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GENDER DIFFERENCE IN ACCESS TO AND CONTROL OVER RESOURCES DURING DISASTER: THE CASE OF KHULNA CITY CORPORATION, SOUTHWEST BANGLADESH

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Abstract: This study focuses on the gender difference in access to household resources and people's participation in disaster risk management in Khulna City. The study has adopted both qualitative (case study and focus group discussion) and quantitative (survey) approaches. The data have been collected by using stratified random sampling. To identify the access to and control over resources during disaster seven types of resources are considered to construct the Cumulative Empowerment Index (CEI). These are access to shelter, income, food, infrastructural facility, organizational support, information and participation in emergency situation. The value of R square (0.95) indicates that the aforesaid variables have 95 percent influence on access to and control over resources. In the study area the respondents (61.8%) noted about fire accident as frequently occurred and serious disaster in the locality. Flooding and water logging due to poor drainage are widespread. Eviction is also responsible for disruption of livelihood of the respondents. Another disaster causes vulnerability of the respondents is water logging. From the study it is found that 37.41 percent male household heads were very highly disaster threatened whereas the female were 74.82 percent and no female headed household is in the category of very low disaster-threatened but 4.96 percent male household head belong to this category. Through case study and focus group discussion many strategies like taking out loan, reducing household food expenditure, vegetable cultivation, participation in community-level mitigation strategies have been identified and were proposed by the beneficiaries involved in managing disaster risk. Disaster response strategies could protect and assist women as well as men are better for the community as a whole. By empowering citizens and enabling those to request greater equality and accountability these initiatives could play a strong role in helping cities to develop into vibrant and sustainable living environments with equitable economic and social resources.

Keywords: Gender, disaster, access, control, empowerment, resource

Introduction

A person's level of risk to a hazard and his capacity to respond to disaster or prepare for disaster management can be affected by gender. Although 'gender' is not just about women, it is a reality that women and girls are disproportionately affected by disasters. This is due to the roles, responsibilities and attitudes attributed to men and women, which impact on their access to resources and information; decision making; participation and leadership. Men and women may have access to resources, either within or outside the household premises, in that they are able to use them in some ways. They may not, however, always have control over these resources. The respondents of the study area face various barriers in obtaining post disaster land and property rights.

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Sen's concept of 'entitlement' can be helpful in understanding the extent of people's access to and control over resources (Sen, 1981). 'Entitlement' is the ability to command access to different forms of capital assets through the use of financial resources, formal and informal relationships with other groups and individuals or legal rights. UN-HABITAT's State of the World's Cities Report 2008-2009 (United Nations Human Settlements Programme, 2008) shows that in some countries, woman-headed households suffer disproportionately from inadequate housing in poor urban neighborhoods. Disasters often exacerbate and reinforce gender inequalities (International Federation of Red Cross and Red Crescent Societies, 2015). Sixty-five percent of the world's urban population currently live in coastal areas, and this percentage is expected to increase to seventy-four percent by 2025 (United Nations Human Settlements Programme, 2011). Most mega cities are either located on seacoasts or directly linked with riverbeds, increasing the exposure in hazard-prone areas. According to Field *et al.* (2012), by 2100, with the likelihood of 90–100 %, sea-level rise will contribute to upward trends in extreme coastal high water levels. Potential hazards in coastal areas and cities built near rivers are coastal flooding, erosion of beaches, sedimentation in river floors, flooding, and landslides. These hazards can intensify with a combination of intensified tropical storms. In addition to these hazards, cities are also expected to be affected by severe heat and cold events. Women's and men's different roles, responsibilities, and access to resources influence how each will be affected by different hazards, and how they will cope with and recover from disaster. During disaster women face number of problems due to their gender identity (Nasreen, 2008).

Women and children in Bangladesh are 14 times more likely to die than men during disasters (Women's Environment & Development Organization, 2007). It has been also observed that sometimes women face an array of physical, psychological and social problems (Faisal & Kabir, 2005; Climate Change Cell, 2009; Ahmed, 2008). Salinity, water logging and frequently occurring natural disaster due to climate change have been making this scenario more difficult and complex. In recent study Nasreen (2012) shows that climate change induced disasters affect both women and men but the burden of coping with disasters falls heavily on women. Women usually single women without children, widows or divorced have less ownership over resources such as land titles, property ownership, household assets and savings. These increase the severity of loss during disasters and limit a person's ability to rebuild their livelihoods.

