

## Assessment of Disaster Risk Management in Kathmandu Metropolitan City, Nepal

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### Abstract

The study on "assessment of Disaster Risk Management in Kathmandu Metropolitan City, Nepal" aims to assess the disaster risk management in Kathmandu Metropolitan City. The Participatory approach and methods like structured questionnaire, key informants interview and focus group discussion has been adopted to collect the information from the field. The majority of the local people reported that the disaster risk management of Kathmandu Metropolitan City have found not satisfactory. The Disaster Risk Management act has been formed by Kathmandu Metropolitan City. However, there is poor capacity and knowledge to implement an act. The Kathmandu Metropolitan City has initiated to collect fund of NPR 100 per household to disaster risk management but not effectively used. There hasn't been found any emergency disaster management plan and policy for effective implementation in the study area. There is lack of training and exposure for the staff about the preparedness, response and post disaster reconstruction & livelihood recovery. The study has been reported that the Kathmandu Metropolitan City should initiate the integrated approach of disaster risk management including investments for risk reduction, strengthening the disaster risk governance, and disaster preparedness, response, rehabilitation, reconstruction and recovery.

Keywords: Disaster Risk Management, Disaster Policy, Disaster Governance, response, reconstruction and recovery

## 1. Introduction

### 1. 1. Background

Disaster risk management (DRM) is an important component for achieving sustainable development of cities, in particular when the world is steadily becoming more urbanized. The rapid growing of cities and urban areas the world increase disaster risk due to economic growth and fast population expansion. The local government has crucial role for the sustainable development and knowledge dissemination for the community. The UNISDR (2009) stated that the disaster is a "serious disruption of the functioning of a community or a society involving widespread human, material, or environmental losses and impacts which exceeds the ability of the affected community to cope using only its own resources [1]"

CRED (2018) stated that there was reported a total of 315 natural disaster events recorded with 11,804 deaths, over 68 million people affected, and US\$131.7 billion in economic losses across the world. The burden was not shared equally as Asia suffered the highest impact and accounted for 45 per cent of disaster events, 80 per cent of deaths, and 76 per cent of people affected. Globally, Indonesia recorded nearly half the total deaths (47%), while India recorded the highest number of people affected (35%). Earthquakes were the deadliest type of disaster accounting for 45 per cent of deaths, followed by flooding at 24 per cent. Flooding affected the highest number of people, accounting for 50 per cent of the total affected, followed by storms which accounted for 28 per cent. Given Asia's large land mass, higher population relative to other continents, and multiple hazard risks, the results are not surprising [2].

South Asia Association of Regional Cooperation (2018) Comprehensive Framework on Disaster Management pointed out that South Asia with its population of about 1.3 billion is one of the regions in the world highly exposed to a variety of natural as well as human induced hazards. Countries in the SAARC region experienced a number of major disasters<sup>1</sup> in the last one and a half decades, which took lives of about half a million people and caused huge economic losses and massive destruction in the countries' economy. Among others the major reasons in increasing vulnerability of people in the region is largely related to the demographic conditions, rapid technological and socioeconomic changes, fast expanding urbanization and development within high-risk environment [3].

According to the Ministry of Home Affairs dataset, 13 types of disasters were recorded during the last two years with a total number of 2,940 disaster events. Of the total disaster events, incidents of fire are the highest in number, followed by incidents of

lightning, landslide, flood and heavy rainfall. In terms of death, disappearance as well as human injuries, earthquakes caused the most loss. For example, during 2015 and 2016, a total of 9,708 human deaths were recorded as a result of different disasters, out of which the mega Earthquake of 2015 alone claimed 8,970 lives (92.5 percent) [4]. Landslides, lightning, fire and floods together claimed the lives of 666 people in total in those two years.

## 1.2 Objectives of the Study

The following objectives have been set for the study:

- To identify the major disaster events frequently occurs and their loss or damages in life and livelihoods of the local people in Kathmandu Metropolitan city, Nepal;
- To analyze the existing policies, strategies, practices in order to address the disaster risks management aspects adopted by Kathmandu Municipality city and identify the related challenges, opportunities to establish Disaster resilient community; and
- To find out the existing gaps in policies and practices and identify the way forward in order to develop disaster resilient city.

## 2. Methodology

### 2.1 Study Area

Kathmandu Metropolitan City is located at 27° 42' North Latitude and 85° 20' East Longitude, occupying an area of 5,067 hectares. It lies at an elevation of about 1,350 meters above sea level, surrounded by four major mountains in the northwestern part of Kathmandu Valley. It is the heartland of Nepalese life, be it history, politics, economy, commerce, culture, education, or tourism. It has been regarded as the cosmopolitan hub of the Himalayan region long before it was officially granted metropolitan status in 1995. Kathmandu is the capital and eldest metropolitan city of Nepal. The city is the urban core of the Kathmandu Valley in Nepal (<http://www.kathmandu.gov.np/>) [5].

