

Emergency Response Planning in Residential High Rise Buildings of Kathmandu Valley

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Abstract

Kathmandu Valley is highly vulnerable to disasters and people are aware of the risks yet there is very low effort for preparedness. We are now taking the path of 'development' with high-rise buildings, basement parking and wide roads. But a well-structured response system with well-functioning services during emergencies is still lacking in areas such as search and rescue, ambulance and fire services. Fast and effective response can save lives. A building must have a safety policy, emergency response procedure and elaborate evacuation plan specific to the needs of the people of the complex, design and layout of the buildings, open spaces and current people available for response during an emergency. This research aims to study and evaluate the effectiveness of policies behind these factors and their implementation, also involving the building user's perception towards them.

Keywords

Emergency response; preparedness; policies; high-rise; apartments

1. Introduction

Kathmandu is one of the fastest growing cities in South Asia, with a population of around 3 million people. The geography lying on a major fault line, places it at a significant risk of an intense earthquake. Out of 21 cities worldwide that lie in similar seismic zones, it is at the highest risk in terms of impact on people.[1] Incidences of fire are not rare cases in the valley as well. Weather extremities due to climate change also add to the risk of frequent flooding. The increasing demand for housing facilities of people migrating to urban areas for better opportunities and quality life has led to the development of multistory buildings in the form of collective and apartment housings in the limited available land. But the rapid, haphazard urban development including non-compliance with the building code, failure to use qualified engineers or trained masons, encroachment of buildings on open space, and depletion of the water table is increasing its vulnerability at a significant rate.

Out of 73 apartment projects with building permit, 23 have already been completed, 4 have been banned from construction while others are still under construction.[2] Because of the 2015 earthquake, high

rise apartment were seriously affected not much from the structural safety point of view but from psychological concerns. Many highrise apartments remained vacant as a result.[3] People were trapped inside the building in the recent cases of disasters. Due to the lack of effort in preparedness in such sectors, it is no truth that serious consequences might not be faced in the near future due to a major impact.

People are erecting stories taller than the allocated building height. Authorities have lagged behind to enforce the standards even after the 2015 building code amendments. They are unsure about the implementation of Emergency Response Plan (ERP) provisions in the high rise buildings after building construction completion. Other social factors such as lack of evacuation spaces, quick access to nearby health services, lack of awareness etc. also contribute to the increasing vulnerability among the residents of apartments in Kathmandu valley.

This paper aims to investigate the effectiveness of the current regulations for emergency response planning among the residential high-rise buildings of Kathmandu valley through the study of existing frameworks and practices, understanding the current

perception of safety and awareness of the occupants and analysing the existing gaps. It focuses on only the hazards that have previously occurred in Kathmandu valley with respect to other emergency risks in high rise type buildings. Since this research was conducted during the active situation of COVID-19 pandemic, site visits and data collection methods were also limited.

2. Literature Review

Reviewing literatures concerning the recent disasters in residential high-rise buildings of Kathmandu valley reveal lag in emergency decision making, sloppy guidelines for occupants safety and site selection for apartments construction. A combination of these factors resulted to the large destruction of properties and few casualties, such as those relating to: damage in Park-View Horizon Apartments due to April 2015 earthquake; flooding in Metro Apartments in 2019; the recent fire in Soaltee City Apartments in 2021 with 3 injuries. Though high-rise structures have a serious impact on evacuation; but ineffective emergency services response and poor plan communication with the building occupants may often exacerbate the rate of fatalities. Therefore, it is equally important to provide awareness and understanding of emergency services' communication to building occupants along with proper monitoring and enforcement of construction policies.

2.1 High Rise Building

The exact height above which a particular building is deemed a high-rise is specified by fire and building codes for the country, region, state, or city where the building is located. [4] According to NFPA, they are defined as the building where the floor of an occupied story is greater than 75 ft (23 m) above the lowest level of fire department vehicle access. The International Conference on Fire Safety in High-Rise Buildings defines it as "Any structure where the height can have a serious impact on evacuation." In the context of Nepal, NBC 206- Architectural Requirements defines high rise buildings under category S3: 9 to 39 Stories or 25m to below 100m as the buildings that are beyond the reach of normal firefighting provision on the ground. In case of emergency, the rescue operation shall require the use of fire lifts in the upper floors.