Certain aspects of gender equality, such as female education and women's share of employment, can have a positive impact on economic (Kabeer & Natali, 2013). Many UN agencies and international organizations have sought to incorporate gender into their policies, government efforts to incorporate gender into their national HFA plans are lackluster (United Nations, 2009). The centrality of gender equality has also been articulated in the outcome document of the United Nations Conference on Sustainable Development, entitled 'The future we want', adopted in 2012, which included recognition of the importance of gender equality and women's empowerment across the three pillars of sustainable development, economic, social and environmental, and resolve to promote gender equality and women's full participation in sustainable development policies, programs and decision-making at all levels (United Nations, 2014). The process of empowerment undoubtedly differ from situation to situation of vulnerability, thereby

challenging change agents and communities to evolve coping and adaptive strategies based upon the extent of the presence or absence of empowerment elements such as access to knowledge and skills, access to income, assets and credit facilities and access to entitlements over land.

In the southwest coast including the Khulna area, women are more vulnerable to the impacts of climate change since they are often not allowed to participate in the public activities and discussions, and therefore are less likely to receive critical information for emergency preparedness. Besides, most climate change policies and programs are not gender sensitive (Leduc *et al.*, 2008). In many cases, socio-economic factors also hinder women's adaptation capacities and increase their vulnerability. The study thus discusses different tangible elements of sustainable livelihoods for women within the overarching frame of gender responsive economic, social and environmental resources.

Materials and Methods

In this study triangulation has been used to ensure the validation of qualitative results by quantitative studies and to confirm the appropriateness for measuring a concept, to overcome challenges related to a single method, and single theory biasness as identified by Shih (1998). The survey, case study and focus group discussion have been used to identify the access and control over resources of the respondent in disaster situation. After conducting census from the population (1414 household heads) fifty percent (707 household heads) were selected as sample in this study. The unit of analysis of this study is the heads of the households of the selected categories (male, 564; female, 143) of city population who are residing at that locality for at least 10 years and household income is not more than 10000 taka. By using stratified random sampling technique the respondents were selected. The reference year of this study is March, 2014 to December, 2015. The study has been conducted on household heads of purposively selected five areas of: i.) Rupsha slum area (352) ii). Khalishpur slum area (156) iii). Tutpara (127) iv). Nirala (44) and v). Gollamari (28) of Khulna City, Bangladesh. For conducting the focus group discussion the group of 10 respondents (having knowledge about disaster situation) from each area were purposively selected. Moreover for in depth study 10 respondents were considered to assess the access to and control over resources during disaster.

The respondents were selected from vulnerable households. To identify the vulnerable people the estimates of household income for the typical household was considered as based on family income not more than US$ 2 per day. During the field survey the conversion rate of US$ 1 was equivalent to almost Taka 77.63 (Bangladeshi currency). In this regard the households having (78*4=312*30= BDT 9360) not more than Taka 10000 monthly income was considered as study population. However they have no access to 2,100 kcals, or 8,400 kcals in total (Deptford *et al.*, 2013). A five points Likert Scale (1 for least important, 5 for most important) has been used to weigh the indicators following the method of Wyatt and Meyers (1987). In this study CEI is constructed, based on the cumulative empowerment index of Parveen and Leonhäuser (2004).

Cumulative empowerment index (CEI): In this regard seven indicators are used for constructing Cumulative Empowerment Index. Each indicator again has a number of sub-indicators. The quantitative part correspond to five categories e.g., 1 = very low and 5 =

very high. Each indicator assigned a quantitative rank from 1 to 5 according to the total score for access to and control over resources based on the field survey. Table 1 represents the way of constructing the CEI: Measurement of Explained (Dependent) Variables.

The CEI range is divided into five categories and labeled asvery highly disaster prone (27-36), highly disaster prone (37-46), moderately disaster prone (47-56), low disaster prone (57-66) and very low disaster prone (67 and above) (Table 1).

Table 1: Indicators of CEI (Cumulative Empowerment Index)

Indicators	Quantitative rank	Qualitative Rank	CEI Range 27- 69
Access to household resources	1 to 5	7	(1-5).7=7-35
Income security	1 to 5	6	(1-5).6=6-30
Food Security	1 to 5	5	(1-5).5=5-25
Infrastructural facilities	1 to 5	4	(1-5).4=4-20
Broader organizational support	1 to 5	3	(1-5).3=3-15
Knowledge about disaster	1 to 5	2	(1-5).2=2-10
Emergency responses	1 to 5	1	(1-5).1=1-5

The multiple regression model for CEI is:

$CEI = b_0+b_1$ shelter $+ b_2$ income security $+ b_3$ organizational support $+ b_4$ infrastructure $+ b_5$ food security $+ b_6$ knowledge $+ b_7$ age $+ u$

Where

CEI= Cumulative Empowerment Index; b_0 = Intercept term; $b_1, b_2, b_3, b_4, b_5, b_6, b_7$ =Regression co- efficient and u = Stochastic disturbance term

Results

***Disaster situation in the study area*:** In the study area the respondents are staying in dangerous places such as riverbanks, steep slopes, along railroad tracks, or near toxic waste dumps. This study focuses on women's participation, perceptions and local contextualization in Khulna City. A combination of human and natural factors results in various urban disaster with serious impacts on the poor. In the study area water logging due to poor drainage are widespread; windstorms and urban fires cause havoc especially in slums. The weak construction of houses; unplanned urbanization and sub-standard building practices pose great risk in the event of a major earthquake. The serious disasters especially facing by the respondents is presented in the Fig. 1.