### 2.2 Selection of the Study Area

According to the 1991 census, the population of this ward was about 20,000. In 2001, the population had almost doubled to 39,530. There are 30 km of roads in the ward, 40,400 sq. m. of which are black-topped. The ward neighbors the Buddhist pilgrim destination of Bouddha on one side and the holiest Hindu temple of Pashupati on the other. Ancient monuments like Ganesh temple and Charumati Bihar help to give character to the ward. Mitra Park, located in the center of the ward, heightens its attraction. Even though physical infrastructure like roads, drinking water, sewerage and telephone is available in the ward, they are in need of maintenance at present. Also, street lighting needs to be extended. The ward is bordered by Ward Nos. 6 and 8 in the east, Ward Nos. south. The total area of the ward is 153.5 hectares 4, 5 and 33 in the east, Ward Nos. 4 and 6 and Kapan in the north, and Ward Nos. 8 and 9 in the



Fig. 2. 1: Map of Ward 7, Kathmandu Metropolitan City

Ward No. 14 was formerly *Kalanki* VDC, and it was included in the Kathmandu Metropolitan City in 1977. Its boundaries are formed by the Bagmati River in the east, *Tinthana* VDC in the west, Ward No. 13 and *Kara Khusi* in the north and Kirtipur Municipality in the south. It has an area of 302.9 hectares, and its population in 2001 was 34,488. Most of the ward consists of residential and business areas. Dense settlements are coming up in the ward's north, while houses are more scattered in the south. *Kuleswar* Housing Project, the first such effort by His Majesty's Government, is situated in this ward. Kalanki temple is the main local religious shrine. Something needs to be done about the Kalanki crossing where the Ring Road and the road to Thankot. It

is descending into chaos because of rapidly growing Vehicular traffic.

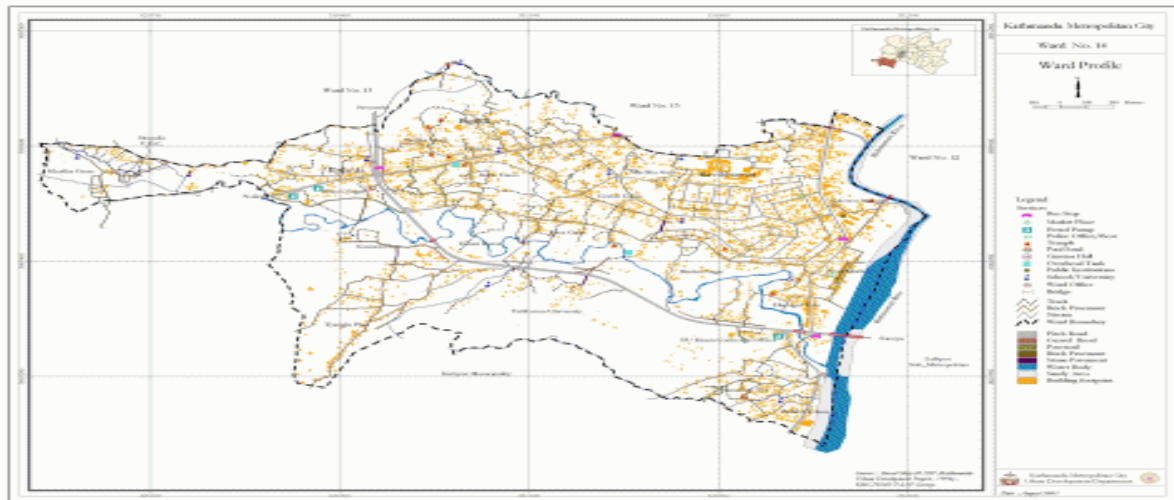


Fig 2.2: Map of Ward 14

The published and unpublished reports were reviewed from the WARD office to gain the detailed overview of the sites to be considered for the study. The two study sites were selected based on following criteria:

- It is located in urban area of Kathmandu Municipality City,
- It is vulnerable area of the Kathmandu Metropolitan City.

### 2.3 Research Design

The exploratory social research design has been adopted during the field study. This is cross-sectional studies to the sampled population. This study was carried out in the field by selecting a sample of respondents from a defined population and administered a standardized questionnaire to them. In addition to household survey questionnaire, focus group discussion, key informant interview techniques and direct observation were used to capture the quantitative and qualitative information from the respondents.

### 2.4 Sample Size

The number of surveyed households was based on the discussion in the community. A total of 113 households were selected as sample size from the study areas. The sampling methodology assumed at 95% confidence level.

According to the sample size has been computed [6] using the (Arkin and Colton, 1963) formula such as  $n = \frac{NZ^2 * p * (1-p)}{Nd^2 + Z^2 * p * (1-p)}$ .

## 2.5 Sampling Procedure

Systematic Random Sampling was used for household survey (McClave and Sincich 2003). It is the process of selecting every  $n^{\text{th}}$  number of the households arranged in a list using sampling interval. In this method, 1<sup>st</sup> sample is selected by going to the center of the city and spinning a pen, the first household for the interview is chosen based on the direction of the pen and the remaining samples was taken in a calculated sampling interval. A sample interval is calculated by using following formula [7].

## 2.6 The Sample Characteristics

Chabahil and Kalanki is located center of the Kathmandu city. The selected area has been identified for the study. The people of the selected area are more vulnerable due to earthquake and flood. The people of the area depend on business and agriculture. The sample household consists of mostly Newar community.

## 2.8 Survey Methods

Basically, structured household questionnaire survey, focus group discussion, key informant interview, direct observation methods was used during the study. Apart from information collected on the field, secondary information was also collected using related relevant documents, literatures, internet, ward office and Kathmandu Metropolitan city office.

## 2.9 Data Analysis

The data collected from the field was tabulated in Microsoft Excel2016 using standard procedures for analyzing and interpretation. The statistical analysis was done using Strata 13.0 software. Basically, the statistical analysis included standard deviation, mean, Chi Square test, etc. The qualitative data from personal views, literatures, results of KII, conclusions drawn from FGD were used as a basis for its analysis and interpretation.