2.2 Apartment

A building containing more than one dwelling unit i.e., three or more living units with independent cooking and bathroom facilities are designated as apartment houses, condominiums, or garden apartments.[5] According to NBC 206/2015- Architectural Requirements based on occupancy, Sub Group A3 which shall include any building or structure which provides residential units in a single building for three or more families, living independently of each other are categorized as Residential Apartments.

2.3 Emergency

An emergency is any situation or occurrence of a serious nature, developing suddenly and unexpectedly, and demanding immediate action.[6] In the framework of response and recovery, it is an event that can be responded to using the resources available at hand, implying that there is no need to request external assistance. An emergency can deteriorate into a disaster if urgent action is not taken, or if the intervention measures are overwhelmed.

2.4 Emergency Response Planning

It is an integrated set of policies and procedures to prepare for, respond to and recover from emergency incidents, to take control of the event and minimize the consequences.[7] It must be flexible, specific to the incident type and provide resources to deal with the situation. It must identify the sources of critical resources and necessary procedures to activate the resources in appropriate time. The cornerstones of emergency response planning is shown in Figure 1. The six steps to developing an emergency plan are discussed below:

2.4.1 Creating the Planning Team

Team members may include representatives from management, human resources, engineering and services, health and environment, public relations and security. The size of the planning team will depend on the operations, requirements and resources and their responsibilities should be clearly defined.

2.4.2 Assessing the Risks and Company Capabilities

This includes performing hazard analysis by determining the types of potential and actual hazards, estimating the probability of the hazard occurrence, estimating the number of people likely to be exposed and estimating the extent of losses arising out of potential emergencies. Next, the resource requirements for the plan, considering the types of resources that will be needed, level of resources required for an effective response and resources currently available. E.g., facilities, equipment, supplies, staff expertise, personnel employee experience and level of training.

2.4.3 Developing the Plan

For this, a clear objective must be set in order to maintain focus. Step-by-step approach can be used to develop the plan and existing plans and community emergency response plan must also be reviewed. The emergency preparedness needs of the occupants should be determined. The key functions of the team members needed to handle each potential emergency situation should also be identified and assigned with a responsibility. An organizational chart setting out the emergency functions and who is responsible for them can be developed and a backup person for every function should also be designated. We should also make sure adequate number of people are in the response team.

2.4.4 Implementing the Plan

An effective communications system can help for the success implementation of a plan. We must train all persons who play a role in the emergency response plan and conduct a drill. Personnel Trainings with detailed procedure for all types of hazards and specialized duties and frequent drills related to evacuation, communications, fire control, medical assistance and first aid, monitoring and cleanup should be conducted. Necessary resources according to the risk assessment must be assembled in an orderly and coordinated manner.

2.4.5 Evaluating the effectiveness of the Plan

An annual review should be conducted, identifying weaknesses and recommending actions for improvement. Management and employee health and safety representatives should participate in all steps and corrective actions should be recommended.

2.4.6 Improve the Plan Continuously

Changes should be made in the existing response plan to implement corrective actions and improve its effectiveness.

2.5 Emergency Response

It shall be specific for specific scenarios. For example, in the case of fire:

- Alarm Activation: Internal Alarm, External Alarm, Off-site Alarms
- Use of Emergency equipments such as fire extinguishers in case of small fire
- Following fire response guidelines such as evacuation procedure, activation of emergency response team, using safety equipments, search and rescue and communicating to the responsible department.
- Emergency Evacuation Procedure using the designated fire exit routes and onto the staging ground.
- Response to power failure
- Shutdown procedures
- Providing Victim Support
- Crisis Management
- Reporting and Communications
- Incident Investigation
- Damage Assessment
- Cleanup and Restoration Plan
- Claims Procedure

2.6 Apartment Construction and Disaster Management Guidelines and Regulations

The Joint Housing Building Construction Approval and Monitoring Procedure 2070 mentions the necessity of procedure related to Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for apartments with units more than 5000 to 10,000sq.m. and 10,000sq.m and more respectively. Expert committee to inspect the construction as per requirements of Building Code



