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The Role of Institutions in Disaster Risk Management and Mitigation in Punjab Pakistan

Yasmeen Abid Maan
Assistant Professor, Architecture Department
Lahore College for Women University, Lahore.
yasmeen.arch@gmail.com

Maryam Jameel
Lecturer Architecture Department,
Lahore College for Women University, Lahore
maryamjamil18@yahoo.com

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Abstract: The role of institutions in determining the capacity of disaster resilience in communities, settlements and regions is very important and influential in operationalizing the DRR strategies deterministically. The domain of risk reduction frameworks in urban as well as rural settlements in Pakistan have been focused very less in last few decades; so therefore establishing a Disaster Mitigation Framework in context of either category of communities is categorically significant in a time frame when Pakistan transits from agrarian economy to more Urban based and industrial state. For Pakistan to achieve moderate to prolonged continuation of contemporary economic development, it must resolve the threats raised by natural catastrophic events, particularly for agricultural / rural regions as 75 % of economy is driven through this sector in the country. Understanding the significance of disaster mitigation for workable environmental, economic, and social development, the Government of Pakistan has undertaken the establishment of effective strategies, institutional and legal provisions along with the execution of policies to reduce disruption and vulnerability. An account of the factual participatory roles of various institutions in context of hierarchal accord as well as the potential capacity of each segment has been established in this research with a projected vison for improving effectiveness of the institutions to assert DRR strategies through either structural or non-structural measures, to make communities disaster resilient. The analysis of potential of capacity building in Institutional management as functioning for rural settlements in Punjab is also established in this research. The productive performance of institutions will render the DRR Strategies as a sustainable solution for making disaster prone communities as resilient. The dire need of strengthening the documented institutions is indicated with an absolute requirement of performance indicators for all quarters

Key Words: Disaster Risk Reduction, Institutions, Rural Settlements, Capacity Building

Introduction

The comprehensive structuring and administration of institutional responsibilities and functions in coping with catastrophes is referred to as disaster risk reduction and management (Quarantelli, 1988; Wisner et al., 2004; UNISDR, 2009).The four phases of a disaster management cycle, which include prevention/mitigation, readiness, response, and relief/recovery, activities and arrangements are often categorized into these phases (Noji, 2005).According to Neal (1997), these phases really aren't necessarily exclusionary since societal, economical, and environmental contexts are not always consistent through time and scale, and various actors, institutions, people, and groups might be involved in different phases of a hazard at the same times. Distinguishing these phases conceptually is also challenging because they may not be easily distinct from one another(McEntire, 2007).Disaster risk management largely refers to the systematic organization and management of institutional roles and responsibilities in dealing with emergencies (Quarantelli, 1988; Wisner et al., 2004; UNISDR, 2009). These actions and arrangements are generally divided into four phases of a disaster management cycle, comprising of prevention/mitigation, preparedness, response, and relief/recovery (Noji, 2005). Neal (1997) argues that these phases are not mutually exclusive as social, economic, and environmental settings may not necessarily be homogenous across time and scale, and different actors, institutions, individuals, and communities can be engaged within different phases of a disaster at the same time. Conceptually, it is also difficult to separate these phases as they may not be neatly distinguishable from each other (McEntire, 2007). These phases are used in this paper as an organizing concept to highlight the role of different institutions and are not considered deterministically. Disaster management, therefore, is seen here as a complex and non-linear phenomenon that involves multiple processes of active coordination and collaboration between different actors and institutions to operationalize policies, strategies, and skills to build capacities during all phases of the disaster management cycle in order to minimize the impacts of hazards, save lives, improve livelihoods, and protect valuable assets and infrastructure. From experiences of large-scale disasters such as in New Orleans following Hurricane Katrina, many scholars emphasized the need to minimize bureaucracy and empower local institutions to manage potential hazards (Westley et al., 2008). Similarly, in a study of local and indigenous institutions and networks in American Samoa, Rumbach and Foley (2014) argue that such institutions play a vital role in terms of emergency decision making, dividing roles and responsibilities, supporting vulnerable groups, and providing communication links between internal and external actors. It is no surprise then that international support agencies acknowledge the value of community-based disaster preparedness as local communities and institutions are deemed the first to initiate rescue and relief efforts (International Federation of Red Cross and Red Crescent Societies, 2010). Such efforts are increasingly important to foster resilience and a capacity to withstand disaster events, as a part of reducing and managing risk.In developing countries, there seems relatively less focus on risk reduction interventions (Kreft and Eckstein, 2013). This lack of concern is largely attributed to the seemingly unfavorable cost-benefit ratios between prevention and preparedness measures as compared with those of response and relief efforts (Mustafa, 2003). This leaves a serious gap in skills and capacity at different organizational levels to operationalize disaster risk management and reduction efforts (Ainuddin et al., 2013). The 2014 Global Climate Risk Index places Pakistan third among the countries most affected by extreme weather events in 2012 (Kreft and Eckstein, 2013). In terms of percentage of gross domestic product (GDP), Pakistan's losses from flooding in 2010 (5.8 per cent of GDP for 2009/2010) were relatively greater than those of Japan in the 2011 tsunami (4.6 per cent of GDP (National Disaster Management Authority, 2013)).