### 3. Results and Discussion

#### 3.1 Population Composition

The population dynamics is the major determinant of the behavior of the people in the community. The level of education and awareness can show their understanding of disaster risk management. Education, sex etc. can determine their prospect and view on disaster management policy and its importance in various aspects of life such as economy, social and their participation (Table 4.1).

*Table 3.1: Distribution of Respondents as classified by Population groups (N=113)*

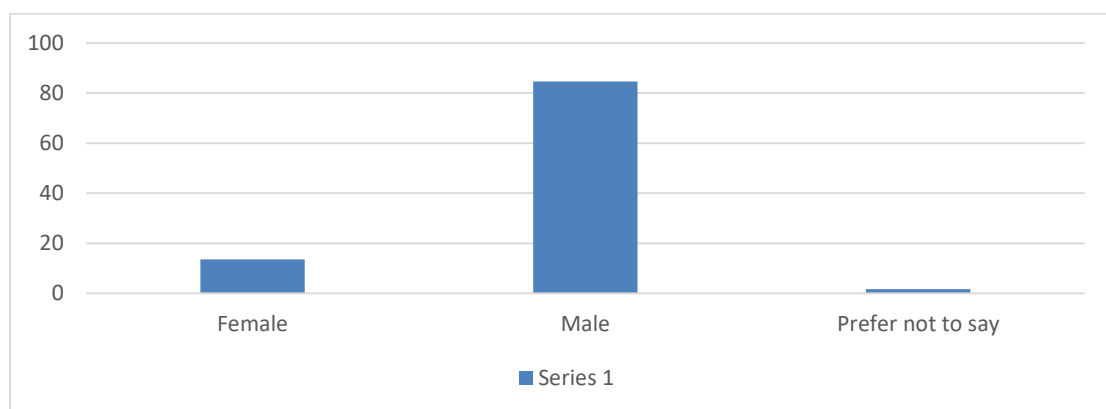
Parameter	Frequency	Percent	Remarks
Head	72	64	
Offspring	34	30	
Spouse	7	6	
Total	113	100	
Under Chi-square test, p-value = 5.047314e-13			

Source: Field survey, 2020

#### 3.2 Sex Composition

Out of 113 respondents, 84.7 per cent reported as male, 13.6per cent female and 1.7per cent did not responded below (Figure 4.1).

*Figure 3.3: Sex Respondent (N= 113)*



Source: Field Survey, 2020

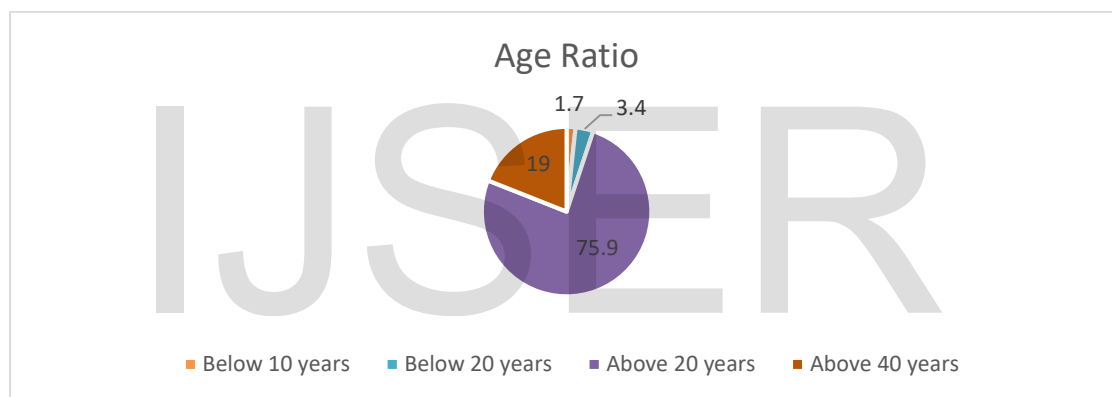
### 3.3 Sex Ratio

The overall sex ratio (number of men per 100 women) of the study area has found 84. Nepal Labor Force Survey-II (NLFS 2008) estimates the average sex ratio of Nepal is 90. The sex ratio of study area is significantly lower as compared to national figure. This is the demographic issue of further research [8].

### 3.4 Age Group

Out of 113 respondents 1.7 per cent reported as Child (1- 10 years), 3.4 per cent Young (10-20) and 75.9 (86per cent) at the age of 20-40, 19 per cent were at the age of 40 years above. According to the study, people at the age of 20-40 years have found highest population as shown in the chart (Figure 4. 2).

