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**Disaster Management & Community Based Early Warning System
(A Comparison between Pakistan & Japan)**

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ADRC VR-2017-B (Pakistan)

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Introduction

- The disaster impacts increase when they are not properly managed and the community is the initial level that is immediately victimized due to the disaster impacts. During past few years, the communities living in the rural areas of Pakistan have witnessed a number of serious setbacks due to the devastations caused by the natural disasters.
- The CBEWS has proved highly valuable for adopting effective measures that play a strong role in improving safety of men and material.
- It is one of the most effective measures for reducing negative impacts of threats and risks triggered by natural disastrous events since, the EWS and other mitigation interventions are a cost effective way of disaster risk reduction.



Introduction

- The early warning is a process of dissemination of the hazard and disaster information before its occurrence in order to assist decision makers to formulate suitable policies and perform certain actions to address the upcoming threats and managing such events to avoid the losses and worst consequences.
- Likewise, the Community Based Early Warning System (CBEWS) is a process of empowerment of the people at grassroots level through which they are enabled to prepare well to face any natural hazards and natural disasters.
- With passage of time, the importance of community based early warning system is growing recognized in both developing and developed nations of the world.
- The importance of the empowerment of the community to tackle the disasters affects as an immediate responder greatly helps whole nation to avert growing losses of men and material.

Literature Review

- The book Institutional Partnerships in Multi-Hazard Early Warning Systems, authored by Maryam Golnaraghi, comprises of various dimensions and discussions on disaster management and early warning conceptualization. It elaborates the scope of early warning as a multi-disciplinary term that is frequently used in many fields to describe the stipulation of information and knowledge that enables particular group of people to take the notice of alert and engage in appropriate countermeasure activities.
- Koh Hock Lye, Philip L-F Liu and, Teh Su Yean in their edited work titled, Tsunami Education, Protection and Preparedness provides similar context on the CBEWS practices and policies. They term the early warning system as a powerful tool that can be set up to by the governments and the vulnerable people alike to avoid and reduce the high impact of hazards that include flood, flashfloods, landslides, storms, forest fires, tsunamis etc.
- The association of an effective early warning system merely lies in the identification of its benefits by the government as policies formulating authority and the members of particular communities that frequently experiences or risk the disaster threats.

Literature Review

- Ashbindu Singh and Zinta Zommers in their edited book, Reducing Disaster: Early Warning Systems for Climate Change elucidate the idea of CBEWS. The community based early warning system is a set of enhanced capacities of the community that is required to produce and disseminate timely and accurate threat warning to the threatened communities to properly arrange for evacuation places along with materials. To take such necessary preparedness measures and actions appropriately the sufficient time is required to reduce the exposure to the threat of harm and losses.
- The Early Warning measures particularly in rural areas of Pakistan could not achieve tangible outcomes; therefore, it needs exceptional measures to adopt real-time means and techniques to reduce the risk of disasters.
- A people-centered EW System essentially comprises four key elements:
 1. Knowledge of the disaster risk
 2. Monitoring / Access to information
 3. Analysis and forecasting of the hazards
 4. Dissemination of alerts and warnings within available capabilities

Research Methodology

- The research study is based on both qualitative and quantitative methods whereas, the primary and secondary resources on DM & CBEWS including field visits, expert discussions and lectures to analyze the practices and policies.
- The primary source including field visits and expert lectures have exceptionally proved helpful in this study. In addition, the real-time early warning expertise of the Government of Japan to cope with the hazards and disasters also proved helpful in exploring variety of aspects of CBEWS and assisted in getting accurate facts and figure that were essential for this research.
- The study is descriptive and analytical in nature. The data collection for DM & CBEWS disaster management laws and policies. The discussions & lectures of government officials & DM experts besides field experiences proved as great asset for learning & researching on CBEWS & DM.

Statement of Problem

The lacking knowledge about disaster related issues and awareness about the management of its consequences along with some flaws of DM & EWS at community based practices leaving lesser room for ownership of the issue enhances the risk of loss during disasters. The obsolete methods and lack of adequate education to use technical and technological means further contributes in the shape of excessive destruction. The issues of education about usage of modern technological equipment, capacity building of communities and government officials at union council levels through proper coordination and mutual support are often ignored that results as a core problem of overcoming disaster management practices at the community levels.