Literature Review

Pakistan is transitioning from a largely agrarian based economy to an economy that is urban, service-based, and industrial. Since last few years, at a remarkable rate of over 6% the economy has developed due to the government's macroeconomic policy initiatives. Natural disasters, even as October 2005 earthquake did, disrupt sustainable economic development by triggering shocks. The earthquake triggered a deficit of USD 5.2 billion, that is drastic relative to something like the USD 25 billion national budget for 2006-07. The number was far higher than the overall social assistance funding allocations. Correspondingly, after 1947 the economic loss sustained by 14 massive floods was measured at USD 6 billion. 1998-2001 drought has shown that this crisis can have significant social, economic, and political implications. Droughts in particular in NWFP, D. I. Khan, Tharparkar, Southern Punjab and in Baluchistan are actually threatening sustainable growth in environment, food security, water resources, livestock, and agriculture sectors. The 2001 drought restricted economic growth rate to 2.6 per cent in comparison to an average rate of growth of almost 6 per cent. It is therefore not a coincidence that disaster-related areas are one of the poorest areas, e.g., Northern regions, Cholistan, Tharparkr, and Balochistan. Pakistan is sensitive to catastrophe threats from a number of vulnerabilities involving tsunami, river erosion, insect attacks, landslides, outbursts of glacial lakes, flooding, epidemics, earthquakes, droughts, storms/ cyclones, and avalanches. Owing to several causes, human-induced hazards that endanger the population include community internal displacement, civil conflicts, forest and urban fires, oil spills, industrial and transport. Significant risk threats in order of magnitude and impact size are: - landslides, windstorms, flooding, droughts, and earthquakes that in the past have caused significant disruption and destruction. Pakistani society's susceptibility to threats lies under a multitude of reasons. This would include impoverished construction techniques, poor management of agricultural and livestock production, and vulnerable natural environment, ineffective early warning systems, level of comprehension, poverty, and education. Inadequate networking systems and a scarcity of essential public services worsen neighborhood vulnerabilities. Limited availability of better land for development in mountainous areas, dispersed population dynamics and adverse weather environments further exacerbate vulnerability. The magnitude and development of animal and human community, destruction of the environment resulting through poorly controlled mechanisms of urbanization and industrialization, and environmental issues and instability are significant structural constraints which accelerate Pakistani contemporary society vulnerabilities. Intensity, severity, and influence of such dangers may escalate in the upcoming years that might result in increased, economic, social, and environmental consequences.

To address these concerns, this paper uses systematic analysis to look at the functions of disaster management structures. This period is of particular important because it reflects the evolution of disaster management policies, strategies, legislations, and institutional frameworks as a remnant of the post-colonial era. This research provides a brief description of the factors, implications, and vulnerabilities of floods in the province of Punjab. In addition, the role of flood mitigation institutions at varying tiers and the initiatives taken to mitigate floods at institution level in the region of Punjab are addressed.

