

# Review on Community and Disaster Preparedness

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**Abstract:** Disasters see no boundaries in terms of geography and also impact. Community has always been the worst impacted and first to respond. Although many interventions have been made to strengthen community response, yet very less has been thought about making the community aware about the risks they are exposed to. It has always been external help that is pressed into service, which at times leads to a greater number of casualties and larger impact. Community, which is impacted, entirely depends on the external help and has never been oriented towards their self-help and capacity enhancement. However, the paper has been designed to discuss the disaster preparedness indicators which can be directly related to awareness creation in community.

**Keywords:** Community, disaster preparedness, community awareness

## I: Introduction

India, due to its geo-climatic conditions, is prone to various disasters be it natural or human-induced. It has also been said that India is a laboratory for practitioners and scholars when it comes to management or study about disasters. It has been seen that in every disaster it is the community which is most affected and also the first responder. They play crucial roles in various facets of management of disasters such as mitigation, preparedness and relief camp management. Since they are important cogs in the wheel of disaster management, building their capacities becomes all the more important. The paradigm shift from response oriented approach to preparedness oriented approach also stresses on community capacity building. The three documents namely Sendai Framework for Disaster Risk Reduction (SFDRR), Paris Climate Change Agreement (COP 21) and Sustainable Development Goals (SDGs), where India is one of the signatory countries also focus on community preparedness.

However, after reviewing a lot of research paper, it has been found that community awareness has been talked about and discussed but not as an indicator for disaster preparedness. Hence this paper will discuss and try to establish the fact that community awareness can be considered as disaster preparedness indicator.

The paper has been prepared with an aim to establish community awareness as one of the disaster preparedness indicators. The objectives with which this idea is being discussed are that every disaster management effort must be focussed on strengthening the community capacity by enhancing the community awareness pertaining to risk and vulnerability.

## II: Literature Review

- 1. Investigating the effects of episodic Super-cyclone 1999 and Phailin 2013 on hydro-meteorological parameters and agriculture: An application of remote Sensing** - Bikash R. Parida, Sailesh N. Behera, Bakimchandra Oinam, N.R. Patel, R.N. Sahoo

The paper has been published with an aim to find the impact of tropical cyclones on agriculture by taking two major cyclones namely Super Cyclone 1999 and Phailin Cyclone 2013 using scientific methods like remote sensing. The outcome of the study was that due to heavy precipitation, rice crop produce declined by 70% and resultant impact on community was also seen. Hence, we see that impact on agriculture can also be considered as an indicator for community preparedness with regard to having alternative cropping pattern.

- 2. Response of the Bay of Bengal to Gopalpur and Paradip super cyclones during 15–31 October 1999** - G. R. Chinthalu, P. Seetaramayya, M. Ravichandran and P. N. Mahajan

The study was carried out by National Institute of Ocean Technology (NIOT), Chennai with an aim to establish the role of parameters like Air temperature, Wind direction, wind speed, sea surface temperature and ocean currents on impact created by cyclones. This study establishes that utilization of scientific instruments facilitate to view and discuss the changes happening during the cyclone. As an outcome, it was established that strength, movement and landfall of the cyclone depend significantly on parameters taken. Hence this was taken as part of my literature review to give a larger idea of the fact as to what other factors can be considered as parameters for monitoring the community preparedness. These factors have indirect impact of community preparedness which is my core area of research.

### 3. **Validating Indicators of Disaster Recovery with Qualitative Research** - Caroline Dwyer, Jennifer Horney

The full process of disaster management completes only when a holistic recovery process is adopted and implemented. However, there has been always a gap in monitoring the community holistic recovery process due to lack of proper indicators to measure it. The study has been carried out to develop indicators to monitor the recovery process with community in view. Authors have undertaken various methodologies to develop few of the community indicators. The major outcomes of the study were that the indicators must be flexible enough to cater to pre and post disaster needs of the community and also be a self-assessment tool rather than a comparison tool. The major challenge in this study was to collect and collate the data from the affected community and matching it with the government available data.

