters
- Prime emphasis on Community based Early Warning system to be developed from block level to the community level.
- Early Warning Task Force members should be trained and encouraged to liaison with the government agencies.

- Efforts to orient every stakeholder involved in the process of early warning dissemination process.
- Warning must be given in good time, be precise and prompt, and should convey reliable information.
- Education, telecommunication systems, multi-disciplinary approaches and networking with other organizations must be strengthened in order to enhance early warning efforts.
- A new-generation flood forecasting system shall be developed, which is general, comprehensive, user-friendly.
- Community should be taken into confidence at the time of installing any people centered early warning.

SSK Intervention on Early Warning System

- ✚ Consultative study on technical solution on Early Warning System is going on.
- ✚ New simple, collective EWS will be developed with community participation.
- ✚ Capacity building of government officials on EWS
- ✚ Interface meeting of the community and government officials will be conducted.
- ✚ Future plan on EWS in the project area after consultative study and suggestion from the communities

-----**End**-----

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