ROLES OF DEPARTMENTS INVOLVEDIN STRUCTURAL MEASURES FOR FLOOD MITIGATION

Irrigation Department

The Punjab irrigation network encompasses of reservoirs, tube wells, small dams, flood control systems and irrigation canals. There are 14 main reservoirs flowing in the center of this valley on the five rivers, including a gross off-take channel capability of 1.2 lac cusecs irrigation resources, and an additional around 1.1 lac cusecs capability of inter-river connections. Department of irrigation oversees, lays out strategy recommendations for establishment of province's irrigation network. Roles and responsibilities of the department regarding disaster risk reduction and management include the mitigation, preparedness and rescue measures specifying to conduct assessments and evaluations of flood prevention services as well as support municipal authorities in the implementations of recovery plans of PDMA.

Housing, Urban Development & Public Health Engineering Department

The Department's aim is to encourage the advancement of sustainable and accessible urban housing and the delivery of healthy and drinkable clean water to marginalized communities, to alleviate the deprivation of folks consuming water from rural areas and to mitigate water-borne infections. Department's core roles in the area of disaster risk mitigation are Establish comprehensive disaster risk management strategy to tackle disaster risks and hazards relevant to departmental assets and directive.

- In annual budget. allot funds for the execution of disaster risk mitigation programs regarding access to safe and clean drinking water.
- Regularly update databases for all water resources using the Management Information System (MIS).
- Collaborate with PDMA / DDMAs and collectively determine necessary measures to reducing the risk and vulnerability of services and infrastructure.
- Continue providing piped water in a sufficient supply for drinking and housekeeping activities.
- Prevention of water resources from contamination by pollution control of streams and consistent water treatment.
- Prepare a technical design for risk management for previously unrecognized schemes as immediate response and mitigation process.

Agriculture Department

The key responsibilities of Agriculture Department are related to disaster risk management are summarized as to effective monitoring of post and during disaster situations as well as assess disaster threats in hazard-prone areas for agriculture and food sectors, specifically in relation to pests, droughts, and floods. Agricultural Land Levelling and Installation of SailabaBundat /Dykes to control rainwater runoff, thus retaining dampness for use in the cultivation of Sailaba (flood) and planning new land on beds of stream built after silting.

Planning and Development Department (P&D)

The department as being the major planning unit of provincial government manages and tracks initiatives dealing with provincial development designed by the provincial departments. It plans an overarching Five Year Plan for the province and the strategic planning plan annually. P&D department functions as a conduit among several departments to boost effectiveness and excellence of the province's economic growth.

Communication and Works Department

The objective of C&W department is to respond to the socio-economic requirements of province as in case of raised state of costs by the construction of road networks and infrastructure to facilitate growth pursuits. In relation to disaster risk mitigation the key roles include establishing municipal standards for construction within potential vulnerabilities, e.g., landslides, earthquakes, floods, etc. varying from small to large scale projects during Mitigation and Preparedness.

Local Government and Community Development Department

Municipal government is a public corporation, regulated by the people's nominated officials. Municipality as such is the legislative legal body whose actions carry the power of law within just a particular geographic region and are representative of the centralized structure and share the responsibility for the procurement of various public facilities with certain tiers of government. The strategic roles of this segment are to Designate funds to incorporate disaster risk mitigation programs in remote regions through the annual budget.Conduct hazard risk and vulnerability evaluation for remote areas Collaborate with PDMA and collectively define suitable steps to mitigate vulnerability and resilience in building community. Carry out an overview of the vulnerability of local government properties and facilities in hazardous areas. As response to Disastrous Calamity, it is responsibility of local bodies to Equip and improve emergency response department capabilities within the department to provide integrated emergency operations.

