Engineering and Technology Journal e-ISSN: 2456-3358

Volume 10 Issue 05 May-2025, Page No.- 4899-4908

DOI: 10.47191/etj/v10i05.18, I.F. – 8.482

Analyzing Disaster Risk Reduction (DRR) Policies and Their Effectiveness in Reconstruction Efforts

Muhammad Tahir[1], Dr. Mohd Fadzil Bin Mohd Idris[2]

[1]University Malaysia Pahang (UMP), Malaysia

[2]Associate Professor at Universiti Malaysia Pahang (UMP), Malaysia

ABSTRACT: Disaster Risk Reduction (DRR) policies play a crucial role in mitigating the impact of disasters and ensuring effective reconstruction efforts. Due to the increasing frequency and intensity of natural disasters particularly in the disaster prone regions, a comprehensive analysis of the effectiveness of existing DRR frameworks has become very necessary. This study examines global and national DRR policies, to assess their implementation in post disaster reconstruction efforts. A qualitative research approach, dating clothes literature review and case study analysis is employed to evaluate the role of infrastructure resilience, governance and community participation in disaster recovery. The findings highlight significant gaps in policy execution and coordination among stakeholders in the processes of reconstruction. Moreover, the study identifies best practices from successful DRR implementations and also provides recommendations for improving the effectiveness of policies. This research contributes to the ongoing discourse on disaster resilience by emphasizing the need for a proactive and well coordinated community driven approach to DRR. Future research should focus on longitudinal studies to assess long term impacts and the role of technology in enhancing DRR strategies.

KEYWORDS: Disaster Risk Reduction (DRR); Reconstruction; Disaster; mitigation; infrastructure; resilience; stakeholders.

LIST OF NOTATIONS

DRR	Disaster Risk Reduction
NDMA	National Disaster Management Authority
PDMA	Provincial Disaster Management Authority
DDMA	District Disaster Management Authority
UN	United Nations
NGO	Non-Governmental Organization

INTRODUCTION

Natural disasters like earthquakes, floods, hurricanes, and wildfires have devastating consequences on human life as well as our economy and infrastructure. Over the past few decades, the frequency and intensity of these disasters have increased due to climate changes and several other factors. Rapid urbanization and environmental degradation also contribute to it. Pakistan is one of the most disaster prone countries in South Asia frequently experience saying natural calamities (Preventionweb.net, 2013). The 2005 Kashmir earthquake and the 2010 floods are significant in its history and have highlighted the country's vulnerability and need for effective disaster risk management. These disasters have not only caused significant human and economic losses but also exposed weakness in DRR policies and reconstruction strategies

The Sendai Framework for Disaster Risk Reduction (2015-2030) emphasizes the importance of building resilient communities, risk mitigation and preparedness (UNDRR, 2015). Pakistan has aligned its disaster management strategies with this Global framework, implementing policies such as the National Disaster Management Act (2010) and the National Disaster Risk Reduction Policy (2013) (Refworld, 2023). However, the effectiveness of DRR in post disaster reconstruction remains questionable despite these policy measures due to lack of coordination among stakeholders and inadequate funding. This research investigate the effectiveness of Pakistan's DRR policies in facilitating reconstruction efforts, focusing on challenges and areas for improvement. By analyzing policy implementation in past disaster events, this study aims to provide insights into how DRR can be strengthened to improve resilience and recovery efforts.

PROBLEM STATEMENT

Pakistan's frequent exposure to natural disasters demands a well structured DRR Framework to mitigate risks and facilitate effective reconstruction. The implementation remains inconsistent despite the introduction of multiple policies by the government. The 2005 earthquake and 2010 floods revealed critical gaps in preparedness, early warning systems, and reconstruction planning (Shah et al., 2022). Despite international support and policy advancements, reconstruction efforts often face delays, mismanagement and lack of community participation.

This study seeks to evaluate the practical impact of DRR policies in Pakistan and identify key barriers that hinder effectiveness in post disaster reconstruction. A better understanding of these gaps is essential for developing a more resilient disaster management system that ensures sustainable recovery for affected communities.

RESEARCH OBJECTIVES

This research aims to:

1. Assess the effectiveness of Pakistan's DRR policies in post disaster reconstruction.
2. Identify challenges in implementing DRR strategies, particularly in governance, funding and stakeholder coordination.
3. Examine case studies of past disaster recovery efforts in Pakistan.
4. Recommend improvements for strengthening Pakistan's DRR framework and reconstruction policies.