Research Methodology

Scope of Research

The national level DM policies & practices have exceptionally proved effective to save lives and livelihood however, the issues at the grassroots level particularly in the rural agricultural background has proved otherwise. There is widespread issue of ineffective and obsolete methods of disaster management that during last few years have proved unsatisfactory in terms of effectiveness.

Objectives of Research

The research study is focused on review and documenting the existing Early Warning System policies and practice at the national and community levels in Japan. In addition, as a comparative analysis it assesses the issues and vulnerabilities of EWS & DM.

Strengths & limitations of the CBEWS approaches for disasters & other hazards		
Approach	Strength	Limitation
Qualitative	- Quick to setup - Comparable numbers	- High level of generalization - Misinterpretation of message
Quantitative	- Contextual details - Long-term process	- Time consuming - Hardly comparable
Participatory	- Reflects individual views - Addresses actual local needs	- Time consuming - Hardly comparable
Quantitative & participatory	- Reflects individual views - Addresses actual local needs - Tangible to various stakeholders - Facilitates comparison	- Highly dependent on facilitators skills

Effectiveness of Early Warning System for Communities

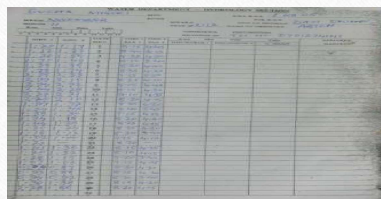
- The early warning system can help nations to minimizing the disaster affects and even it can also prevent such affects if effective practiced. The community based early warning systems can serve as one of the most useful tool that ensure about the safety of the people and help in managing the disasters.
- The early information to the community through national or regional organizations provides the individuals exposed to the disaster hazards to make necessary arrangements to cope with
- The threat assessment is one of the crucial components of the early warning since, the message of the upcoming hazard may reach the responder however, it mainly depends how the individuals act to realize the scale of the hazard they are going to face. the approaching hazard.

Effectiveness of Early Warning System for Communities

- The natural hazards only turned into disasters when the communities are vulnerable and unprepared. Effective Early Warning Systems (EWS) have proved beyond doubt to save lives and reduce economic losses; however, they have not been significantly made an integral part of the disaster management and risk reduction initiatives.
- The previous experiences of the disasters show that the timely disseminated warnings saved lives of people living in disaster prone areas. The communities in rural areas of Pakistan were able to evacuate to the safer places and take appropriate measures to safeguard their cattle and other belongings.
- The early warning also provided the government a better opportunity to effectively reach the vulnerable people and initiate a process of immediate rescue operation and provision of necessary relief items.

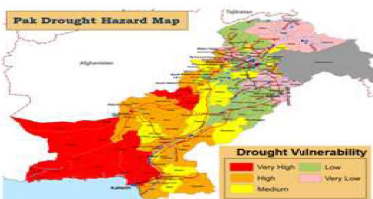
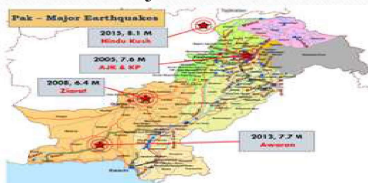
Community Based Early Warning Equipment

- The international advocacy for the empowerment of the communities following the 1995 World Conference for Disaster Reduction in Japan that mainly emphasized for effectiveness of the Community Based Disaster Management and Early Warning System was pioneer in development of simplified technological equipment for the disaster reduction.



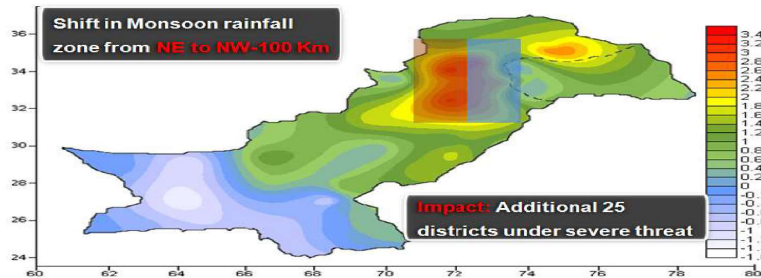
Country Profile and Disaster Issues in Pakistan

- Pakistan with a total area of 796,095 sq km and lies between 24 and 37 degrees north and longitudes 62 and 75 degrees east. The country is highly prone to various hazards since the region wherein Pakistan lies is geographically bestowed with topographical and environmental extremes. The region hosts all types of terrains and climates, and barely manages extreme conditions. It comprises the four provinces of Punjab, Baluchistan, Khyber Pakhtunkhwa (KPK) and Sindh plus the Federal Capital (Islamabad), Gilgit-Baltistan region (GB) and 'Tribal Areas (FATA) under the federal administration, and Azad Jammu & Kashmir (AJK).