ROLES OF DEPARTMENTS INVOLVEDIN NON-STRUCTURAL MEASURES FOR FLOOD MITIGATION

Health Department

Health Department is an executive branch to provincial government and is liable for delivering health care and coping with other problems relating to health industry regulation in the context of provincial and federal healthcare resources and recommendations. Department of health offers technical support, legislative enforcement, and execution of such prevention services primarily. The core roles in the area of disaster risk mitigation are Serve as a catalyst for coordinating all facets of emergency preparedness, treatment, and rehabilitation in a state of disaster in good cooperation with PDMA.To assign funds to the annual budget for the execution of disaster risk mitigation programs.Collaborate with PDMA and collectively determine effective measures to reduce exposure to health threats.Perform hazard-based analysis of all medical services, including vulnerability evaluation (infrastructure and organization) and incorporate risk management initiatives

Environment Protection Department

Department of Environmental Protection, Government of Punjab provides a significant function in enhancing the wellbeing of the common man and in carrying forth a significant shift in the community through reducing and minimizing the negative environmental impact of effluent discharges from industrial operations, waste of all sorts and contamination that is harmful to public health, welfare, and well-being. The Department intend to implement quantitative and qualitative criteria intended for the disposal of pollutants, industrial effluents, contaminants of noise or air, whether for specific use or for a specific source or region, in context of National Environmental Quality Standards as well as other standards set out in the Pakistan Environmental Protection Act, 1997 and also any rules and regulations set out therein. The core roles and responsibilities in the context of disaster risk management are: Apply environmental policies, regulations, and guidelines within the province

Establish structures for surveying, monitoring, and sampling of contaminants and establish a facility for research and analysis.

- Take initiatives to strengthen sustainable growth and include knowledge on environmentally friendly technologies.
- Integrate the assessment of natural disasters in the guidelines for environmental impact assessment.
- Build professional capability of departmental personnel to conduct disaster risk evaluation and mitigation practices in the environmental field.
- Taking measures to determine the susceptibility of natural infrastructure (forests, wetlands, waterways, conservation areas) to environmental and human hazards.
- Develop measures for the protection and restoration of natural resources to mitigate the threats of environmental perils, e.g., reforestation, protection of natural reserves (e.g., reservoirs, dams), combating desertification.
- To provide funding for the development of projects to preserve and incarcerate the environment and natural resources, in particular in upstream river systems as *Mitigation.* Moreover, establishing an organizational cell for emergency management to adapt for environmental emergencies is core role of the Department in developing preparedness for countering the hazardous situation. The recovery of natural degradation and liabilities in the midst of disasters accounts for response plan

Finance Department

The Department of Finance is concerned for supervising and monitoring municipal funds, planning provincial budgets, formulating Budgetary Regulations and Civil Services Regulations related to Civil Servants' salaries, perquisite, and pension, handling public debt, and administering the Audit Division of Local Fund and Treasuries.

Information Technology Department

The department promotes policy development of Information Technology relevant to personnel and technology development. The department would assist in the creation of a disaster risk mitigation software to be used by the department as well as the PDMA on disaster risk management. Certain disaster risk mitigation functions comprise of Preparedness for a disastrous situation and therefore focus on planning infrastructural and communication services for response to emergency conditions.

Industries Department

The Industries Department's mission is to facilitate and promote Industry. Role of department in Mitigation and Preparedness includes development of systems for tracking industrial sector implementation of the DRR guidelines and to make sure that the entire industrial area / region has built-in protection / risk safety systems in the construction plan's complete framework to compensate not only for fire but for chemical leakage also. Inclusion of appropriate waste disposal method for both solid and liquid wastes in industrial zones. Industrial department establishes an incentive and disincentive framework for industry to facilitate disaster protection applications and develop awareness-raising projects on integration of disaster risk mitigation into project development and execution processes for the industrial sector as well as the Chambers of Commerce and Industry (CCI). They track

and promote the adoption of industrial health safety standards as well as establish regulations in hazard-prone areas for the industrial sector to assure safety of manufacturing processes and industries and disaster risk mitigation strategy in consideration of the Department's mandate. The department prepares industry inventories depending on the form of raw materials and chemicals being sourced in manufacturing goods, and risks faced by specific categories of factories and Strengthen physical capacity to withstand all kinds of potential industrial disasters, like chemical hazards" after sufficient reprocessing.