### 4. **Disaster Preparedness Indicators: an application in the state of Paraná, Brazil** - Eduardo Gomes Pinheiro, Carlos Mello Garcias, Larissa Ferentz, Murilo Noli da Fonseca

The study was carried out with an aim to evaluate the preparedness of urban governance viz a viz community. The document includes methodology for the development of indicators that allow public officers to monitor risk and disaster management in communities, minimizing the negative impacts suffered by the local population. The outcome of this document was that it addressed the need to study how municipal managers deal with preparation for extreme events, which have an increasing trend in their cities.

### 5. **A System of Indicators for Disaster Risk Management in the Americas** - Omar D. Cardona

The document discusses about micro level planning which is necessary for decision making in management of disasters however, it focusses mainly on extreme weather events. As the needs of stakeholders at all levels is different, the indicators being developed must also cater to this. The study designed four indices namely disaster deficit index to evaluate financial implications, local disaster index to evaluate management at local level, vulnerability index to evaluate exposure to disasters and risk management index to evaluate the overall risk.

### 6. **Disaster Preparedness Index: A Valid and Reliable Tool to Comprehend Disaster Preparedness in India** - V. R. Rohith; S. Kolathayar; K. Priyatham; V. Karan Kumar; and S. Nikil

Preparedness for disasters help in reducing the loss of life in a big way, which has been reiterated in almost every UN report. Thus, evaluation parameter for measuring preparedness for the country becomes necessary so that ultimate impact of disasters is reduced to minimal. This paper presents the development of one such tool that measures preparedness of individuals towards any natural disaster on the basis of four factors. It included a 14-item scale for disaster preparedness index (DPI) for individuals along with demographics for interpretative studies. The 14-item scale included necessary measures that were considered necessary for an individual to safeguard life and property not only during a major natural disaster but also to secure the life of the individual after the disasters.

### 7. **Fostering disaster preparedness school** - A M Ikramullah, E Maryani, I Setiawan

The author has carried out the study as an effort to build disaster preparedness in his own country Indonesia, which is one of the major disaster-prone countries in the world. School, we all know, is one of the important stakeholders as it is the nurturing ground for future generations and also is being used as relief centres during disasters. Hence strengthening disaster preparedness in schools is the need of the hour. This study aims to find out the implementation of disaster preparedness at school's communities. The method used was a survey of twelve schools in Banda Aceh City, with respondents consisting of education personnel, teachers, and students. The results showed that disaster management related simulation exercises or workshops/ seminars were conducted in designated schools in less number, however due to other factors like government support and school commitment the preparedness level may be termed as high.

### 8. **A Great Escape from the Bay of Bengal “Super Sapphire–Phailin” Tropical Cyclone: A Case of Improved Weather Forecast and Societal Response for Disaster Mitigation** - U. C. Mohanty, Krishna K. Osuri, Vijay Tallapragada, Frank D. Marks, Sujata Pattanayak, M. Mohapatra, L. S. Rathore, S. G. Gopalakrishnan, and Dev Niyogi

“Phailin (2013)” was the strongest cyclone that hit the Odisha state since the super cyclone of 1999 but still casualties were in less number. This happened due to a better and timely early warning and its dissemination amongst the stakeholders. This timely warning resulted in timely evacuation of a record 1 million people across 18 000 villages in both the Odisha and Andhra Pradesh states to coastal shelters. Thus, the property damage and death toll were minimized through the proactive involvement of three-tier disaster management agencies at central, state, and district levels. Review of this article gives a clear-cut point that timely and effective whether forecast and its dissemination leads to minimized destruction. Hence this can be one of the indicators of preparedness.

