Review of National Multi-Hazard Early Warning System Plan of Pakistan in context with Sendai Framework for Disaster Risk Reduction

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Abstract

Pakistan has undergone multiple geological and climate-related disasters in recent years. This includes the devastating 2005 Kashmir earthquake, and yearly countrywide flooding since 2010 till present. The recurrence of such disasters has led to the establishment of national and provincial disaster management institutions, which worked towards the formulation of national disaster management plan. As a result, Pakistan's National Disaster Management Plan (NDMP) was approved in 2012. This paper provides a review of Pakistan's National Multi-Hazard Early Warning System Plan (NMH-EWS-P) that is part of the overall NDMP, approved prior to the introduction of the 2015-2030 Sendai Framework for Disaster Risk Reduction (SFDRR). The research identifies various aspects of the national plan, which require amendments in the light of the Sendai Framework. The implementation of the NMH-EWS-P is reviewed by the case study of the province of Punjab, where the Punjab Disaster Management Authority (PDMA) is responsible for the implementation of the national plan at provincial level. With the analysis of Early Warning Systems against natural disasters, as implemented by the PDMA, the gaps and shortcomings of the prevailing practice are identified. Furthermore, this research also aims to propose practical solutions and recommendations for improvement, and better alignment of the prevailing Early Warning System with that of the Sendai Framework.

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1. Introduction

According to International Disaster Database [1], there is an increasing global trend in the number of reported disasters, affected population and estimated damages. The main causes of increases in disaster risks are attributed to various factors influencing the human settlement which include increasing population, land use issues, uneven economic and urban development, climate change, disaster related policies, weak governance and limited endogenous capacities [2,3]. Nevertheless, if vulnerabilities and the coping capacity of communities are suitably addressed, the occurrence of "natural disasters" can be controlled [4]. This requires improved and coordinated monitoring of risk, reliable information, scientific predictions and an overall integrated early warning system [5]. The objective of this research is to study various aspects of multi-hazard early warning system to counter natural disasters as deemed necessary for the practical implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR). The case of one of most populous and disaster prone developing countries i.e. Pakistan is considered where the responsibility to prepare for and respond to disasters has been decentralized on a provincial level. For this study, Pakistan's largest, most industrialized and developed province of Punjab [6] is selected. The prevailing Early Warning System (EWS) in the province, as implemented by the Provincial Disaster Management Authority (PDMA), is analysed and compared with the contemporary state of the art practices in the world. This study aims at identifying the scientific, social, technological and institutional gaps in the implementation of EWS in the province and proposes practical solutions and recommendations for improvement, and better alignment of the prevailing system with that of the Sendai Framework.

Research methodology is presented in section 2 and standard literature review covers section 3. In section 4, the case of Pakistan and Punjab is discussed from disaster risk management and multi-hazard EWS viewpoint. Lastly, section 5 comprises of the key findings of the investigation, conclusions and recommendations for improvement in the existing EWS of Punjab.

2. Methodology

This research is conducted by reviewing online documents, reports and subject-relevant literature. Categorically, two types of documents are reviewed. First, the published draft of the Sendai Framework and peer reviewed research papers by international academics and practitioners. Second, official documents published by the government of Pakistan, which are publically available. The former of these documents sets the foundation of this research, by establishing a standard with which the publications, policies and frameworks developed by the government institutions are compared and analyzed. Since the focus of this research is to establish the functionality of government institutions with reference to EWS against natural disasters, the study of publication by official institutions is crucial to gain insight into prevailing institutional mechanisms. The process of studying two distinguished set of documents exposes gaps and deficiencies in the prevailing early warning system practiced in Punjab, Pakistan. Also, the author's experience of working with several government and non-government institutions has provided valuable insight of the existing system. Overall, this study aids in revealing how some components of the early warning system are overly emphasized, while others are left unattended. Based on the findings of this research, suggestions and recommendations are proposed in order to cover up the gaps in existing scenario and to align the prevailing EWS with that of the Sendai Framework.

3. Literature Review

One of the seven targets of the Sendai Framework is to "substantially increase the availability of an access to multi-hazard early warning system and disaster risk information to the people by 2030"[7]. Both in the pre 2015 Hyogo framework for Action (HFA) and post 2015 SFDRR, an early warning system (EWS) is conceived be a complex, multidimensional tool, focusing multi-hazard phenomenon with sound scientific basis, supported by institutional and technological instruments and encompassing people's centred approach [7]. EWSs are considered to be effective if these are designed to be "people-centred: understood, accessible, timely, and tied to response actions"[8,9]. For this reason, EWSs should be "end-to-end: from the hazard assessment to the response" [10]. In this way, the people's centred early warning system creates links between scientific observations of hazards, communication science, and social science and management science. The potentially affected communities, local