



Harnessing the Indigenous Knowledge base for preparedness development and management of natural disasters in hill ecosystem of West Bengal.

KEYWORDS

Disaster, prediction, preparedness, management, indigenous knowledge

A. K. Bandyopadhyay

Professor, Department of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal

K. Pradhan

Assistant Professor, Department of Agricultural Extension, Uttar Banga Krishi Viswavidyalaya, Pundibari, Coochbehar, West Bengal-736165, India

Soma Pradhan

M.Sc (Ag) in Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal

Zigme Yolmo

[M.Sc(Ag) in Agricultural Extension, Uttar Banga Krishi Viswavidyalaya, Pundibari, Coochbehar, West Bengal-736165, India

Rema Das

M.Sc(Ag) in Agricultural Extension, Uttar Banga Krishi Viswavidyalaya, Pundibari, Coochbehar, West Bengal-736165, India

ABSTRACT

In the changing climate scenario, the major victims of the disaster are the pro poor people of the society. Consequently, the traditional people had developed their own prediction and preparedness strategy to combat the disaster as a whole. The present paper was started its journey to explore the meander of local peoples' knowledge in hill ecosystem on disaster prediction and preparedness which has immense implication in the present socio-cultural milieu to combat the ill effects of climate change. The study was conducted at three small villages of Darjeeling district in West Bengal. The information was collected with the help of semi structured interview schedule through participatory methods like key informant method and focus group discussion method. The identified disasters in hill ecosystem are landslide, heavy rain, heavy storm, earthquake, unwanted event in household and sudden rise in day temperature. The different insects and animals mobility implies the prediction of natural disasters like landslide, heavy rain, storm, incidents about to occur at home, rise of temperature etc. The management strategies like plantation of trees, use of old tin roofs, triangular shaped roofs etc. are the key indigenous management strategy to overcome the disasters.

INTRODUCTION

In the changing climate scenario natural disaster is the inevitable phenomenon and over the years traditional local communities have continued to rely heavily on indigenous knowledge to deal with natural disasters. The communities, particularly those in disaster-prone areas, have generated a vast body of indigenous knowledge on disaster prevention and mitigation, early warning, preparedness and response, and post-disaster recovery. The meander of knowledge includes technologies, know how, experiences, observations, beliefs and rituals. With the advent of modern technology disseminations and with their declared hegemony some of the local knowledge bases have gone extinct or dwindled down. So, there is an urgent need for application and integration of indigenous knowledge for the sustainable development of the local people by developing management strategies to overcome the natural disaster discourse. Sometimes the traditional knowledge or indigenous technical knowledge helps the local people to become more resilient in responding to major natural disturbances in India. It provides insights into the traditional, age old practices of prediction and management of natural disasters. India is vulnerable in varying degrees to a large number of natural as well as human caused disaster hazards (Sethi et al, 2011). Indigenous knowledge is the knowledge handed down from one generation to another through oral and written communication that suggests a sense of communal ownership. It is the systematic body of knowledge acquired by the local people through the accumulation of experience, informal experiment and intimate understanding of local conditions providing a productive context for strategies designed to help the communities. Thus peo-

ple's knowledge is more detailed than that of others who have not had the same experiences or do not have the same skills in observations and analysis (Sankaran, 2005). The tribal people serves as repository of such accumulated knowledge passed on by word of mouth from one generation to another and thus permanently record their experience and knowledge in a form usually inaccessible to the outsiders (Deshpandey, 2000). The present journey was started along the meander of people's knowledge and wisdom and local practices to explore their efficacy and endurance over threats of natural disaster hence in the entire process the participatory approach was followed to identify and document these utilitarian and pursuits of disaster prediction, preparedness and management in some parts of hill ecosystem of West Bengal in India.