## 9. Evaluation and Analysis of Hospital Disaster Preparedness in Jeddah - Nidaa A. Bajow, Shahnaz M. Alkhalil

Disaster risk of Jeddah, the study area, can be attributed to its geographical location, climate variability, topography, etc. Methodology adopted for this study was questionnaire-based survey by dividing the study area. Impact of disaster on health infrastructure and system as a whole, results in huge economic losses, hinderance in developmental activities, loss of life and in turn strength and confidence of the nation is impacted. Thus, a focussed approach for Hospital disaster preparedness is a must. Network of rural and urban health infrastructure is necessary to boost health system. The finding of the study shows that hospitals included in this study have tools and indicators in hospital preparedness however there is lack of training and management during disaster. Hence, it is necessary for hospitals to understand that most of hospital disaster preparedness is built in the hospital system itself.

## 10. Social vulnerability indicators in disasters: Findings from a systematic review - Farin Fatemia, Ali Ardalana, Benigno Aguirrec, Nabiollah Mansourid, Iraj Mohammadfame

Social factors are one of the most important causes of vulnerability of exposed communities to disasters. Keeping this in view, this paper aims to review the social vulnerability indices and their validity in disasters within the period 1985–2015 and to develop a suitable classification to make sense of social vulnerability indices in the Iranian context. After reviewing various documents, initially, it found 32 indicators and 150 variables, but it was possible to subsume them into a few valid social vulnerability indicators, which were gender, public health condition, public infrastructures and migration. They are the five top categories of social vulnerability that are most useful in the Iranian context.

## 11. A Review on Management of Cyclone Phailin: Early Warning and Timely Action Saved Lives - Gourikumari Padhy, Rabi Narayan Padhy, Sangeeta Das, Abhisek Mishra

In October 2013 Phailin Super Cyclone hit Odisha affecting more than 13.2 million people, and causing enormous damage. There was massive destruction of power supply, communication and transportation system. The estimated total damage to houses, crops and public properties was 14373.47 crore. However, early warning alerts, disseminated four days before landfall of Phailin, had administration prepared for the evacuation and relocation of approximately 1.2 million people, resulting in the largest evacuation operation in India in 23 years. Early warning using multiple channels of communication and timely action saved lives during Phailin. Government cooperation, preparedness at the community level, and lessons learnt from Odisha Super Cyclone 1999 contributed to the successful evacuation operation, effective preparation activities and impact mitigation. This event exhibits the importance, benefits and effectiveness of the use of early warning for a massive disaster.

## 12. Assessment on Historical Cyclone Tracks in the Bay of Bengal, East Coast of India - Bishnupriya Sahoo and Prasad K. Bhaskaran

The Bay of Bengal basin in the North Indian Ocean reports the highest number of tropical cyclones in India. Semi-enclosed nature of this basin in conjunction with its funnel shape steers the cyclone pathway striking the land. Hence, there is a need to understand the risk factors attributed from extreme winds, storm surge, and associated coastal inundation. This study aims to develop the most probable cyclone track for each state located along the east coast of India. This study also deals with aspects on frequency and cyclogenesis locations in the Bay of Bengal based on analysis from historical data. In addition, this study also evaluates the energy metrics such as Power Dissipation Index (PDI), and Accumulated Cyclone Energy (ACE) for tropical cyclones that occurred during past four decades in the Bay of Bengal. This also reveals that Impact assessment in terms of frequency and track of cyclone can also be treated as indices leading to preparedness.