RESEARCH QUESTIONS

1) How effective are Pakistan's DRR policies in post disaster reconstruction?
2) What are the key challenges in implementing DRR policies?
3) How past disasters have shaped the country's disaster management strategies?
4) What policy improvements can enhance Pakistan's resilience to future disasters?

SIGNIFICANCE OF THE STUDY

This study is crucial for policymakers, disaster management authorities, and researchers in understanding the strengths and weaknesses of Pakistan's DRR policies. This study provides practical insights into how reconstruction efforts can be improved to build safer, more resilient communities through analyzing past disasters. This research also emphasizes the need for community participation and sustainable reconstruction in disaster management.

This study is crucial for policymakers, disaster management authorities, and researchers in understanding the strengths and weaknesses of Pakistan's DRR policies. This study provides practical insights into how reconstruction efforts can be improved to build safer, more resilient communities through analyzing past disasters. This research also emphasizes the need for community participation and sustainable reconstruction in disaster management.

SCOPE AND LIMITATIONS

This study focuses on Pakistan's disaster risk reduction policies and their effectiveness in reconstruction efforts. The research will examine major disaster events including the 2005 earthquake and 2010 floods to analyse the policy implementations and challenges. The study is qualitative in nature and relies on literature reviews, policy analysis and expert insides rather than primary data collection. Majorly it provides valuable policy recommendations, but further empirical studies maybe required to access long term impacts of DRR policies.

LITERATURE REVIEW

OVERVIEW OF DISASTER RISK REDUCTION (DRR)

Disaster Risk Reduction refers to systematic efforts to analyse and reduce risk from natural and man induced hazards. It includes policies, strategies, and measures that minimise disaster impacts by strengthening resilience (UNDRR, 2015).

The Sendai Framework for Disaster Risk Reduction (2015-2030), that was adopted by the United Nations emphasizes on four key priorities listed below:

1. Understanding disaster risk
2. Strengthening disaster risk governance
3. Investing in disaster risk Reduction for resilience
4. Enhancing disaster preparedness for effective response

The Sendai Framework is the Global standard for DRR, influencing national disaster policies worldwide including in Pakistan (UNDRR, 2015).

Figure 1: Sendai Framework 4 Priority Areas
Source: ("Sendai Framework Priority Areas ," 2024)

GLOBAL DRR FRAMEWORKS AND POLICIES

There are many Global initiative that provide guidance for DRR implementation. These include:

1. **Sendai Framework for DRR (2015-2030):**
   Focusses on risk prevention and resilience building (UNDRR, 2015).
2. **Hyogo Framework for action (2005-2015):**
   This framework preceded the Sendai Framework and emphasized disaster preparedness and risk governance (UNDRR, 2015).
3. **Paris Agreement (2015)**
   Highlights the link between climate change and disaster risks. It promotes adaptation strategies (UNFCCC, 2015).

Countries with strong DRR governance, such as Japan and New Zealand, have successfully implemented early warning systems, resilient infrastructure and community based DRR.

PAKISTAN'S DISASTER RISK REDUCTION POLICIES

Pakistan has taken significant steps in DRR the country's disaster management Framework includes:

1. **National Disaster Management Act (2010)**
   This act established the National Disaster Management Authority (NDMA) and Provincial Disaster Management Authorities (PDMA's), that provide a legal Framework for disaster preparedness and response (National Disaster Management Authority (NDMA, 2024).

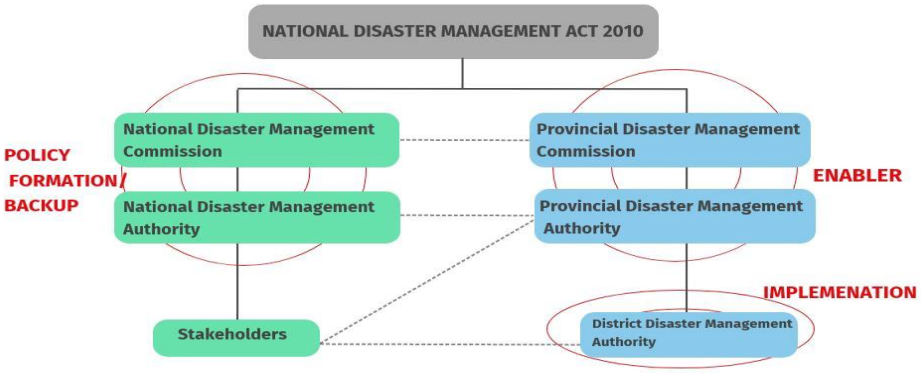

Figure 2 National Disaster Management Act (2010)
Source: (Dossa, 2019)

2. **National Disaster Risk Reduction Policy (DRR) (2013)**
   This policy outlines strategies to integrate DRR into development planning. It emphasizes on:
   - Risk assessment and early warning systems
   - Strengthening community based disaster risk management
   - Enhancing post disaster recovery and reconstruction (Preventionweb.net, 2013).
3. **Climate Change Act (2017)**
   Recognizing the impact of climate induced disasters, this act mandates integrating climate resilience into National policies (Change, 2017).