Forest, Wildlife and Fisheries Department

The department is responsible for aquatic resource, wildlife, and forest protection. Some of the Disaster risk mitigation roles includes provision oftechnical guidance on planting rangelands and elevating tree nurseries for forestry and reforestation initiatives. To collaborate with PDMA as well as other research organizations to collect data on the risks and threats that may contribute to desertification of rangelands. The department publishes content on the seasonality of dangers and threats in pasture and water management areas for communities and other stakeholders. It manages animal pasture in areas of rangeland which have vulnerable tree species.

In response to flood disaster, the department organizes emergency management endeavors through the PDMA and render all sorts of services accessible to PDMA where appropriate upon receipt of any disaster scenario notification. It creates a Disaster Management Unit /Rescue Team to tackle any disaster problems such as flooding, fire, etc. The department provides staff trained in first aid, livestock care, civil defense, firefighting, etc. as well as the equipment for earthquake, storms, flood, and fire includes birds and animals moving special vehicles, firefighting equipment, motorboats, water lift pumps etc.

Mines And Minerals Department

The Department of Mines & Minerals mission is to enhance and support the advancement of mines & minerals. Having regard to the following listed Laws and Regulation Acts, (Electricity Rules 1937, Consolidated Mines Rules 1952, Metalliferous Mines Regulation 1926, Coal Mines Regulation 1926, Mines Act 1923); Mining Inspectorate establishs a disaster risk management strategy to tackle disasters and hazards in regard to the assets and mandate of the department.In the annual budget, assign funds for the execution of mining and industrial safety regulations. It cooperates with PDMA and collectively define effective steps to minimize the risk of mining and industrial accidents and conducts annual inspections of each mine in order to enforce the safety requirements of the Mines Act, 1923, Laws and Regulations rendered in compliance with at least 10 inspections each month. It prosecutes in the event of serious accidents and impose legal measures against the defaulting parties, as provided under the statute and addresses mine emergency situations by ensuring mine technicians / proprietors with emergency services at all mines in the aftermath of a disaster.

Education Department

In mitigation and preparedness, the department's key roles on disaster risk management are designing a disaster risk management curriculum for universities, colleges, and schools, primarily in hazard-prone areas and introducing initiatives at the college and school level to maximize student understanding and encourage cumulative preparedness in the enlightening institutions by implementing exercises, drills etc. It helps in reconstructing all new universities, colleges, schools, and additional educational

infrastructure sited in hazardous zones to meet higher benchmarks of hazard resistance and incorporates steps to mitigate vulnerability of developed infrastructure in the education field in hazardous areas such as retrofitting, repair, rehabilitation etc. It incentivizes community education organizations and teachers to brace and incorporate preparedness plans for school disaster.

In Response to the disaster provisional education assistance is provided by the department to maintain quality of learning in times of disaster.

Special Education Department

The Department of Special Education seeks to create a healthier socioeconomic atmosphere by serving the chronically disabled and socially deprived.

In Mitigation and Preparedness of floods the department performs investigations in province's hazard-prone areas to recognize highly vulnerable communal classes. It develops departmental disaster vulnerability plans for the highly vulnerable demographic groups, e.g., disabled, children, women minorities prior and throughout the disasters. The department collaborates with PDMA and the Human Rights, Law and Justice Ministry to assure that disaster relief addresses the needs of the most vulnerable social classes as well as in resettling of poorest and most vulnerable casualties of disasters by rehabilitation and training centers. Various programs are developed by the department to increase awareness and preparedness for the most vulnerable social classes.