Figure 1: Cornerstones of Emergency Management

2055, NBC 206/2015 and construction of joint housing act. The Joint Housing Ownership Act 2054 mentions the ownership, responsibility and expenses of facilities such as open spaces and building services under collective interest except the partial building damage due to disasters shall be repaired by the founder or committee. The criteria for width of access roads, setbacks, FAR, building height, ground coverage, plot requirements, aviation regulation and open space requirements are elaborated in the KVDA Bye laws 2046. The requirements for provision and sizes of exit doors, staircases, width of corridors, lifts, basements, refuge area, emergency staircase, fire hydrants, fire storage tank, standby pumps and lightning arrestors are mentioned in NBC 206/2015-Architectural Requirements, NBC 207/2003-Electrical Requirements, NBC 208/2003-Sanitary Requirements and NBC 107/1994-Fire Safety Requirements respectively. NBC 108/1994- Site Considerations for Seismic Hazards mentions the examination of site conditions for active fault planes, liquefaction susceptibility and slope instability.

Similarly, the Building Act 2055 authorizes DUDBC as the responsible committee for supervision of construction works, formulation and implementation of Building Codes also supervised by the Urban Development Office of KVDA. Town Development Act 2045 mentions the approval for planning and operation of physical development from KVDA. KMC Building Construction Procedure 2075 mentions the registration and supervision of building permit and building completion certificate by Building Permit Department of KMC which is also

supervised by DUDBC and KVDA for the case of apartments. Town Development, Urban Planning and Building Construction related Basic Guidance-2015 ensures the compliance with building codes and third party verification of buildings of complex nature. Land Use Policy 2015 mentions the classification of lands of the country into Residential Zones and Public Open Space Zones only.

Hyogo Framework for Disaster Risk Reduction 2005 ensures that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation; identify, assess, and monitor disaster risks - and enhance early warning; use knowledge, innovation, and education to build a culture of safety and resilience at all levels; reduce the underlying risk factors and; strengthen disaster preparedness for effective response at all levels. Sendai Framework for Disaster Risk Reduction 2015-2030 mentions the priorities for action; Understanding disaster risk, Strengthening disaster risk governance to manage disaster risk, Investing in disaster risk reduction for resilience and Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

National Policy for Disaster Risk Reduction 2018 mentions that Emergency preparedness plan and disaster preparedness and response plan will be prepared and implemented at federal, provincial and local levels; disaster information, awareness and learning management; disaster risk assessment and mapping system; capacity development; risk sensitive land use plan; community based disaster risk reduction; identification and management of open

spaces for disaster preparedness and response; communication and dissemination system based on modern information technology; disaster risk reduction and management strategic action plan including periodic, annual and emergency plan will be prepared and implemented at the federal, provincial and local level for planned implementation of this policy; and the Disaster Risk Reduction and Management National Council will monitor and evaluate the implementation of the policy at the national level.

The Disaster Management and Civil Safety Guideline 2070 mentions KMC to be responsible for disaster related policy making, preparedness and recovery assistance, carrying out formal and informal education, trainings and drills on disasters, search and rescue, warning system arrangement, preparation of risk sensitive land use plans etc.

3. Case Study

3.1 Site Selection

For this study, 5 apartments were chosen lying in the urban core, sub-urban and outer fringe of the valley- Apartment 1, Tokha; Apartment 2, Tahachal; Apartment 3, Sanepa; Apartment 4, Ravibhawan and Apartment 5, Kuleshwor.

3.2 Materials and Methods

This study is based on pragmatic paradigm involving logical methods best suited to the research problem be it qualitative or quantitative. It uses case study approach as the main method as it focuses on contemporary events/ phenomena, behavioral events within the research environment occur within a real-world context outside the control of the researcher and uses of multiple sources of evidence. The research framework is as shown in Figure 2. Purposive/Judgemental sampling was used to select occupants of high-rise buildings with first-hand experience of disasters. Sample size of 80 occupants was calculated with the confidence level of 95 percent followed by 0.5 population proportion and 0.1 margin of error. The sample size of 82 occupants was taken as the final sample size for the survey.

Primary data was collected using key-informant interviews, questionnaire survey and direct observation. Key informant interviews were carried out among the government officials of Building

Permit Department and Disaster Management Committee of Kathmandu Metropolitan City Office, Kathmandu Valley Development Authority(KVDA) and Department of Urban Development and Building Construction(DUDBC). The data was recorded using audio devices. Questionnaire survey was prepared for the users of apartments in the form of checklist and the results were tabulated and analysed using KoboToolbox. Field visits were carried out along with taking photographs for direct observation. Secondary data was collected using document review of various published and unpublished documents such as reports, journals, guidelines and acts.