Despite these policies, implementation challenges remain, particularly in governance, financing and stakeholder coordination.

CASE STUDIES OF MAJOR DISASTERS IN PAKISTAN

THE 2005 KASHMIR EARTHQUAKE

The 7.6 magnitude earthquake caused over 87,000 deaths and massive infrastructure destruction in Azad Jammu and Kashmir (AJK) and Khyber Pakhtunkhwa. The governors response lead to:

- The creation of Earthquake Reconstruction and Rehabilitation Authority (ERRA)
- Introduction of Seismic Building Codes
- International aid contributing to housing and infrastructure rebuilding (Shah et al., 2022).

However, challenges included delayed reconstruction and lack of community participation during the aid distribution (Amaratunga, Keraminiyage and Kaushal, 2017).

THE 2010 PAKISTAN SUPER FLOODS

These floods affected over 20 million people and left damaging their homes, crops and infrastructure completely. Key DRR responsibilities included Development of flood early warning systems, increased investment in disaster resilient infrastructure and establishment of National Flood Protection Plan-IV (2015-2025) (National Disaster Management Authority (NDMA, 2024).

Despite these efforts, poor coordination among the federal and provincial authorities as well as limited financial resources hindered the effectiveness of reconstruction (Shah et al., 2022).

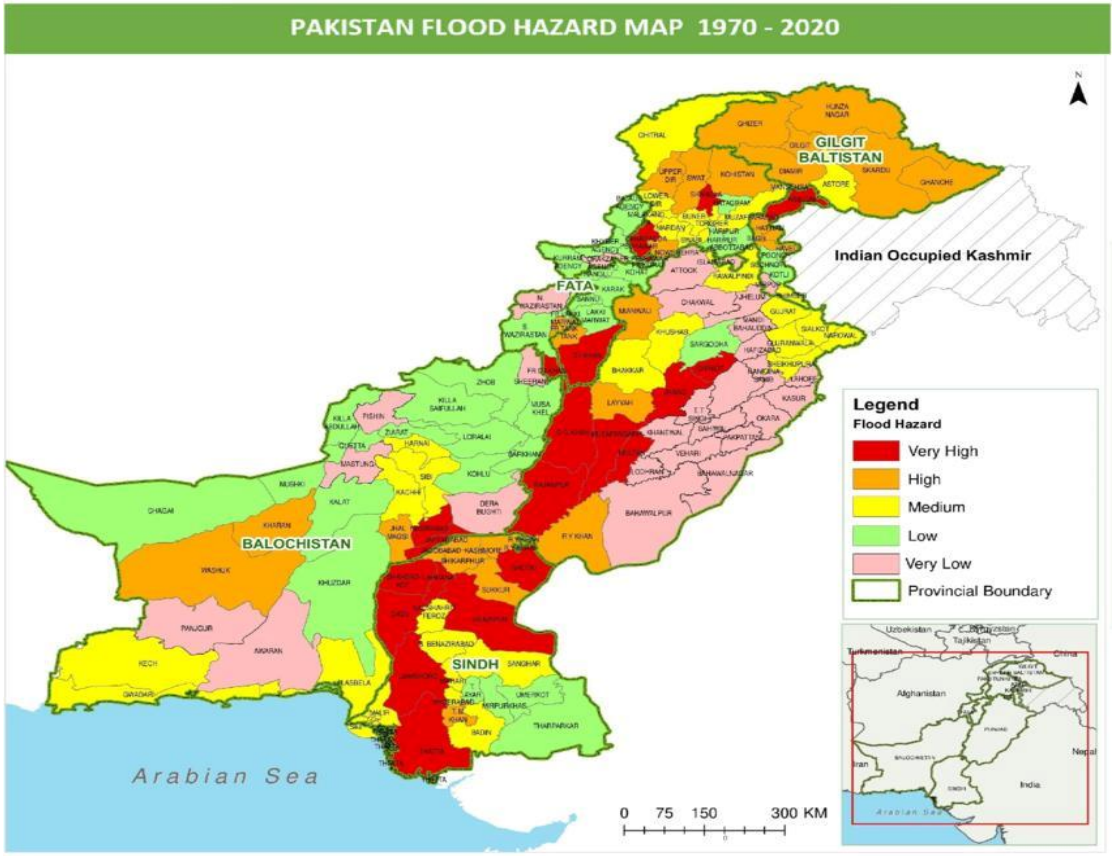

Figure 3 High Risk Areas for flood hazard in Pakistan
Source: ("Hazard Zonation Maps," 2019)