Figure 3.4: Age Ratio (N=113)



Chi Square Test			
Chi Square Test	Value	DF	P-Value
	163.6843	3	2.937506e-35

Source: Field Survey, 2020

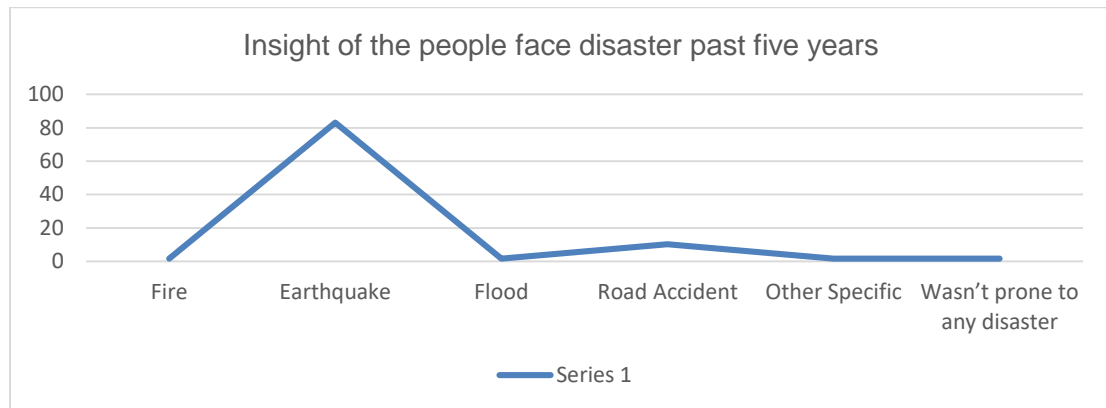
### 3.5 Perception of the local people face disaster past five years

Out 113 respondents, 83.1 per cent were mentioned the earthquake, 10.2 per cent were road accident, 1.7 per cent were fire, 1.7 per cent flood, 1.7 per cent wasn't prone to any disaster. Many respondents remembered the Gorkha earthquake happened in 2072.



Some of them in Kalanki site have expressed the problem of flood damage in the area (Figure 4.4).

*Figure 2.5: Perception of the people faced disaster in the past five year (N=113)*

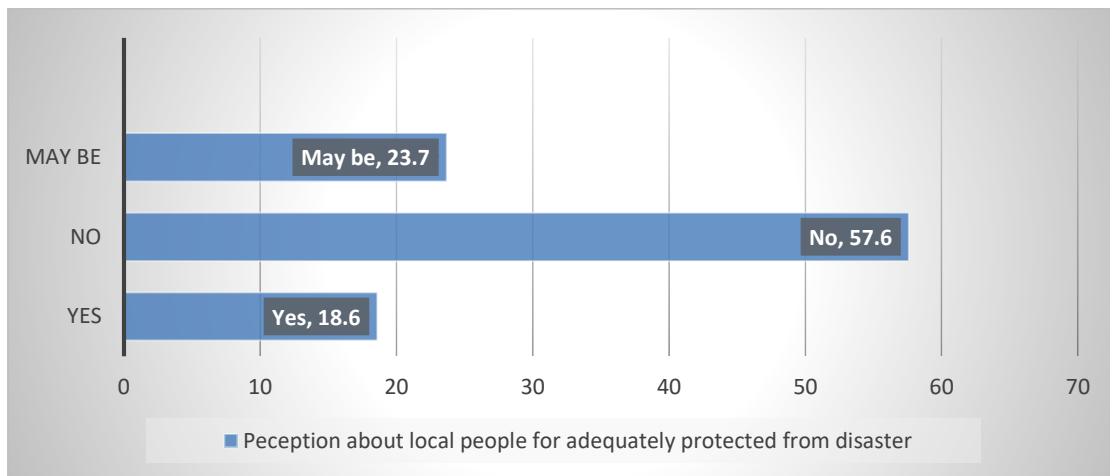


Source: Field Survey, 2020

### 3.6 Perception mapping of the local people for disaster safety

The study found out that the most of the community was not felt safe to stay in Kathmandu Metropolitan City during disaster. The respondents articulated that there was fear among the local people in the last Gorkha devastating earthquake 2015. Out of 113 respondents, around 57.6 per cent were not felt safe during the disaster whereas 18.6 per cent reported as safe condition and around 24per cent were felt either good or may not be good. The large majority of the respondents has found not satisfactory with the humanitarian support provided from the government due to poor governance, in order to proper execution during disaster response (Figure4.6).

*Figure 3.1: Opinion of local people for safety from disaster (N=113)*

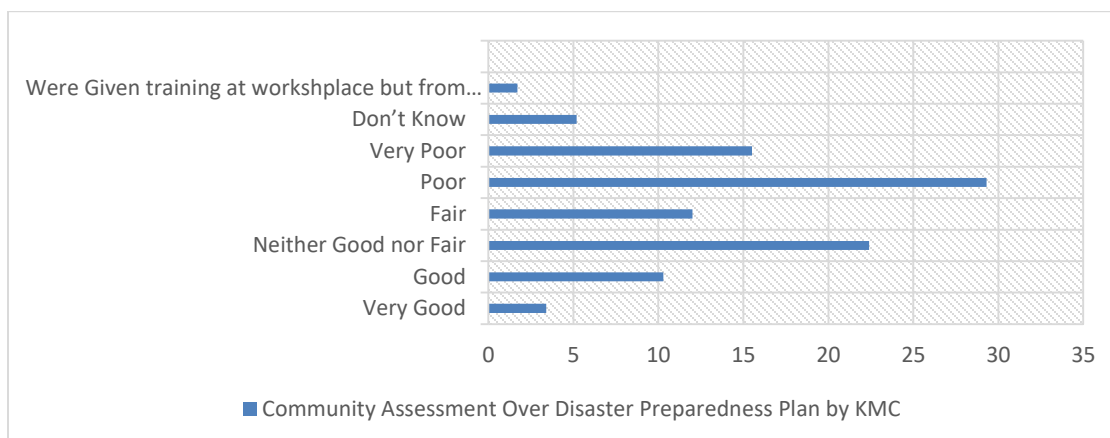


Source: Field Survey, 2020

### 3.7 People's Perception towards the disaster preparedness plan

The study has pointed out that around 3.4 per cent respondent have rated very good, 10.3 percent expressed good, 22.4 per cent articulated neither good nor fair, 12.1 per cent counted as fair, 29.3per cent poor, 15.5per cent very poor, and 5.2per cent did not responded. The study has stated that the respondent didn't feel happy about the present disaster preparedness plan by the Kathmandu Metropolitan City. There is a need of strong commitment to implement the disaster preparedness plan into practice to achieve the target as planned (Figure 4.7).