## 13. Improving National Intelligence for Public Health Preparedness: a methodological approach to finding local multi-sector indicators for health security - Ngozi A Erundu, Afifah Rahman-Shepherd, Mishal S Khan, Ebba Abate, Emmanuel Agogo, Evelien Belfroid, Osman Dar, Angela Fehr, Lara Hollmann, Chikwe Ihekweazu, Aamer Ikram, Bjorn Gunnar Iversen, Alemnesh H Mirkuzie, Tayyab Razi Rathore, Neil Squires, Ebere Okereke

Gaps in public health strategy and ability of countries to cope with health related emergencies have always been a matter of concern. The ongoing pandemic COVID-19 has once again highlighted this gap. The global frameworks that exist to strengthen core public health capacities lack coverage of several preparedness domains and do not provide mechanisms to interface with local intelligence. The study is a process which has been designed and piloted, in collaboration with three National Public Health Institutes (NPHIs) in Ethiopia, Nigeria and Pakistan, to identify potential preparedness indicators that exist in numerous frameworks and tools in varying local institutions. Following a desk-based systematic search and expert consultations, indicators were extracted from existing national and subnational health security-relevant frameworks and prioritised in a multi-stakeholder two-round Delphi process. As an outcome of the study it was derived that NPHIs play an increasingly central role in health security and must have access to data needed to identify and respond rapidly to public health threats. The document was reviewed to identify indicators in disaster preparedness for community as health is an integral part of community safety.

**14. Indicators for Disaster Risk Management: Disaster Risk Communication Tools from a Holistic Perspective - Omar D. Cardona**

The paper talks about importance of micro level planning when it comes to effective management of disasters. Communication redundancy at the time of emergencies has been mentioned in post disaster analysis everywhere. Lot of emphasis has been laid on strengthening of communication network. Utilization of networks available with various agencies has also been emphasized for effective communication during disasters. Communication has always been an important tool in decision making regarding getting intelligent information and analysing it for effective management. Hence it becomes important to include communications as a tool or indicator for better preparedness level of any area.

**15. Disaster risk reduction and the limits of truisms: Improving the knowledge and practice interface - Daniel Nohrstedt, Charles F. Parker, Nina von Uexkull, Johanna Mård, Frederike Albrecht, Kristina Petrova, Lars Nyberg, Malin G'oteman, Jacob Hileman, Gabriele Messori, Giuliano Di Baldassarre**

The article, published in 2022, utilizes the SFDRR to identify and interrogate ten selected areas, related to forecasting, loss, conflict, migration, the local level issues, collaboration, social capital, prevention, policy change, and risk awareness, from across the social and natural sciences, that have been prevalent in shaping DRR research and practice. We all know that action towards strengthening disaster risk reduction (DRR) ideally builds from evidence-based policymaking to inform decisions and priorities. However, some of these practical guidelines conceal oversimplified or unsubstantiated claims and assumptions which, if not properly addressed, may jeopardize the long-term goal to reduce disaster risks. Author arrived at the conclusion that relationships between science and practice end with suggestions for developing the field through advances in conceptualization, measurement, and causal inference.

**16. A systematic review of rapid needs assessments and their usefulness for disaster decision making: Methods, strengths and weaknesses and value for disaster relief policy - M.W.G. Bosmans, C. Baliatsas, C.J. Yzermans, M.L.A. Dückers**

Disaster and humanitarian aid authorities are expected to ensure a timely response to the needs of populations affected by disaster. However, they typically have to operate under challenging conditions, hindered by lack of time, capacity and other practical complications. Authors aim to provide a comprehensive overview of the methods, strengths and weaknesses and implementation factors of rapid needs assessments (RNAs) in a disaster context through this systematic review. A total of 45 assessments were included and categorized in different need categories. The review suggests that it is certainly possible to collect information on needs for disaster decision-making, however, its practical implementation depends on two conditions: the level of preparedness and the nature and dynamic circumstances of the incident.

**17. Elements of standard operating procedures and flexibility issues in emergency management: A Japan-Taiwan comparison - Takaaki Kato, Jieh-Jiuh Wang, Ning-Yu Tsai**

The empirical study on published in January 2022, compared the emergency response SOPs prepared by municipalities in Japan and Taiwan. The study adopted a strategy to discuss the merits and problems of using SOPs for emergency response and obtained some unique results. During the study it was found that Japanese municipalities could autonomously decide their SOPs, while Taiwanese municipalities largely followed the SOP format within a nationally standardized emergency management system. It was evident from the study that defining standard operating procedures (SOPs) was a key tool for planning emergency responses. However, study revealed that defining standard operating procedures may also hamper the process of contingency response. Another outcome of this study was that lack of proper use of SOPs revealed the lack of effectiveness of response.