CHALLENGES IN IMPLEMENTING DRR POLICIES IN PAKISTAN

Despite having a strong policy Framework Pakistan faces significant barriers to effective DRR implementation. Lack of coordination between NDMA and PDMA's, and local authorities lead to in efficient response. Bureaucratic delays in fund allocation slow down reconstruction efforts. There are limited financial resources, the country's disaster management budget is insufficient to implement large scale DRR projects. Heavy reliance on foreign aid effects long term sustainability of disaster risk reduction programs. Despite updated Seismic regulations, Maine buildings do not complied due to lack of enforcement as well as the informal settlements remain highly vulnerable to floods and earthquakes. Many DRR programs lack community engagement with ultimately reduces local ownership. Low literacy rates and misinformation limit the disaster preparedness at the grassroots levels (Amaratunga, Keraminiyage and Kaushal, 2017)(Shah et al., 2022).

KEY LESSONS

Based on past disasters, several key lessons can improve DRR in Pakistan. Strengthening the local governance by empowering PDMA's and district authorities for a fit response. By increasing domestic funding for DRR we can enhance the financial mechanisms to reduce the reliance on external aid. Improved enforcement of building codes can be done by ensuring strict compliance, specially in urban centers. Local awareness and preparedness can be promoted through education by investing in these community based Disaster Risk Reduction programs. Expanding the early warning systems using AI and satellite monitoring can be very helpful.

Figure 4 Disaster risk management cycle

Source: ("DISASTER MANAGEMENT in PAKISTAN – Jahangir's World Times," 2021)

RESEARCH METHODLOGY

This research adopts a qualitative approach to analyze the effectiveness of DRR policies in Pakistan. The reason that qualitative research is appropriate for the study is that it enables an in depth exploration of policy frameworks, governance challenges and for the coordination in the post disaster recovery. A case study methodology is used to examine Pakistan's 2005 Kashmir earthquake and 2010 super floods which are two of the most devastating disasters in the country's history. Case study analysis allows for a detailed investigation of policy responses, challenges and lessons learned (Yin, 2018).

DATA COLLECTION

This study relies on secondary data sources that include a comprehensive review of academic research and government reports and international DRR frameworks. Key sources included the NDMA reports on disaster management and DRR policies. Academic journals and case studies on the implementation of DRR policies in Pakistan were also studied. Reports of the World Bank and United Nations (UNDRR) on disaster resilience were also studied. Government policies such as the National Disaster Management Act (2010), National Disaster Risk Reduction Policy (DRR) (2013), and Climate Change Act (2017) are analysed to assess their impact on post disaster reconstruction. Two major disasters of Pakistan are examined

in the study. One is the 2005 Kashmir earthquake where evaluation is done of the role of the earthquake reconstruction and rehabilitation authority (ERRA) in post earthquake rebuilding efforts. Second is the 2010 floods where effectiveness of the NDMA and provincial disaster management authorities PDMA's in flood response and recovery are assessed. These case studies help identify the gaps in policy implementation and funding challenges.

A thematic analysis is used to identify key themes and patterns in Pakistan's DRR policy effectiveness. The analysis follows some steps which are data familiarisation: reviewing collected reports and policies, Coding: categorising key themes such as policy effectiveness, financial constraints and community participation, Theme Development: identifying recurring issues in implementation of DRR policies, Interpretation: drawing conclusions on policy's weaknesses and strengths.

ETHICAL CONSIDERATION

Since this research is based on secondary data, there are no ethical concerns related to the human participants. The study ensures credibility and reability by using official government reports and peer reviewed journals and articles. Proper citation and acknowledgement of all referenced works is included.

RESULTS AND ANALYSIS

Below we will discuss the findings of the study which analyse the Pakistan's disaster risk reduction policies and their effectiveness in post disaster reconstruction. Results of the study are based on case studies of 2005 Kashmir earthquake and 2010 super floods and thematic analysis of challenges in DRR implementation.