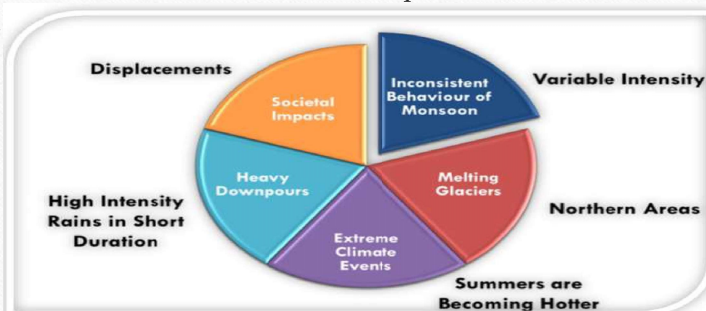
Country Profile and Disaster Issues in Pakistan

- The massive floods during 2010-11 were some of the greatest recorded disasters in the history of Pakistan. The floods affecting over 14 million people with an approximate loss of \$9.5 billion to the economy of Pakistan that included the loss of agricultural production, livelihood, small and medium business and infrastructure of the country
- The climate of Pakistan varies with its topography but most consists of hot, dry desert, temperate in north-west and arctic in the north. About 60% of the total land area is classified as arid, which receives less than 200 mm annual rainfall. The southern slopes of the Himalayas and the sub mountainous tract receive higher rainfall ranging from 760 to 1270 mm annually. Some areas adjoining Kashmir receive more than 2000 mm precipitation per annum.



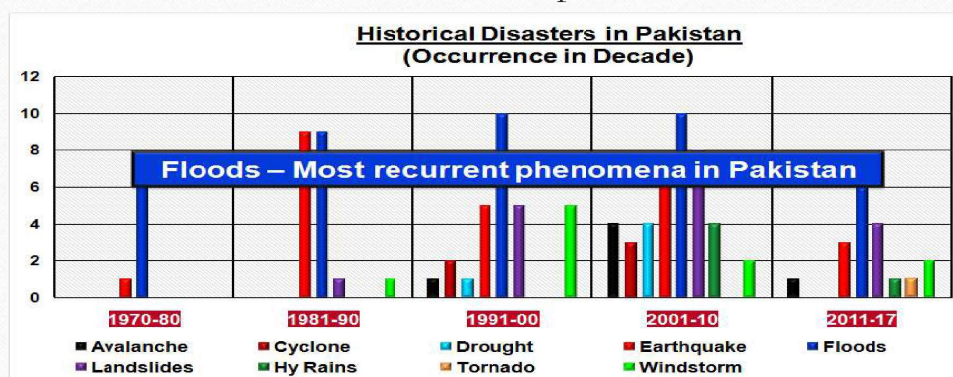
Disaster Context & Risk Profile of Pakistan

- Pakistan frequently suffers from earthquakes. Northern and Western parts are particularly vulnerable to earthquakes. The Indus River is known as flood-prone area especially in July and August. High priority hazards in terms of their frequency and scale of impact are: earthquakes, flooding, droughts, wind storms and landslides that have caused widespread damage and losses in the past.
- A range of hydro meteorological, geo-physical and biological hazards including earthquakes, floods, tsunamis, cyclones and storms, droughts, glacial lake outbursts, landslides, avalanches, pest attacks and epidemics pose risks to Pakistani society. Some of these hazards are predominantly seasonal & occur on an annual basis, whereas other hazards such as earthquakes and tsunamis are rare events but potentially highly destructive.



Disaster Context & Risk Profile of Pakistan

- The historical overview of the statistics of the period from 1947 to 2017 lay out Pakistan's disaster profile. One hundred and seventy-two natural disastrous events resulted in loss of 11 hundred thousand human lives, left near 9.5 million people homeless and cost an economic loss of more than 2.8 billion dollars. The pie chart given below describes a more detailed and clearer picture about the disaster history of Pakistan.