**18. Professionalization of community engagement in flood risk management: Insights from four European countries - Kseniia Puzyreva, Zerline Henning, Renate Schelwald, Hannes Rassman, Emanuela Borgnino, Pieke de Beus, Sara Casartelli, Daniel Leon**

Flood management has been dominated by scientific expertise, centralized decision-making and top-down professional management, however, the changes in probabilities of risk and its shapes has changed the focus of flood management from reactive approach to proactive approach bringing in mitigation and preparedness aspects for resilience. Community engagement is recognized as centre stage for such initiatives and thus their capacity building and change towards professional approach becomes very important. The paper on, examines the micro-level facets of professionalization of community engagement in Italy, Germany, England, and the Netherlands based on five-months fieldwork conducted in 2020 and discusses the ambivalent implications of professionalization for community engagement in flood risk management. The conclusion of the study establishes that professionalization largely contributes to better coordination of the activities of community group members, their alignment with risk management needs and priorities, and enhances sense of belonging in the professional field of flood risk management.

**19. Key performance indicators of disaster preparedness: a case study of a tsunami disaster** - Reinny Patrisina, Faradissa Emetia, Nikorn Sirivongpaisal, Sakesun Suthummanon, Alfadhiani, and Dicky Fatrias

This study, having focus area as tsunami affected persons, aims at designing of key performance indicators to measure individual disaster preparedness. We all know that impact of disaster is not only on human life but also social bondages, infrastructure, culture and environment. If the risk has to be minimized the preparedness must be ensured at individual level also. Using the Delphi method, 14 indicators of three critical factors were identified. The preparedness level of an individual against a disaster had been plotted in 2-dimension matrix (awareness & attitude versus actions taken). The outcome of the study may be utilized by important stakeholders such as government agencies to design programmes to strengthen individual preparedness levels.

**20. Measuring the level of disaster preparedness in Auckland** - Ma Katrina Rañeses, Dr. Alice Chang-Richards, Jaime Richards, Jackie Bubb

Auckland is susceptible to natural hazards and need was being felt to strengthen the disaster preparedness and resilience. The need was further strengthened after the 2010 and 2011 earthquakes which shook the region. This research study, having stemmed out from a previous study of measuring the level of disaster preparedness in the CBD, intends to examine the validity and robustness of the measurement tool used with special reference of the communities in Auckland's suburban areas. The study revealed that the tool is robust, thus, may be used in other communities as well. The outcome of this study confirmed that the tool used for the previous study was robust. Further outcomes of the study were that around 23% of the participants were considered fully prepared while approximately 24%, 39%, and 15% of the respondents were found to be committed, aware, and unaware, respectively. Moreover, it was noted from this research that people interpreted that preparedness is more inclined towards awareness levels of the community.

**21. Organising knowledge to prevent global health crises: a comparative analysis of pandemic preparedness indicators** - Alexander Kentikelenis, Leonard Seabrooke

The COVID-19 pandemic has laid the problems of organizational challenge and highly reliable coordination amongst institutionally diverse countries, bare. This article examines the construction of the three main cross-national indicators of pandemic preparedness: a database with self-reported data by governments, external evaluations organised by the WHO and a global ranking known as the Global Health Security Index. Each of these presents a different model of collecting evidence and organising knowledge: the collation of self-reports by national authorities; the coordination of evaluation by an epistemic community authorised by an intergovernmental organisation and on the basis of a strict template; and the cobbling together of different sources into a common indicator by a transnational multi-stakeholder initiative. We posit that these models represent different ways of creating knowledge to inform policy choices, and each has different forms of potential bias. In turn, this shapes how policymakers understand what is 'best practice' and appropriate policy in pandemic preparedness.