OVERVIEW OF PAKISTAN'S DRR POLICY IMPLEMENTATION

Over the past two decades, Pakistan has made significant progress in developing disaster management frameworks. Establishment of the national disaster management authority NDMA, provincial disaster management authorities PDMA's, And the national disaster risk reduction policy (2013) demonstrates the country's commitment to (DRR) (Preventionweb.net, 2013). However gaps in the implementation remain, particularly in the areas of funding allocation, coordination among the community and governance.

.

There is limited integration of disaster risk reduction in development planning, disaster risk considerations are often overlooked in infrastructure projects (World Bank, 2025). Despite the regulatory updates after the earthquake of 2005, still many buildings remain so vulnerable (Shah et al., 2022). Challenges between coordination among stakeholders remain because of the overlapping responsibilities between national disaster management authorities and provincial disaster management authorities as well as the local government create in efficiencies in disaster response (National Disaster Management Authority (NDMA, 2024).

CASE STUDY FINDINGS

An earthquake of 7.6 magnitude cost 87000 deaths and displaced 3.5 million people in the Northern area of Pakistan (ReliefWeb, 2006). After this the government established the earthquake reconstruction and rehabilitation authority that is abbreviated as ERRA, it came into existence to lead the reconstruction efforts. Successful points of this step included the introduction of Seismic Building Codes for an improved and resilient structures. This project gained international aid which rapidly facilitated emergency response and infrastructure rebuilding. Some challenges of this project included the slow reconstruction due to which many affected families had to stay in temporary shelters for years (Shah et al., 2022). Corruption and mismanagement of funds hindered the rapid recovery efforts (Amaratunga, Keraminiyage and Kaushal, 2017). There was lack in community participation due to which reconstruction efforts were useless and long term sustainability was not ensured.

The floods of 2010 affected over 20 million people, destroyed 1.8 million home and cost economic losses of over 10 billion (National Disaster Management Authority (NDMA, 2024). National and provincial disaster management authorities coordinated immediately for response efforts against these floods with the help of international support from the World Bank and UNDP. Successes of this project included development of early warning systems during these times add improved emergency response. National flood protection Plan-IV (2021-2025) was also established to mitigate future risks. Challenges of this project included very slow aid distribution due to bureaucratic inefficiencies (Shah et al., 2022). There was inefficient funding and financial constraints faced for a long term recovery (World Bank, 2025). The reconstruction of many communities was done in high risk areas which will definitely increase future vulnerabilities

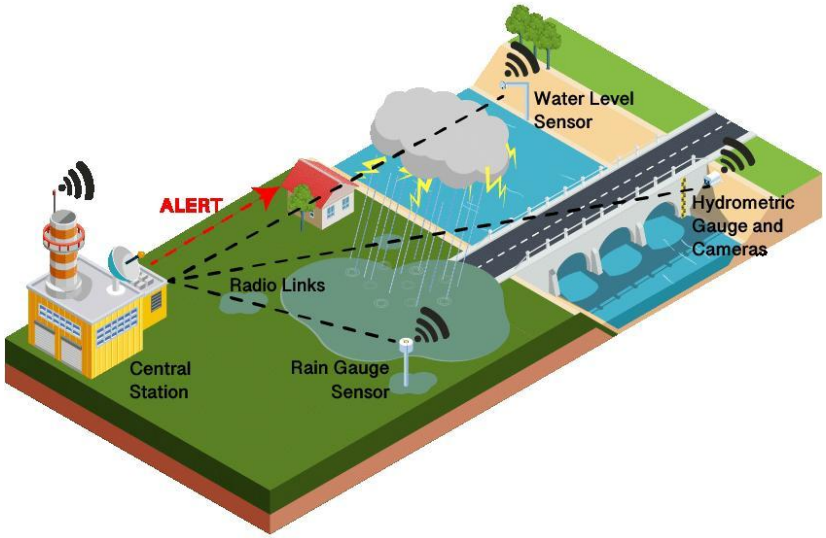

Figure 5 Example of proposed early warning system
Source: ("Example Implementation of a Flood Early Warning System Based...," 2024)

KEY THEMES

Using the thematic analysis, four Major challenges in Pakistan's DRR policy implementation were identified:

Governance and institutional weakness: the lack of coordination among provincial, Federal and local disaster management agencies creates inefficiencies. Overlapping responsibilities of these organisations leads to delay in the reconstruction efforts.