Disaster Management System in Pakistan

- Prior to Earthquake 2005, the West Pakistan National Calamities Act of 1958 was the available legal remedy that regulated the maintenance and restoration of order in areas affected by calamities and relief against such events. An Emergency Relief Cell within the Cabinet Division has been serving since 1971 as an institutional disaster relief support at the national level. Similar institutional arrangements existed at the provincial level in the form of relief commissioners.
- The NDM Act of 2010 is comprehensive national DR policy guideline that elaborates following components of the system: -
 - National Disaster Management Commission (NDMC)
 - National Disaster Management Authority (NDMA)
 - Provincial Disaster Commission (PDMC)
 - Provincial Disaster Management Authorities (PDMA)
 - District Disaster Management Authorities (DDMA)
 - National Institute of Disaster Management (NIDM)
 - Obligation of Federal and Provincial Governments in case of disaster.
 - Establishment of National / Provincial Fund for Disaster Management (N/PDMF).

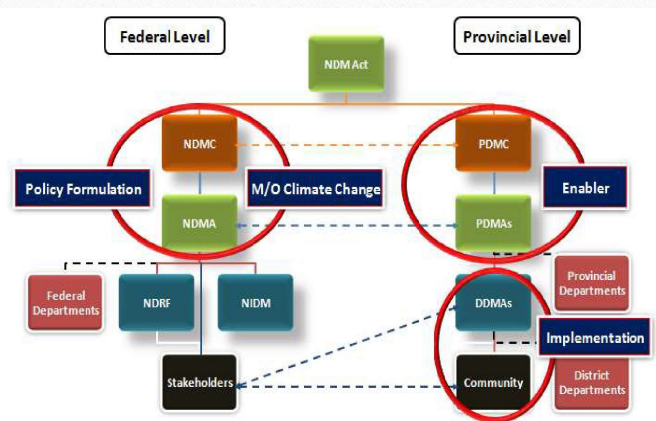
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The occurrence of devastating earthquake of 2005, followed by global obligations provided the required stimuli for the government to introduce a new Disaster Management System in the Country. Subsequently, the National Disaster Management (NDM) Ordinance was promulgated in December 2006 which became NDM Act with the approval of the Parliament in 2010. This Act serves as the primary law of the land in the field of disaster management and to implement the law, National Disaster Management Authority (NDMA) was created under National Disaster Management Commission (NDMC).



Pakistan Disaster Management & International Obligations

- Establishment of “Safer and Resilient” societies is the most ever desire of every people centric government of the world. However, achieving resilient societies is a long journey and requires number of intervention from grassroots to state and international level.
- The international organizations along with regional and local collaborations can help focus the attention of national governments and policy makers on the importance of natural hazards awareness and disaster risk reduction education programs. International organizations have a key role to play with regard to long-term planning as they are decoupled from the shorter-term political mandates of national, local and local decision-makers.
- International efforts may also lead to the establishment of transnational platforms and networks aimed at developing a coherent cross-border approach to disaster risk management strategies and promoting a culture of safety in the long run. Pakistan has been actively participating in various international DR frameworks such as:
 - Sendai Framework for Disaster Risk Reduction (SFDRR -2015-2030)
 - The Hyogo Framework for Action (HFA)
 - The Global Platform for Disaster Risk Reduction (GPDRR)
 - International Federation of the Red Cross

Community Based EWS in Pakistan

- The community based early warning practices in disaster prone particularly in rural areas rely upon public awareness through mosque loudspeaker to inform entire community about evacuation and counter-measures to save lives and their belongings in case of any flood, earthquake and other hazard.
- The limitations of communication and the message dissemination further require for exceptional measures to avoid prototype warning methods of door to door knocking and the community gatherings.

There are some community based disaster volunteer organizations working with limited resources however, there is need of proper training of those volunteers about DRR issues so that prior to occurrence of disaster they would educated about the prospective issue they could cope with during the disasters.



Community Based EWS in Pakistan

- People Gather around the notables of the community to learn about the disaster hazards and possible measures to avoid losses during the disasters.
- In villages, the notable person is usually an elder of the community or a religious scholar and or sometimes the educated people belonging to the same community hold gathering of their community people to sensitize them about the disaster issues.



The non-governmental organizations often support such activities with their limited capacities however, the need of usage of modern disaster forecast equipment requires significant expertise and such limitations frequently hamper the disaster reduction efforts of the community.