*Figure 3.2: Community assessment over disaster preparedness plan by Kathmandu Metropolitan City (N=113)*



Source: Field Survey, 2020

### 3.8 Preparedness Plan of Kathmandu Metropolitan City for disasters

The study illustrated that the respondents have reported as unhappy during the disaster relief materials distribution particularly focusing in Gorkha earthquake 2015. The local government should be fully prepared and well equipped in order to humanitarian assistance. The study found out that around 5.2 per cent expressed very good, 5.2 per cent stated good, 25.9 percent indicated fair, 53.4 expressed poor, and 10.3 per cent reported as did not know about the disaster preparedness plan of Kathmandu Metropolitan City (Table 4.5).

*Table 3.2: People's Perception towards Emergency Management of Kathmandu Metropolitan City (N=113)*

Parameter	Frequency	Percentage	Remarks
Very Good	6	5.2	
Good	6	5.2	
Fair	29	25.9	
Poor	60	53.4	
Don't Know	12	10.3	
No Response	0	0.00	
Under Chi-square test, p-value = 4.333257e-7			

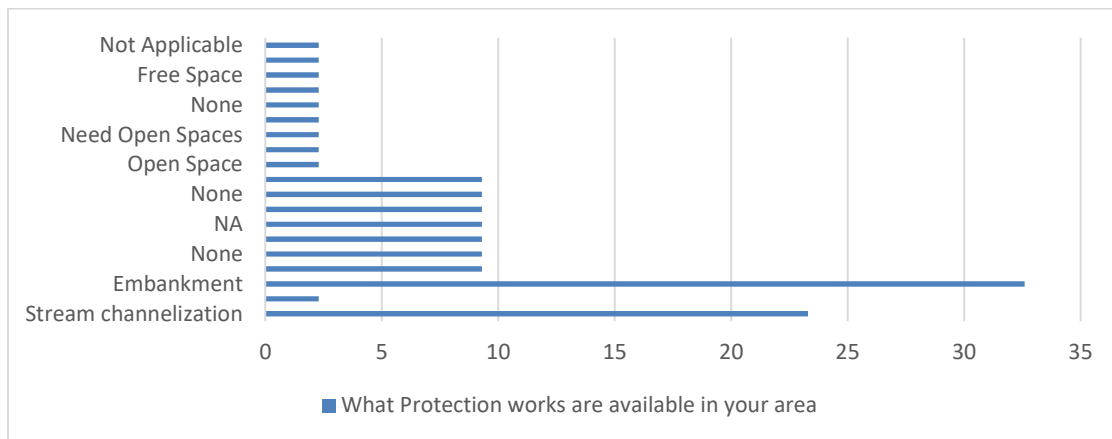
Source: Field Survey, 2020

### 3.9 Disaster Safety Measures in the Study Areas

The study clearly stated that the respondents have expressed different view about the protection system of Kathmandu Metropolitan City. Around 23.3 per cent respondents have expressed to construct the stream channel, 2.3 percent suggested constructing dam, 32.6 per cent embankment, and 9.3 per cent respondents didn't response. About 2.3 per cent respondents recommended protecting environment, around 2.3 per cent expressed about the open space, about 2.3 per cent recommended for evacuation area.

The study showed that the Kathmandu Metropolitan City should construct an embankment in the area for the protection during disaster occurrences. The local government should actively work in order to maintain the for disaster risk management (Figure 4.8).