METHODOLOGY

The study was conducted at three small villages namely Aloorbari Jungle Busty, Rai Gaon, and Aloorbari Gumba Gaon of Darjeeling district in West Bengal due to the presence of ethnic tribal people in this area under hill ecosystem with an aim to provide a detailed insight into the existing prediction and management strategies of natural disaster in hill ecosystem of West Bengal. The information was collected with the help of semi structured interview schedule through participatory methods like key informant method and focus group discussion method. The key informants were mostly age old men and women. The three mixed focus groups with twenty members were prepared for each village. For the selection of focus group members the snowball sampling procedure was followed. The collected information was processed and documented to

get an idea about the prediction of the disaster and the preparedness to combat the disaster with the help of traditionally transmitted indigenous knowledge in hill ecosystem.

RESULTS AND DISCUSSION

The prediction of different disasters in hill ecosystem like earthquake, landslide, heavy rain, Hill storm, sudden rise in temperature through indigenous knowledge base of tribal people may help in order to develop some approaches to mitigate the sudden losses in agriculture and allied sectors for their sustainable livelihood.

Earth quake

India's high earthquake risk and vulnerability is evident from the fact that about 59% of India's land area could face moderate to severe earthquakes. Earthquake measuring 5.0 on Richter scale hit Sikkim on 3rd October, 2013. Tremors also were felt in Darjeeling, West Bengal.

Prediction

Unusual barking (unusual sounds and restlessness) of street dogs in groups is the most probable prediction for the onset of earthquake in the study area.

Preparedness

The people are taking shelter at the corner of the house or under the wooden bed or coming outside the house.

Management

The people are giving signal with the help of whistle or horn which is used as the "Early Warning System" by the community for protective action (emergency shelter, high ground) after receiving the alert.

Heavy rain

About 75% of the total rainfall in India is concentrated over a monsoon season of about four months (June-September). The heavy rain during this period is responsible for uprooting houses, disrupting livelihoods and damaging infrastructure (Fig. 1). The fragility of the settlements in the Himalayan mountain ranges is a continuing source of concern because they are highly vulnerable to earthquakes, landslides, floods and avalanches.

Prediction

The spiders mostly weave large webs inside the houses to trap the insects which gather inside to protect themselves from rain. The croaking of frogs is also indication of heavy rain. Birds flocking away during rain indicate that the rain will continue.

Preparedness

Heavy amount of grasses are cut and kept for cattle feed. Poultry houses are covered with polythene sheets and old tin roofs. The community usually stores fermented food products to consume during rainy seasons. They love to eat boiled/fried corns as a part of their diet during heavy rain.

Management

During heavy rainfall the community members mostly make temporary drainage channels to drain out the excess rain water so as to avoid soil erosion and water logging.

Landslide

On 24th May, 2009 a cyclonic storm named as Aila occurred in the southern part of West Bengal, the effect

of which was reverberated in the Darjeeling Hills from 25th to 27th May, 2009 (Darjeeling Times, 2009). A rainfall amounting 465 mm within 48 hours from 26th to 27th May, which usually occurs in 12 days in the rainiest month i.e. in the month of July, was the triggering factor of several devastating landslides tolling 7 lives and huge property (Govt. of W.B., 2009) in the Darjeeling town. The mean daily rainfall of the Darjeeling town from 10 years rainfall data for the month of July being 38.305 mm clearly demonstrates that Aila rainstorm produced 6 days' rain in one day or 24 hours (which was 232.5 mm). In the entire Darjeeling hills 40 major landslides occurred claiming 27 lives beyond 2 persons who are still untraced (Darjeeling Times, 2009; Govt. of W. B., 2009). The total damage of dwelling houses caused by this storm induced landslides was Rs 888.67 million, approximately 542.989 hectares of agricultural lands have been reported to be damaged (Fig.2). All major 5 roads connecting Darjeeling to Siliguri and Kalimpong faced 15 to 20 landslides in each stretch. (Govt. of W. B., 2009).

Prediction

Ants, rats and other reptiles shifting to a safer place are indication for landslides. Heavy rain during the night and sunshine during the day for several days may also result to landslides.