3.3 Survey Results

Among the 82 respondents, 57percent were male and 43percent were female. 67percent fell within the age group of 18 to 45years while 25percent were above 45years. Only 7percent were under 18years. Table 1 shows the sampling distribution among the apartments. 78percent of the respondents had good education profiles with graduation from upper secondary/university level while 13percent had secondary education (9 to 12). Only 8percent had basic level of education (1 to 8).

Table 1: Sampling Distribution

Value	Frequency	Percentage
Apartment 1, Tokha	18	22
Apartment 2, Tahachal	19	23
Apartment 3, Sanepa	10	12
Apartment 4, Ravibhawan	18	22
Apartment 5, Kuleshwor	17	21

With reference to respondents recent experience with disasters, 39percent had experienced disasters recently while 56percent felt vulnerable during disasters. 35percent did not agree with the easy accessibility of evacuation route/exit signage and 13percent mentioned the route to be used for evacuation was difficult. Almost all of the respondents mentioned having a staging ground lying within the distance of 50metres while 26percent of the responded to not having staging ground in their building.

88percent responded to having power backups in the building while 12percent did not have knowledge about their availability in the building. 72percent responded to not having logistics supplies (food storage, drinking water, flashlights etc.) in their building while 50percent responded to not having any

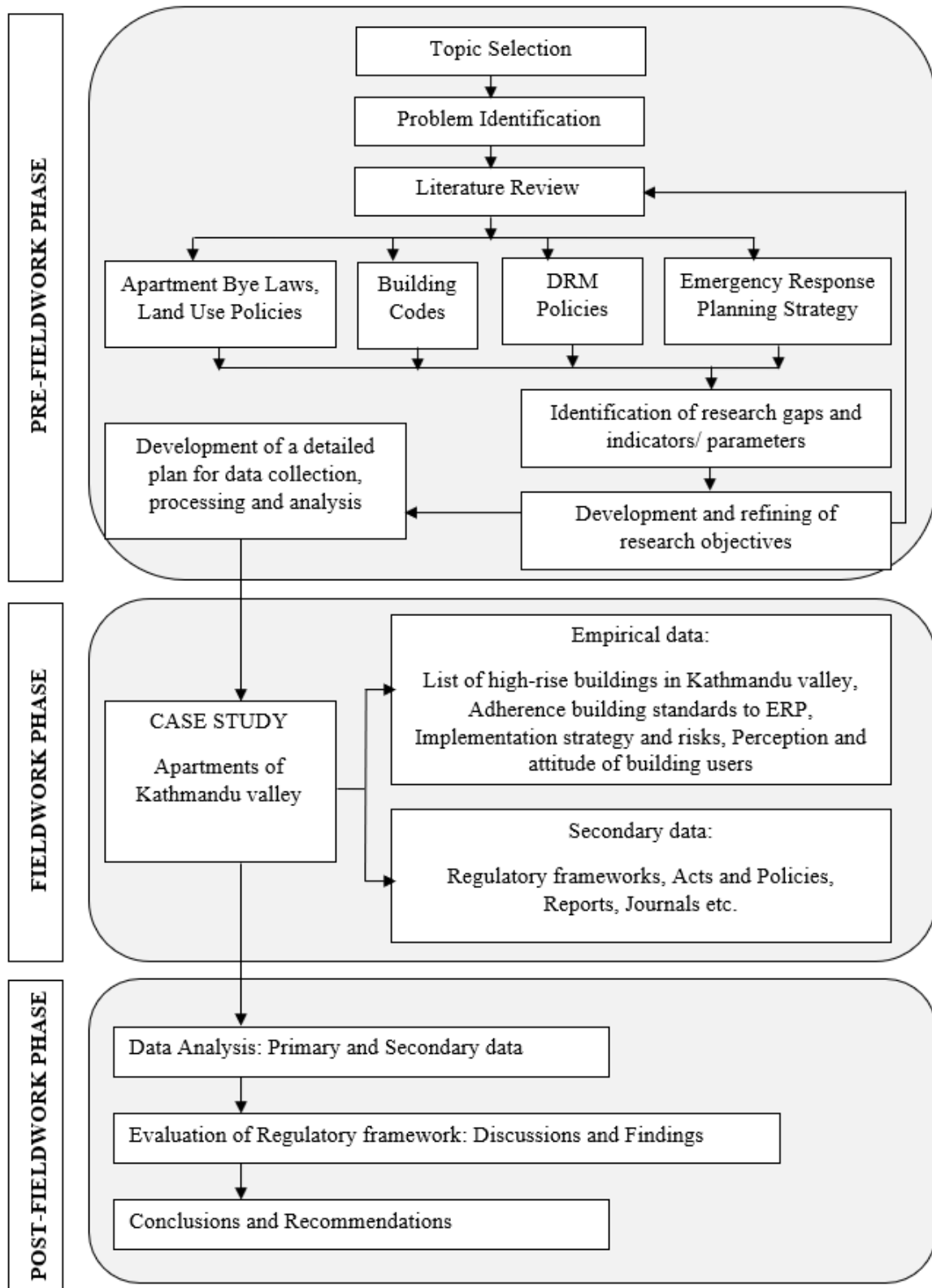


Figure 2: Research Framework

emergency alert systems (warnings, alarm system, smoke detectors etc.) in their building. 89percent responded to having emergency equipments in the building.

28percent responded to not having timely maintenance and monitoring of building services while 41percent responded to having maintenance at only some times of the year. 74percent responded to not having process drills regarding the use of equipments while 17percent had drills only after their recent experience with disasters.

44percent had knowledge about fire extinguishers, hydrant systems and alarm systems while only 9percent had knowledge about safety equipments and disaster communications. 6percent did not have knowledge about any disaster facilities. 57percent did not know how to use any of the emergency equipments while 27percent knew how to use fire extinguishers and hydrant system only after trainings due to recent disaster. Only 10percent of the respondents who were from medical and social welfare background knew using first aid kit during such situations. 22percent did not know who to contact in their buildings during emergencies. Most importantly, 41percent did not feel safe with these facilities while 15percent were not sure about their safety in the building.