*Figure 3.3: Disaster Safety Measures in the study area (N=113)*

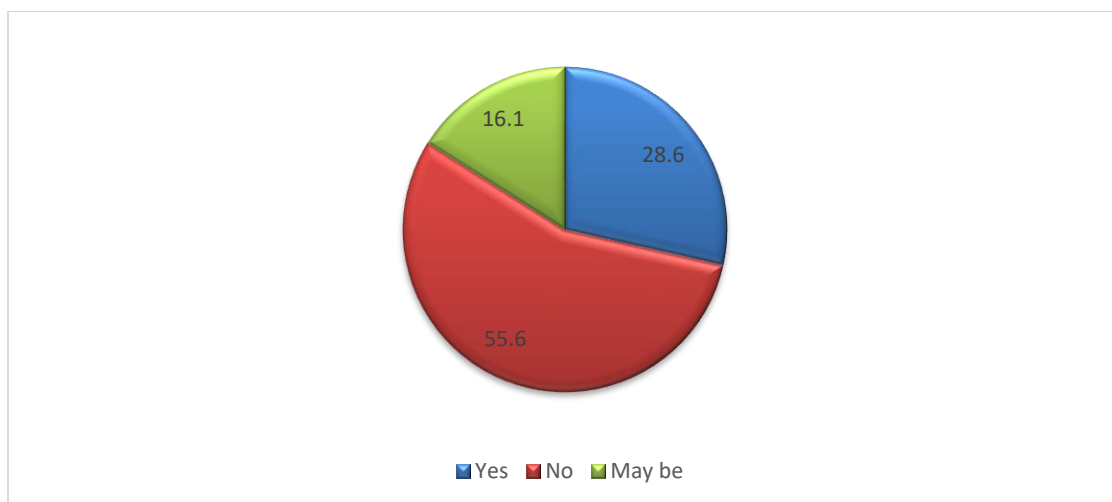


Source: Field Survey, 2020

### 3.10 Identification of evacuation routes in Kathmandu Metropolitan City

The study shows that there is no clear evacuation route in the study area. The government should make open space every 10 Km in the area. Around 28.6 per cent respondents expressed their views for open space facilities in the study area whereas about 55.4 per cent respondent responded for no open space in the area. The local government should be aware to build the evacuation route for disaster protection and safety measure (Figure 4.9).

*Figure 3.4: Identification of evacuation routes in Kathmandu Metropolitan City (N=113)*

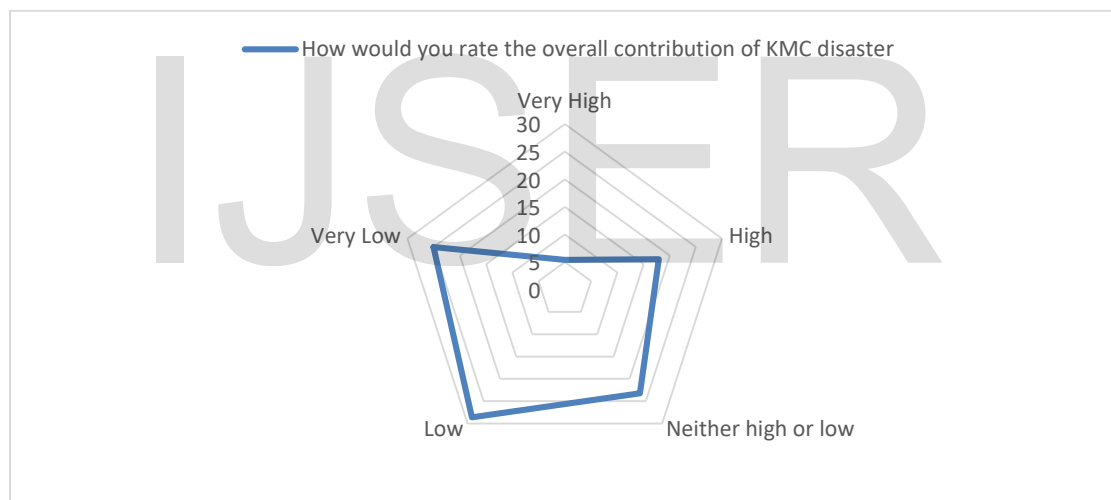


Source: Field Survey, 2020

### 3.11 Contribution of Kathmandu Metropolitan City in disaster risk management

Out of 113 respondents, 5.4 per cent stated very high, 17.2 per cent expressed the contribution in disaster is high, whereas 23.2 per cent said fair contribution, 28.6 per cent has said low and 25 per cent has expressed very low contribution in the disaster risk management by Kathmandu Metropolitan City in the study areas. In the study areas, the respondent's satisfaction level has found very low for the contribution of disaster management by Kathmandu Metropolitan City. The local government should give high priority for the disaster risk management in the study areas (Figure 4.12).

*Figure 3.10: Contribution of Kathmandu Metropolitan City for disaster risk management (N=113)*



Source: Field Survey, 2020

### 3.12 People's Suggestions towards the implementation of disaster policy

When asked the respondents about the suggestions towards an effective implementation of disaster policy into practice the respondents answered the following points:

- Policy Awareness program among local people for disaster preparedness;

- Mobilization of the staff with full motivation in order to humanitarian assistance;
- Building code should strictly follow during the construction of new buildings;
- Emergency rehabilitation centers, logistic support system and emergency warehouse should have managed by local level government for disaster preparedness;
- Prepare contingency plan in order to address the humanitarian support during disaster events;
- The local level government should accountable towards the community services during disaster events;
- Proper implementation of disaster policy into practice during disaster preparedness, response and reconstruction and livelihood recovery;
- Early warning system and rescue and relief units should be established and strengthened by local level government for the effective humanitarian assistance;
- Result-based monitoring, reporting and evaluation system should be in place to ensure effective humanitarian support during disaster events;
- Prepare roster of the humanitarian experts, explore innovative technologies, identify the open spaces, and capacity development of staff members of Department of Disaster Risk Management in Kathmandu Metropolitan City towards the sustainability and disaster resilience city;
- The disaster policies should be revised as per the lesson learned from the local, national and international current practices for disaster resilient city;
- Urban planning incorporating the disaster preparedness, response, reconstruction and recovery should be in place based on land use planning; and
- Follow the Disaster Risk Management Act 2017 in order to address the disaster response, rehabilitation, reconstruction and livelihoods recovery by local level government as well.