Financial constraints in DRR implementation: reliance on international 8 for disaster recovery instead of sustainable domestic funding is a huge drawback. Very limited budget is allocated for disaster risk reduction which too is not affective for long term reconstruction projects.

Weak enforcement of DRR policies: after the earthquake of 2005 building codes for introduced which are still not consistently enforced. Reconstructed communities are built in high risk zones and their safety is completely ignored.

Community involvement and awareness: lack of local engagement in disaster risk reduction strategies leads to ineffective implementation (Amaratunga, Keraminiyage and Kaushal, 2017). Most of the public is unaware about preparedness of disaster particularly the rural communities.

COMPARATIVE ANALYSIS: 2005 EARTHQUAKE VS. 2010 FLOODS

Table 1 Comparative analysis of Major hazards

ASPECT	2005 KASHMIR EARTHQUAKE	2010 SUPER FLOODS
Impact	87000 deaths, 3.5 Million displaced	20 Million affected, $10 Billion economic loss
Response	ERRA led reconstruction efforts	NDMA, PDMA's coordinated response
Successes	Seismic Building Codes, international aid	Early warning systems, flood protection Plan-IV
Challenges	Slow reconstruction, weak governance	Delayed relief, inadequate funding
Community role	Limited involvement in recovery	Minimal participation in DRR planning

This comparison highlights the funding and governance issues in both disasters despite policy improvements over time.

DISCUSSION

Implications for Pakistan's DRR policies

Based on the findings, several policy recommendations can enhance Pakistan's disaster resilience. Strengthening the local disaster management institutions can improve coordination and reduce bureaucratic delays. Increased funding from the government for disaster risk reduction to reduce reliance on foreign aid. Enhancing enforcement of building and flood plain regulations to minimise disaster risks. Expanding community based disaster preparedness programs can improve local resilience.

Pakistan's DRR policies have evolve significantly but challenges in the community engagement, governance and financing still continue to the effectiveness of these policies. Lessons learnt from the 2005 earthquake at 2010 floods emphasize the need for stronger enforcement of policies, better coordination amongst the national and provincial disaster management authorities and sustainable and better funding from the government is very necessary to ensure resilient post disaster reconstruction.

INTERPRETATION OF RESULTS

The findings indicate that a significant progress in institutionalizing disaster risk reduction policies has been made in Pakistan particularly through the national disaster management authority and all the related frameworks. However some challenges continue to Hinder effective disaster recovery efforts.

Government and coordination issues due to the overlapping rolls of national disaster management authority and provincial disaster management authority and district disaster management authorities create inefficiencies in disaster response. Pakistan haveli reliance on international aid for post disaster recovery that leads to unsistanable financing models for disaster risk reduction (World Bank, n.d.). Weak enforcement of regulations of building codes and flood plain regulations remain poorly enforced. This increases vulnerability to future disasters (Shah et al., 2022). Lack of community engagement in post disaster recovery efforts often lead to a failure because of lack in local participation and integration which is also a key factor in reducing the effectiveness of disaster risk reduction strategies (Amaratunga, Keraminiyage and Kaushal, 2017).

LIMITATIONS

While this study provides valuable insights into Pakistan's DRR policies, it has some limitations. The study is based on existing reports and case studies rather than primary field research, reliance on this type of secondary data can limit this study's implications. Findings are drawn mainly from the 2005 earthquake and 2010 floods which limits the scope of analysis for other disasters. There is a lack of longitudinal analysis because this study does not assess the long term impact of disaster risk reduction policies on disaster resilience. Future research should incorporate field surveys, interviews from the stakeholders and quantitative risk assessments to provide a more comprehensive evaluation of disaster risk reduction policy effectiveness.

CONCLUSION

Pakistan's disaster risk landscape underscores the urgent need for effective DRR policies and sustainable reconstructions strategies. While there is some progress made in developing our national disaster management framework, persistence in governance, financial and enforcement challenges hinder the policy effectiveness. The case studies of both 2005 Kashmir earthquake and 2010 super floods highlight both successive and failures in disaster recovery. Lessons from these disasters emphasize the need of better coordination, strict enforcement of regulations and increased financial investment from the government as well as stronger community participation is necessary for disaster risk reduction efforts. By implementing targeted policy reforms, Pakistan can build a more resilient disaster management system which will be capable of minimising future disaster impacts and ensuring sustainable reconstruction.