Many of the respondents mentioned that despite the availability of facilities in the building, they did not use the available equipments or evacuation route due to the state of panic/ psychological terror. Glass break pieces along the floor, blackout due to smoke, breathing difficulties, inaccessible location of the fire equipments, disturbances in the exit routes due to furnitures, garbages or personal belongings etc. added to the reasons for not using such facilities. Fire hydrants and water reserve tanks were not filled with water. Some of the power backups failed to function in the emergencies due to damage and many of the vulnerable population were compelled to live inside the building until search and rescue teams arrived. Also, users mentioned lack of provisions in policies related to disaster recovery. It was mentioned that it took a long time for the operability of the building services after the disaster.

3.4 Direct Observation

During field visit, it was observed that some apartments were in operation without building

completion approval. Clearances for width of open spaces and setbacks for circulation of fire brigades were also not considered. Absence of external staircase in some of the apartment led to suffocation in exit and reduced visibility during fire. Refuge Area was not provided in any of the apartments staircase and disabled exit routes were not considered in many of the apartments. Illuminated clear signages were not provided in most of the apartments and timely monitoring of operability of equipments were also not done. There weren't demarcations of fire zones or presence of fire alarm system itself in most of the buildings while some added them and conducted drills only after recent disasters.

3.5 Key Informant Interview

According to the key informant interviews with government officials, owners tended to seek building permit and IEE whilst construction since it takes short time and later add more units extending the area as well as building height of apartments. There was lack of monitoring unit for private and high rise buildings for timely examination of availability and operability of equipments, facilities and services after building completion. Structural defects in apartments were observed specially in the column areas due to impact of earthquake 2015 also affecting the neighborhood settlements. There were lack of monitoring of availability of signages for evacuation and disabled exit routes.