### 3.13 Perception mapping of the respondents towards community satisfaction in disaster policy & strategy of Kathmandu Metropolitan City

When asked about the perception towards the performance of Kathmandu Metropolitan City, around 73.2 per cent respondents have found unhappy, 21.4 per cent happy and 5.4 per cent very happy respectively. The large majority of the respondents [73.2 %] have rated unhappy due to poor implementation in the field, poor governance and less commitment to action, insufficient staff members and lack of integration of disaster policy into development projects as well and around [26.8%] have rated happy towards the

performance of Kathmandu Metropolitan City particularly focusing to implementation of Disaster policy and strategy into practice at the community level. The happiness mapping tool was used to map out the perceptions of the community people, staff, political leaders and school teachers and students towards Kathmandu Metropolitan City [Table 4.8].

*Table 3.3: Perception mapping towards community satisfaction in disaster policy and strategy of KMC (N=113)*

Parameter	Frequency	Percentage	Remarks
Very happy	6	5.4	
Happy	24	21.4	
Unhappy	83	73.2	
Don't Know	0	0.00	
No response	0	0.00	
<b>Total</b>	113	100	
Under Chi-square test, p-value = 3.229053e-46			

Source: Field Survey, 2020

### 3.14 Disaster Risk Management action plan in Kathmandu Metropolitan City

According to the study around 49 per cent respondents have viewed that the Government should implement the DRR action plan, 19 per cent respondents pointed out that the community themselves should execute the DRR action plan, 5.7 per cent respondents replied that the Private sector should responsible to implement the DRR action plan, 17 per cent respondents pointed out that the NGO/INGOs should participate in the DRR action plan implementation, and 7.4 per cent respondents did not response in this. However, the local level government has the primary responsibility to implement the Disaster Risk Management Action Plan in the study areas. The other stakeholders like private sector, NGO/INGOs and local community based organization (*Guthi*) regarded as the secondary humanitarian support agency to implement the DRR Action Plan in the study areas (Table 4. 9). However, there is enough room for improvement for capacity development of local level government in order to disaster response, rehabilitation, reconstruction and livelihoods recovery.

*Table 3.4 Disaster Risk Management action plan implementation in Kathmandu Metropolitan City (N=113)*

Parameter	Frequency	Percentage	Remarks
Government	55	49.1	
Community	21	18.9	
Private	7	5.7	
NGO/INGO	20	17	
Collectively	2	1.9	
No Response	8	7.4	
Under Chi-square test, p-value = <b>1.092107e-19</b>			

Source: Field Survey, 2019

### 3.15 Feedback from the disaster survivors towards disaster risk reduction

The study has found out that 90 per cent respondents suggested to support building resistance houses, 2 per cent respondents viewed to collect fund from national and international agencies, 4per cent respondents have responded nothing,2 per cent respondents have appreciated for the government initiation but not worthwhile and 2 per cent respondents have suggested to launch the disaster awareness program for preparedness (Table 4. 7).

*Table 3.5 Local People suggestion towards disaster risk reduction (N=113)*

Parameter	Frequency	Percentage	Remarks
Building Resistance Material	102	90	
Fund raising	2	2	
Government initiation	2	2	
Awareness program	2	2	
No response	5	4	
Under Chi-square test, p-value = 2.895943e-74			

Source: Field Survey, 2020



### 3.15 Gap Analysis in current disaster policy in Nepal

When asked the respondents about the suggestions and feedback towards the identification of gaps in disaster policy the respondents answered the following points:

- The disaster policy has not shared at the community level by Federal Level Government and local level government;
- Lack of proper Implementation plan prepared by local level government;
- Lack of proper co-ordination between central, province and local level government in order to effective implementation of disaster policy into practice;
- Poor monitoring, reporting and evaluation of the disaster risk management policy; and
- Lack of research and development for the policy analysis of disaster risk management.
- Lack of active participation of the local community during the formulation of Disaster Risk Management policy.

### 3.16 Areas for improvement in the disaster policy & practice

When asked the respondents about the suggestions towards the recent disaster policy into practice the respondents answered the following points:

- Need awareness raising about the disaster risk management policy among the local community;
- The local level government should mobilize the ward Office and community based organizations in order to policy improvisation as per the local context and resources available;
- Allocate enough resources and technical support to the local level government in order to proper implementation of DRM policy into practice;
- The local level government should disseminate the information regarding DRM policy among the different level stakeholders to improve the policy;
- Early warning system and rescue unit should establish and strengthened in each local level government;
- The local level government should do the proper monitoring, reporting and evaluation of DRM policy into practice; and
- The policies should revise as per the lesson learned from disasters and current global practices;

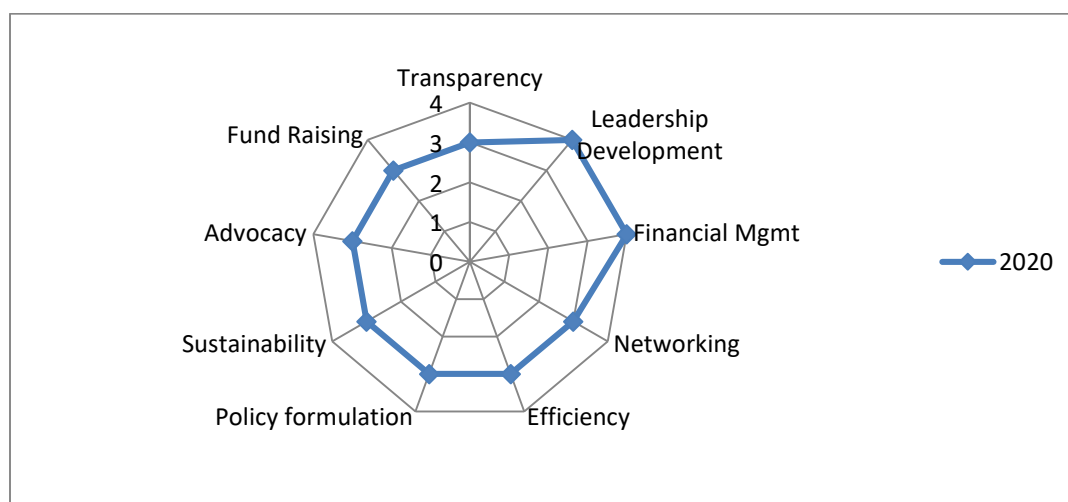
### 3.17 Organizational Assessment of Department of Disaster Risk Management, Kathmandu Metropolitan City