Disaster Context & Warning System in Japan

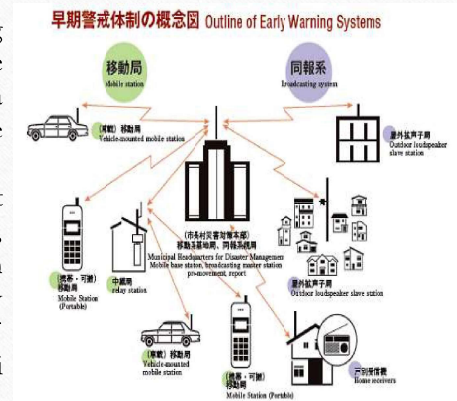
- The Japan as a developed country has outstanding mechanism for the early warning system for tsunamis, floods, volcanic eruptions and many other disasters. The early warning system essentially helps the communities to minimize the levels of damages and losses during disaster period. The early warning-related Government Departments have only implemented limited measures.

However, in addition to these measures new institution for EWS, new modern technology, proper training of communities to sensitize them about the disaster issues and develop a mechanism to enable these communities to coordinate with the government and non-profit organization about the issues they cope with during and before the occurrence of disasters. The national government, local governments, and research organizations have installed seismometers, seismic intensity meters, and tsunami monitoring facilities throughout the country.



Disaster Context & Warning System in Japan

- The JMA in Japan manages various DM issues and collects observation data to monitor seismic activity and tsunamis. To reduce disaster-related damage at initial level, it is considered highly important to make residents of at-risk areas aware of safe evacuation methods and nearby evacuation routes and sites ahead of time so that they can take appropriate actions based on early warning information
- Japan has developed some of the most advanced versions of early warning equipment that are continuously being upgraded by time and again. The early warning information evacuation prior to the occurrence of a tsunami or any other disaster is well calculated and ensured the message should reach every concerned person and organization.
- The early warning about disasters during the disaster period is imminent information upon which property and life of people depend therefore, all means and resources including town level radio communication systems, J-Alert (a satellite based system that allows authorities to quickly broadcast alerts to local media and to citizens directly via system of speakers), television, mobile phones etc are utilized, and tsunami warnings are effectively delivered to the people



Conclusion

- The EWS is an effective source of weather and disaster forecast and contribute in DM efforts. The generated data through various community based equipment help in systematic data collection, investigation and provision of well estimated result based recommendations.
- The process of early warning also includes risk assessment and information dissemination based on qualitative and quantitative or a blend of both data sources. The early warning systems enhance the capacities of the governments that in actuality mean a mechanism of investing in local competence.
- The effective means of early warning systems effective serve as capacity building resource that empower people at grassroots levels and also facilitate a process of transparent interaction between government, civil societies and the vulnerability communities of disaster prone areas.
- The empowerment and sensitization of the community is highly effective in overcoming disaster affects. The governments who focus on community based capacity building experience lesser losses. The ownership and the realization is also a necessary question that should be prioritized by both i.e. governments and the community.

Conclusion

- As a comparative analysis, there is wide gap between disaster preparedness and community based early warning practices in Japan and Pakistan.
- The advanced technological means and utilization of state institutions is highly supportive for the cause.
- Apart from the post disaster scenario, the broadcasting system and the mobile network services can be highly helpful to reach communities in every nook and corner and mitigate the disaster affects.
- In Japan, the use of technological means and information provided by many organizations including news broadcasters, prefecture governments, central government and various research institutes helps communities to better arrange for disaster preparedness.
- In case of Pakistan, the similar level of information at the governmental level is available however; the interpretation of the information is key obstacle in disaster preparedness of communities.
- To overcome, this issue, there is high need of capacity building, educating people about DRR issues, usage of various tools and first aid equipment and arranging mock drills.
- The disaster information is one of the important factor of the disaster management activates therefore, the timely information would help communities to anticipate the disaster risks and assess their hazard vulnerability thus avail the chance to make necessary arrangements, take appropriate preparedness and countermeasures support of authorities.

Recommendations

- To achieve the disaster mitigation goals, it is crucial to enhance capacity of communities through mock exercises and other participatory forums with particular focus to communities living in the flood and earthquake prone areas.
- The local government at districts levels (as being practiced in Japan at prefectural levels) can assist communities to develop and manage community level disaster management plans, mapping and evacuation places. These plans will provide a road map according to which communities will be able to implement key disaster preparedness and response actions.
- The key components of the community disaster preparedness plans should focus on land and resource use planning. Such measures would enable community to evaluate existing loopholes and verify how resources are affected by weather patterns and thus develop relevant initiatives that can reduce the potential negative impact of disasters on their lives and livelihoods.
- Individual motivation for the cause of disaster preparedness can mobilize whole nation to manage the disasters effectively and collectively.

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