There were lack of specific strategies for disaster risk management in and around high-rise buildings. Fire hydrants were located in densely populated areas where fire brigades could not reach but it was limited to only some areas of ward no. 16, 17, 27, 25 and 32. Out of 8 fire trucks of Juddha Fire Brigade, only 3 were operable and out of 18 rescue vehicles only 9 were operable. Total 43 people were available for manpower. Fire hydrants and fire ladders could not reach for building height more than 10 storeys, and there were lack of specialized technological equipments in case of great disasters. There were lack of awareness campaigns and drills and policies for logistics facilities for apartments. There were lack of evacuation open space specifically planned by land use zoning around high rise buildings and lack of land use zoning for site selection for the construction of apartments.

Though followed throughout building permit process, facilities were not provided in site construction. Green/

open spaces were lacking on site due to increasing construction of basements and non permeable floorings rather than green concrete floors around the building were observed.

4. Findings and Analysis

Using comparative analysis, it was found that considerations for clearances for width of open spaces and setbacks for the circulation of fire brigades should be made and incorporated as an evacuation area/ staging ground that is free of obstacles such as parking. External emergency staircase should be considered or interior staircase should be with at least one side open to exterior to avoid suffocation during exit and reduced visibility in fire. They should also be clean, well maintained and free of garbages. Refuge Area should also be provided in all buildings and disabled friendly exit routes should also be considered. Considerations in clear illuminated exit signages, fire protection in basements and specifications for fire extinguishers, alarm system, emergency response team, communications, logistics supply etc. should also be mentioned in the policies along with their provision in the buildings.

Using institutional analysis, it was found that there was lack of designation of proper monitoring units for the operability of emergency equipments, emergency staircase and other building services in the government as well as committee level after the building completion.

There was lack of enforcement of existing monitoring policies related to exit signages, disabled friendly escape routes, etc. before building completion approval. Also, there were lack of sufficient number of skilled human resources, equipments, capacity development and trainings for the employees and search and rescue team in most of all the sectors.

Using policy analysis, it was found that policies related to Joint Housing Building Construction Approval, KMC Building Construction Procedure, Town Development, Urban Planning and building construction guidance as well as building codes needed strict enforcement in today's context. Considerations should be made in insurance/ disaster recovery policies, site allocation for apartments construction and open space/evacuation space management for settlements around high-rise area. Special considerations should also made and enforced for disaster risk reduction in apartments. Building bye

laws should also consider the open space management regarding the increasing demand for high-rise buildings and update FAR to breadth-height ratio for structural stability. Building codes should provide specifications and provisions for fire alarm systems, location and number of fire extinguishers, fire hydrant systems, emergency response team, emergency decision making, drills and disaster communications. The authority and disaster management guidelines should also mention and provide specifications for sufficient human resources, technical equipments and necessary trainings for their capacity development.

5. Conclusion

The main objective of this research was to investigate the effectiveness of the current regulations for emergency response planning among the residential high-rise buildings of Kathmandu valley. However, it was found that there is very little attention and awareness towards the provision and implementation of these policies.

Various document reviews carried out to identify the legal framework and mechanism for ERP in apartment buildings revealed that building construction and disaster management policies have not specifically mentioned and properly correlate with each other about the apartments. There were lack of policies related to land use zoning for site selection of apartments, emergency decision making, logistics, disaster communications and awareness campaigns. Building code guidelines were also missing policies related to provision of emergency alert system, fire alarm system, location and number of firefighting equipments, availability of exit signages, suitable location of building services etc.

Key informant interviews and Direct field observation carried out to explore the current practices in building construction and identify the existing risks to ensure the safety of individuals revealed that there were lack of sufficient number of skilled human resources and technical equipments in all sectors of disaster management and building construction for the proper monitoring procedure and search and rescue as well. There were many existing problematic buildings built before introducing the policies of 2015 and considerations for escape routes and proper signages for disabled and vulnerable groups were lacking even in the newly built structures. Even after months of the recent disaster, proper corrections such as

maintenance and improvement of the existing structure and building services were not completed and it was observed that disaster recovery assistance policies were almost non-existent even for the users or the apartment committee.

Questionnaire Survey carried out to understand the current perception of safety, attitude and awareness of residents towards these policies and framework. It was observed that there was much negligence in following the building codes, bye laws and guidelines related to building height. Operability and accessibility of emergency staircase were also not timely monitored after building completion and the exit routes were difficult to use in many apartments due to obstacles such as garbages, furnitures and pigeon wastes. Despite the development of future technologies, improvement in knowledge of risk communications and disaster communications was still lagging behind and it was observed that very few people had knowledge of using such technologies.