In Response to the mitigation efforts the department renders institutional provisions for the procurement of disaster recovery and relief support to the most distressed social classes (establishment of a commission, setting up of disaster response offices). It administers post-hospital treatment, healing, and rehabilitation of vulnerable and poor patients after a disaster and facilitates the rehabilitation and recovery of all underserved populations in post-disaster instances.

Pakistan Red Crescent Society

Red Crescent Society of Pakistan acts as a government support to alleviate deprivation of the most unprotected in need, deprived of injustice. It supports the municipal institutions in the case of conflicts, disasters, and emergencies, but does not substitute them. The Society 's core initiatives include humanitarian work during and after crisis, disaster recovery, and supplementary welfare and medical facilities, with a wide variety of initiatives for the less fortunate and disadvantaged in urban as well as rural places. In emergency situations, the Society offers medical care ambulance, along with search and rescue facilities. It has a successful and continuing capacity building program with district government officials. volunteers, and CBOs.

Discussion

The Institutions of Punjab Province responsible for Disaster Risk Management at all levels have been described above. The discussion has evolved need to focus on managing all aspects of disasters, from prevention, preparedness, and preparation to disaster recovery. The performance of NDMA, PDMA and DDMAs has had mixed outcomes in disaster response since its founding in 2006; throughout time, though the mandate has been redefined and developed to become more effective. Geography, climate, and economic conditions all posed numerous threats to effective disaster management, while also

posing several difficulties at institutional levels so as to achieve decrease disaster impacts on member states. The constraints include a limited resources inclusive human as well as physical infrastructures. Similarly, the use of ineffective national organizations to supplement regional coordination units also lacks with almost nil performance indicators. This profile of hazard preparedness necessitates the coordination of different actors as well as engagement with a large network of regional collaborators.

The Irrigation Department regulates the water flows and is kept aware of the flood management infrastructure's condition. The author attended a consultation session that took place after the 2014 flood and discovered that the absence of the Irrigation Department from the field culminated in significant destruction to settlements. Owing to a lack of cooperation, data regarding the water discharge from flood control facilities is not being disseminated to the irrigation department and information about flood alerts is not being given to the PMD. Another point of view is that although the Pakistan Army is one of the key organizations, it carries out its duties in compliance with its defined role. The Pakistan military has robust communications facilities, qualified officers, and professional manpower.

Conclusion

All the institutions engaged with flood mitigation have been explicitly delineated in legislation or DMPs. The vulnerability of community is found to be intensified as to shortage of capacity of local governments as reflective through in-depth research methodology. Owing to a shortage of necessary equipment and personnel, the emergency response exercises have not been performed. The transfer of powers to district management and Tehsil Level Management in times of emergency does not fulfil the mechanism attributed as District Disaster Management Plans (DDMPs) are not equipped for emergency response actions. Transferring flood control duties to TMA, and to the degree that the latter's responsibilities were still in effect during flood seasons, is another consequence of the absence of DDMAs. While lacking in ability, TMAs are unable to conduct most DDMAs duties, including early warning.

In brief, on one side, organizations are not fully informed of all their obligations, yet, on the other hand, functions and responsibilities overlap. In this case, the lack of horizontal coordination between DMA districts and other line departments is noted (Rahman, 2010). It is therefore suggested that better communication be developed. Owing to an inadequate number of trained professionals, the disaster mitigation institutions cannot withstand a flood emergency scenario. Institutional capability deficits have implicitly enhanced community vulnerability because they have neglected to offer the community prompt flood warning; setting up relief and recovery operations; infrastructure maintenance; and integrating DRR initiatives into infrastructure. While Pakistan has developed a DRR strategy and governance framework, it requires more financing, political commitment, and coordination of efforts among disaster management organizations. The majority of the focus is on response and rescue. The preceding explanation clearly indicates that the DRR implementation method must be enhanced to minimize flood losses.

To be effective in providing comprehensive disaster management outcomes, PDMA must traverse all of the obstacles. It must manage the various organizational needs required to adapt to the complexity of disaster management in a challenging situation.

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