For the organizational assessment, 0-4 score was used. The organizational assessment was done with department head and staff members using the focused group discussion. The organizational assessment processes have been done based on the direct experience and judgments of the head of department and staff members in Kathmandu Metropolitan City and direct observation of researcher as well (Thapa, 2019)[9].

The leadership development and financial management has found highly satisfactory whereas transparency, efficiency, networking, fund raising, formulation of policies, sustainability, advocacy appeared to be satisfactory as perceived by respondents. There is an area for improvement in publication of best practices and lessons learnt to influence policies and practices with Government and donor agencies at national and international level (Fig. 4.19). There is a need of authority delegation from department head to field based managers to complete the program as planned.

The overall organizational performance has been rated as Satisfactory. This needs to be improved in the days to come. The efficiency, formulation of program policies, sustainability and lobbying/advocacy seems to be areas for improvement. There is enough room for improvement in order to develop the quality of work.

*Figure 3.15 organizational assessment of the Department of Disaster Risk Management in Kathmandu Metropolitan City*



Source: Focus Group Discussion, March 2020

Rating/Assessment Criteria (0-4 score):

4 - Highly satisfactory

3 -3.5 Satisfactory

2 -2.5 Moderately Satisfactory, and

0-1 Unsatisfactory

**Note:** It is assumed that higher the score greater the performance whereas lower the score poorer the organizational performance.

#### 4. Conclusions and Recommendation

##### 4.1: Conclusions

The primary disaster risks have identified as earthquake, fire, road accident; flood whereas secondary disaster reported as windstorm, epidemics, landslide and drought in the study area. Additionally, open spaces, camp coordination and camp management, evacuation routes planning and marking are non-existent in the study areas. There has been no disaster risk [exposure and vulnerability] information management system is in place in the study areas. There has been lack of assessment on multi-hazard risk, the probable economic and well-being losses in the study areas. There has been gap for the integration of disaster risk reduction in development program launched by the Kathmandu Metropolitan City due to poor orientation among the staff members and local leaders that resulted collapsed the infrastructures like roads, buildings, bridges, public hospitals, commercial centers, industries, electricity, water, and sanitation and telecommunication system every year.

According to the study the overall assessment of the organization performance has found satisfactory based on the experience and judgment of the respondents and direct observation of the researcher. For the organizational assessment, 0-4 score was used (4-highly satisfactory, 3-3.5 Satisfactory, 2-2.5 moderately satisfactory, and unsatisfactory).

In the study around 73.2 per cent respondents have found unhappy whereas 26.8 per cent reported as happy. The large majority of the respondents have rated unhappy due

to poor implementation in the field, poor governance and less commitment to action, insufficient staff members and lack of integration of disaster policy into development projects as well in the study areas particularly focusing to implementation of Disaster policy and strategy into practice at the community level.

The DRM act is the key legal document in disaster risk reduction. KMC have made own disaster risk reduction and management policy. All the wards have formulated disaster risk reduction & management community as well. In the study areas there is not yet formulated the strategic action plan to address the disaster response, reconstruction and recovery. It is reported that there is no practice of risk analysis and hazard assessment mapping in the study areas. There has been collected the fund NPR 100 per household from the Ward Office of KMC to address the humanitarian response during disaster events.

There has been found less priority in disaster risk management, poor capacity development of the technical human resource, poor technological innovation, poor knowledge about disaster risk management and poor orientation to local elected representative are the key challenges for disaster risk management in the study area. The study has found that the elected representatives or municipal leaders have lack of information about local risk and vulnerability in the study areas. The Kathmandu Metropolitan City is one of the highly disaster prone areas in the world. In the study areas there is no emergency management center for the humanitarian response during the disaster events.

#### **4.2 Recommendation**

The following recommendations have been put forward for the improvement of disaster policy and practice:

- The disaster risk management aspect should have integrated in the development projects for the sustainability and reduce risk.
- Kathmandu Metropolitan City should formulate the strategic action plan for disaster risk management in order to timely response during the disaster.
- Kathmandu Metropolitan City should establish the emergency response center at community level for disaster response, rehabilitation, reconstruction and livelihood recovery.
- Kathmandu Metropolitan City should have own warehouse to stock the disaster relief materials including food and non-food items.
- The local level government should provide the special encouragement for the participation of the local people, women and disabled people in disaster risk management.

- Kathmandu Metropolitan City should explore the alternative approach for disaster risk management in partnership with community, Public and Private sector for the sustainability of the disaster risk management; and
- It should user-friendly feedback mechanism system for active participation of local people towards the sustainability of disaster risk management.

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