It should also be considered that despite the availability of such facilities, the psychological condition of the users during the disasters may not ensure its full effectiveness. There were lack of awareness campaigns related to existing risks, importance of green open evacuation space, emergency response knowledge, building construction policies etc. to encourage building users to use, check and timely inform related committee and authorities for their operability and maintenance. Committees did not conduct regular drills and community participation activities hence there was lack of civic sense, sense of collective ownership and belongingness among many residents.

Various analysis such as comparative analysis, institutional analysis and policy analysis were carried out to analyse the gaps in the effectiveness of the current framework for ERP in residential high-rise buildings of Kathmandu valley. It was found that policies related to apartment building construction and town development need strict enforcement in today's context. There was not proper monitoring of the location of building services, emergency equipments, provision of clear signages, provision of refuge areas, disabled and vulnerable people escape routes etc. Timely monitoring procedure of operability of emergency equipments after building completion also were missing from both apartment and government sectors. Specifications and provisions for emergency alarm systems, equipments, response team and

communications should be provided in the building code and sufficient human resources, technical equipments and necessary trainings should be allocated in the authority policies.

6. Recommendations

6.1 Policy Making

At policy-making levels, there can be improvement in building classification policies according to building materials, use of structural stability approach to F.A.R., provision of green open spaces, etc. in bye laws. Policies related to provision, specifications, numbers and feasible location of fire alarm system, emergency alert system, fire hydrant system and fire extinguishers; logistics supply; emergency decision making; disaster communications etc. must be included in the building codes for high-rise buildings. Micro-zonation for the site selection of construction of apartments and necessary allocation of open public space for the evacuation of surrounding area must be done in the land use planning or physical development policies of Kathmandu valley. Policies related to disaster recovery (funding, insurances etc.) should also be introduced. There should be proper correlation/sync in between all the related policies. Timely monitoring policies of high-rise private or public buildings after building completion should also be introduced. Policies related to manpower management and capacity development should also be provided in the organizations. Policies related to evacuation plans, drills and awareness programs should also be introduced for users in and around high-rise buildings.

6.2 Policy Enforcement

Strict enforcement of the existing legal frameworks should be done to avoid haphazard construction. Strict and effective monitoring procedures for supervision before and during building construction process should be done to check compliance with the building guidelines. Disabled exit routes, location, operability and accessibility of emergency staircase, building services, provision of refuge areas, provision of clear and well-lit signages, etc. should also be monitored. Proper risk assessment should be carried out in public, high-rise private buildings and buildings of special importance.

6.3 Awareness programs

Awareness programs related to importance of open spaces, building codes, emergency evacuation and response knowledge and community participation should be conducted time and again to develop civic sense, sense of collective ownership, sense of belongingness and social welfare among people before or after disasters. First aid kit and health assistance trainings/awareness programs should also be conducted considering disaster recovery.

6.4 Disaster Experience Knowledge

Since, it was observed that people with recent disaster experience were more willing to share their suggestions and advices, government should also incorporate their opinions whilst policy making and awareness programs.

6.5 Existing Risks

In the existing problematic buildings built before introducing the policies of 2015, newly updated technologies and new approach to design considerations should be incorporated considering the future disaster risks. New risks such as urban flooding due to climate change should also be considered in the existing buildings.

6.6 Equipment, technology and communications

With the development of future technologies, improvement in knowledge of risk communications and disaster communications should also be considered since it was observed that very few people had knowledge of using such technologies. It can be easier, save time and lives at no cost. It can be very useful for disabled and vulnerable group of people as well. Disaster rescue equipments, vehicles etc. should be available, upgraded, operable and in sufficient quantities.

6.7 Civil Society

Civil Society must act responsible and not neglect the existing laws and regulations. Building users should

try to use, check and timely inform related committee and authorities for the operability and maintenance of emergency facilities.

6.8 Improvement in Plan

Timely necessary amendments and improvements must be done to ensure the effectiveness of existing policies.

6.9 Understanding the need

Understanding the urgent need of emergency response planning in such kind of buildings in the present context, government should encourage conducting further researches on this topic to ensure the effectiveness of its policies and safety of occupants within Kathmandu valley.

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