**22. Measuring Individual Disaster Preparedness** - Kevin Kohler, Florian Roth, Benjamin Scharte

Disaster preparedness consists of the knowledge and capacities to effectively anticipate, respond to and recover from the impact of any natural or human induced hazards. Although the responsibility to manage the disasters always remains with administrative authorities, yet preparedness of impacted community cannot be ignored and also plays critical role for resilience. This study opens a gateway for the design of future disaster preparedness studies. Preparedness needs to be adapted to specific contexts, including the local frequency and severity of hazards, the individual vulnerability and exposure to hazards, as well as geographical features that affect the accessibility of critical resources. The report discusses a broad variety of indicators including an emergency supply kit, that can help to measure individual disaster preparedness. The report explores the data availability of these preparedness indicators for Switzerland. It highlights existing gaps in the preparedness literature with regards to empirical evidence for the composition and effectiveness of emergency supply kits, as well as the specific challenges of suburban contexts and suggests remedial actions for the same.

**23. Indicators for disaster risk and risk management** - Omar Dario Cardona

The study focusses on developing indicators to mainstream disaster risk reduction into development policies as there has been evidence and experience which shows that there are considerable economic and social positives to be made by adopting a proactive approach to risk reduction. Author infers that in order to integrate disaster risk reduction into development policies and practices, risk must be documented with quantifiable and timely information in a manner that is easily understood by decision-makers who are not disaster experts. Author also concludes that this tool will be of use to government officials in sector ministries as well as local governments, and international development agencies.

**24. Rule of Law and Natural Disasters in India** - Dr. Manika Kamthan,

In the paper, author tries to critically evaluate the upcoming idea of environmental rule of law and evaluate its evolution and application in the larger framework of Disaster Law in India. In India, Kerala witnessed the worst floods of all times in 2018. It left about 483 deaths, many injured & devastated and heavy economic loss. Author of this article mentions that the genesis of sustainable

development can be traced back to the principle of “rule of law”, which is an indication of environmental governance. Environmental degradation violates rule of law because it exposes people to risk of natural disasters. The 13th SDG of “Climate Action” aims to help the vulnerable countries to adapt to climate change and how disaster risk measures can be integrated into the national strategies. In India various vulnerabilities like gender and poverty are aggravated in the wake of disasters. This calls for the integration of rule of law in disaster management. The violation of environmental laws has the potential to undermine sustainable development which hampers “rule of law”.

### III: Consolidated Review

Authors of this paper had reviewed papers related to the topic and found that although so much work has been carried out in this field but very little has been done to establish the fact that community awareness becomes an integral part of disaster preparedness of any area. The areas which have been discussed in the references talk about scientific know how such as air temperature, wind direction, wind speed etc. while few others discuss about holistic recovery process, urban governance, etc. Papers reviewed are mainly from foreign authors who have discussed the preparedness indicators which prevail in their own countries. During review we found that few papers also talk about community but have been specific while discussing preparedness.

One of the studies on Phailin Cyclone 2013 shows that despite the fact that cyclones which hit Odisha shores in 1999 and 2013 were of same intensity and almost impacted same areas, yet the death toll in 1999 super cyclone were much higher than that in 2013. This was made possible through timely and near accurate early warning and timely action by Authorities. Hence after reviewing this document it can be said that timely early warning and its dissemination to concerned is one of the disaster preparedness indicators.

### IV: Conclusions

After reviewing these papers, authors are of the view that disaster prone communities require knowledge, real time and timely information, social engineering and self-assessment process for better preparedness. After reviewing research papers in the related field, the authors infer that although a lot of work has been done for community empowerment and capacity enhancement, yet very few are oriented towards community preparedness indicators. Further to it, very few Indian case studies are available to strengthen the idea of community preparedness indicators for disasters.

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