POLICY IMPLICATIONS

Based on these findings, several policy adjustments are necessary to improve Pakistan's disaster risk reduction framework. Strengthening disaster governance and coordination by establishing proper and clear rolls and responsibilities for national disaster management authorities and provincial disaster management authorities as well as the district disaster authorities. Enhancing communication and collaboration between inter agencies for disaster response. Improving financial sustainability of disaster risk reduction by reducing reliance on foreign aid which is only possible by increasing government budget allocations for disaster preparedness. Encouraging public private partnerships to fund resilient infrastructure projects. Enforcing building and flood plain regulations by keeping a check and monitor enforcement mechanism for seismic building codes. Implementation of strict penalties for unauthorised construction in high risk areas. Enhancing community based disaster risk reduction by involving all the local communities in disaster preparedness programs. Promoting disaster risk reduction education and training on local levels as well as in schools and community centres. Taking advantage of all the possible means including technology for disaster resilience. Early warning systems can be expanded by using satellite and AI based risk assessments. Development of a centralised disaster management platform for real time monitoring and response. By acting upon these implications there are possibilities for a better disaster risk reduction program.

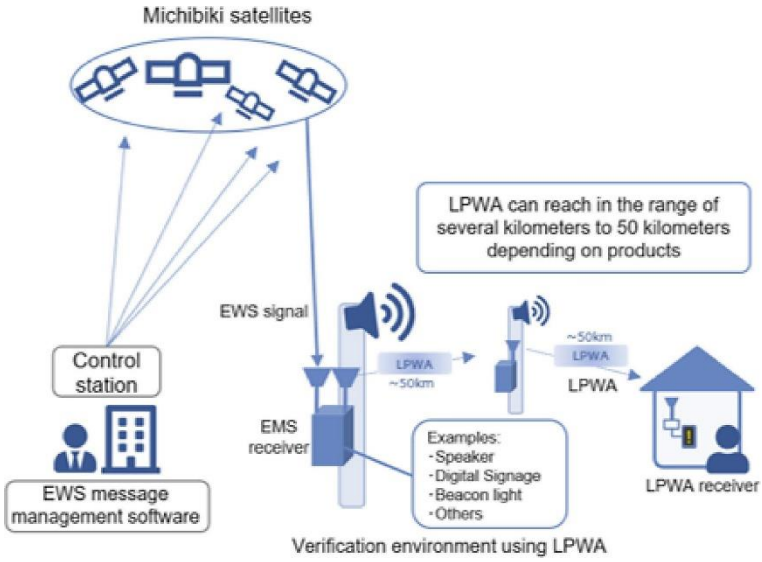

Figure 6 Satellite Early Warning System
Source: (Science & Technology, n.d.)

PRACTICAL IMPLICATIONS

In this study, there are practical implications for policymakers. Those are the local authorities. Hence, known as the disaster management agencies in Pakistan. By knowing the specific commendations, including resilient building codes. As well as, the centralized stakeholder coordination, and community education on DRR. Therefore, it provides an outline for a legal strategy. That is to strengthen disaster recovery practices. Implementing this framework could lead to more resilient and sustainable reconstruction. As well as, reduce vulnerability to future disasters, and strengthen long-term community suppleness.

SOCIAL IMPLICATIONS

Focusing on community engagement and education in DRR has an important social impact. That is by encouraging local populations to become active participants. Especially, in disaster preparation and recovery. It also empowers individuals to take the rights of the recovery process. This community-based approach is in contour with global trends. Hence, it is in disaster management that distinguishes between local knowledge and community-led resilience strategies.

FUTURE RECOMMENDATIONS

Future research on Pakistan's DRR policies should explore the long term impact of DRR policies on disaster resilience. The effectiveness of technology based early warning systems in disaster prone regions. Community perceptions and participation in disaster risk reduction efforts through primary field research. Comparative analysis of disaster risk reduction frameworks in Pakistan and other disaster prawn countries. By focusing on these areas of study can contribute to evidence based policy making, that will ultimately sent thunder Pakistan's disaster preparedness and recovery capacity.

ACKNOWLEDGMENTS

The authors would like to acknowledge the University of Universiti Malaysia Pahang Al-Sultan Abdullah, which collectively funded this project.