Preparedness

When the community feels that landslide may occur within some days, then they normally move to a neighbouring village community hall for safety.

Management

They mostly plant trees with good soil holding capacity at the landslide prone areas to prevent soil erosion. The community usually plants *Erythrina arborescens* Roxb. commonly known as Phaledo, , *Alnus nepalensis* commonly known as Utis etc. at the affected areas because they grow very quickly.

Hill Storm

The storm of the hill areas causes a severe destruction of infrastructures and disrupting livelihoods in the areas (Fig. 3).

Prediction

The colour of the sky changes. Flocking and chirping of birds and the barking of dogs in the nearby areas indicates the coming of storm.

Preparedness

Mostly the houses built in this community have a basement with a small opening at the upper floor which is also used for storing goods. During storms these rooms can be used as a protective shelter. The roofs are also made in triangular shapes to protect the house from strong winds.

Management

The community members mostly cut the side branches of the trees nearby the houses and roads so as to prevent the damages that could be caused by the fallen branches during storms.

Sudden uneven incidents at home

Prediction

Rearing of pigeon is a common practice of the community. Shifting of pigeon to a different place and strange attitudes of the dogs (crying instead of barking) are indications for some incidents about to occur at home. It is also

said that whenever something bad is about to happen in the village then, some of the community members often see strange dreams.

Preparedness and Management

During such cases the people mostly consult the Jhankris (traditional healers), Bauns (pandits) or the Monks accordingly and carry out some religious practices and rituals which could be helpful as believed by the community members.

Sudden rise in temperature

Prediction

Extinction of certain species of plants, migration of certain species of birds and animals from that region, unseasonal maturing of vegetables and fruits, unfruitfulness of some winter season fruits, occurrence of new species of birds and insects such as mosquitoes which was not found earlier in that area. The people also forecast the temperature by looking at the snowfall in the mountain ranges which is clearly visible from the area (Fig. 4). Lower rate of snowfall in the mountains indicate warmer temperature and fully snow covered mountains indicates that the upcoming days will be colder.

Preparedness and Management

More number of trees are planted by some of the responsible members of the community to control rising of temperature as they believe that deforestation is the main cause for it.

CONCLUSION

The present descriptive research paper has identified different types of disasters namely earthquake, landslide, heavy rain, storm, unusual happenings and sudden rise of temperature in hill ecosystem. The frequency of all these disasters is increasing day by day as an ill effect of climate change. The people residing at the heart of the nature are the most vulnerable section of the natural disaster. Consequently, the indigenous people develop the strategy for prediction of disaster with the help of their own indigenous knowledge base. For this reason the present paper has explored the untapped knowledge of the indigenous people in the hill ecosystem. In future, this knowledge can help prepare the adaptation strategies of disaster management for sustainable livelihood of the hill ecosystem people.

FIGURES



Fig.1 Heavy rainfall about to occur



Fig.2 Landslide damaging the walls and blocking the roads



Fig. 3 Destruction caused by storm



Fig. 4 Snowfall in the mountains indicating the rise and fall in temperature

REFERENCE

- Darjeeling Times. 2009. Nature's fury unleashed in North Bengal May 29, 2009. <http://www.darjeelingtimes.com/news/author/Various%20Sources.html> | Despandey, M. 2000. Science protects traditional knowledge. *Mirror Today*. 13(12): 80-81 | Govt. of West Bengal. 2009. Disaster management plan, Office of the D. M., Darjeeling, pp 1-6. | Sankran, P.N. 2005. Indigenous knowledge: resource for sustainable development. *Employment news weekly*, Publications division, Ministry of I and B New Delhi, 30(2):1-48 | Sethi S.M., Sundarya J.K., Manigrahi, A. and Chand Subhash. 2011. Prediction and management of natural disasters through indigenous technical knowledge with special reference to fisheries. *Indian Journal of Traditional Knowledge*. 10(1) : 167-172 |