REFERENCES

1. Amaratunga, Keraminiyage, & Kaushal. (2017). *Mainstreaming disaster resilience in the construction process: Professional education for a resilient built environment Original Citation Mainstreaming disaster resilience in the construction process: Professional education for a resilient built environment. Project Report. A report of the CADRE project: Collaborative Action towards Disaster Resilience Education*. Retrieved from https://eprints.hud.ac.uk/id/eprint/31907/15/__nas01_librhome_librsh3_Desktop_CADRE%20Report%20Public.pdf
2. Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa
3. Change, C. (2017). Ministry of Climate Change and Environmental Coordination. Retrieved February 23, 2025, from Mocc.gov.pk website: https://mocc.gov.pk/Detail/ZDJmNDFmYzItY2RhNy00N2VmLWI4N2EtYjg5NjJjMjE3NDg1
4. DISASTER MANAGEMENT IN PAKISTAN - Jahangir's World Times. (2021). Retrieved February 24, 2025, from Jahangir's World Times website:

https://www.jworldtimes.com/old-site/pakistan-affairs/disaster-management-in-pakistan-3/
5. Dossa, D. S. (2019, November 19). With vulnerability to disasters extremely high, it's time for Pakistan to adopt a continuum approach. Retrieved from DAWN.COM website: https://www.dawn.com/news/1514907
6. Figure 2. Example implementation of a Flood Early Warning System based... (2024). Retrieved from ResearchGate website: https://www.researchgate.net/figure/Example-implementation-of-a-Flood-Early-Warning-System-based-on-the-IoT_fig2_359165452
7. Hazard Zonation Maps. (2019). Retrieved February 24, 2025, from Mavink.com website: https://mavink.com/explore/Hazard-Zonation-Maps
8. National Disaster Management Authority (NDMA. (2024). National Disaster Management Authority (NDMA). Retrieved February 24, 2025, from Ndma.gov.pk website: https://www.ndma.gov.pk/plans_by_category/5?page=2
9. Pakistan Disaster Risk Management Program. (n.d.). Retrieved from World Bank website: https://www.worldbank.org/en/programs/pakistan-disaster-risk-management-program
10. Pakistan: National disaster risk reduction (DRR) policy 2013. (2013, May 15). Retrieved February 23, 2025, from Preventionweb.net website: https://www.preventionweb.net/publication/pakistan-national-disaster-risk-reduction-drr-policy-2013
11. Pakistan: National Disaster Risk Reduction Policy (2013) | Refworld. (2023). Retrieved from Refworld website: https://www.refworld.org/legal/decreees/natlegbod/2013/en/121377
12. Pakistan: National DRR Policy 2013. (2013, March 14). Retrieved February 24, 2025, from Preventionweb.net website: https://www.preventionweb.net/publication/pakistan-national-drr-policy-2013
13. Report of the Secretary-General on the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 (2023) | UNDRR. (2023, August 30). Retrieved from www.undrr.org website: https://www.undrr.org/publication/report-secretary-general-implementation-sendai-framework-disaster-risk-reduction-2015-6
14. Science, E. M., & Technology. (n.d.). Satellite-based disaster early warning systems can improve evacuation measures in remote Asian communities. Retrieved from phys.org website: https://phys.org/news/2023-07-satellite-based-disaster-early-evacuation-remote.html
15. Sendai framework priority areas . (2024). Retrieved February 24, 2025, from App.goo.gl website: https://images.app.goo.gl/SMQVMdGm1DqQDRq97
16. Shah, I., Mahmood, T., Khan, S. A., Elahi, N., Muhammad Shahnawaz, Dogar, A. A., … Begum, K. (2022). Inter-agency collaboration and disaster management: A case study of the 2005 earthquake disaster in Pakistan. *Jàmbá: Journal of Disaster Risk Studies*, *14*(1), 11. Retrieved from https://jamba.org.za/index.php/jamba/article/view/1088/2199
17. The Kashmir earthquake of October 8, 2005: Impacts in Pakistan - Pakistan. (2006, February 28). Retrieved from ReliefWeb website: https://reliefweb.int/report/pakistan/kashmir-earthquake-october-8-2005-impacts-pakistan
18. UNDRR. (2015). Sendai Framework for Disaster Risk Reduction 2015-2030. Retrieved from UNDRR website: https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030
19. UNFCCC. (2015). The Paris Agreement. Retrieved from United Nations Climate Change website: https://unfccc.int/process-and-meetings/the-paris-agreement
20. Yin, R. K. (2018). Yin, R. K. (2018). Case Study Research and Applications Design and Methods (6th ed.). Thousand Oaks, CA Sage. - References - Scientific Research Publishing. Retrieved from www.scirp.org website: https://www.scirp.org/reference/referencespapers?referenceid=2914980
21. (2025). Retrieved February 24, 2025, from World Bank website: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/858541586180590633