As in urban area the respondents noted (Fig. 1) about fire accident as frequently occurred and serious disaster in the locality. Eviction is also responsible for disruption of livelihood of the respondents. Another disaster causes vulnerability of the respondents is water logging

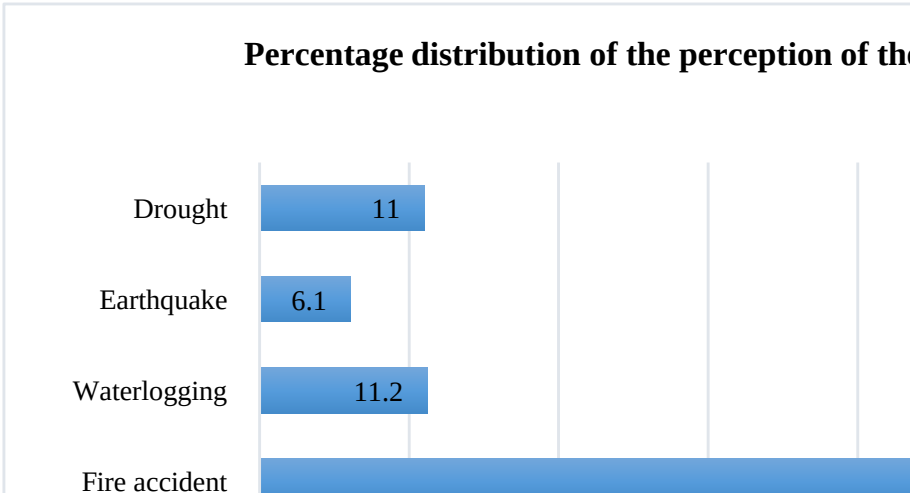

Fig: 1: Serious disaster in the locality

Table 2: Frequency of disaster in the locality

Serious Disaster in the locality	Prevalence of disaster faced by the respondents (with percent)				
Fire accident	Never (35.1)	Once (14.9)	three times (20.7)	Four times (23.2)	Five times and more (6.2)
Eviction	Threatened at present (32.2)	Threatened for more than three times (19.2)	Threatened for more than two times (28.7)	Threatened once (10.7)	No threat (9.1)
Water logging	Waterlogged during rainy season (56.0)	Waterlogged due to river flow (19.4)	Always flooded (18.1)	Flood free (6.5)	-
Earthquake	Threatened for more than three times (100.0)				
Drought	Suffered for almost half of the year (100.0)				

Table 2 presents that among the respondents 20.7 percent informed that fire accident occurred in their locality for about three times whereas in 23.2 percent cases it was four times. More than six percent (6.2%) respondents told that they have attacked by fire accident for about five or more times. In the study area especially in the slum areas Jabber (67) stated that, "the lanes are so narrow that it is not possible for Fire Service and Civil Defense Authority to go through their equipment to distinguish the fire. Especially due to this problem, the fire disrupts the locality and create disaster situation". Through focus group discussion one respondent Salma (52) informed that "cooking by single earthen hearth inside the house is the leading cause of home fires". Following CEI the disaster situation has been assessed (Table 3).

Table 3: Disaster situation faced by the respondents

Disaster situation	Percentage distribution of the respondents regarding sex	
	Male	Female
Very highly disaster-threatened (27-36)	211 (37.41)	107 (74.82)
Highly disaster-threatened (37-46)	140 (24.82)	24 (16.78)
Moderately disaster -threatened (47-56)	122 (21.63)	10 (6.99)
Low disaster- threatened (57-66)	63 (11.17)	2 (1.40)
Very low disaster -threatened (67 and above)	28 (4.96)	0
Total (mean-41.77, Standard Deviation.-11.75)	564	143

From the Table 3 it is found that 37.41 percent male household heads were very highly disaster-threatened whereas the female were 74.82 percent and no female household is in the category of very low disaster-threatened but 4.96 percent male household heads belong to this category. The mean (41.77) value indicates that majority of the respondents are highly disaster-threatened.

***Access to and control over resources during disaster*:** The access to and control over resources are discussed in the Table 4.

Table 4: Percentage distribution of the respondents regarding access to and control over resources

Access to and Control over Resources	Percentage of the respondents with level of access				
	1	2	3	4	5
Access to shelter	Public school/community center (60.3)	Relatives house (15.8)	Own house (19.4)	Own house with 2 decimal space (3.3)	Own safe location (1.3)
Income security	Income not sufficient (68.09)	Adequate income (19.4)	Production facilities (9.6)	Adequate production (1.1)	Savings (1.0)
Food Security	No security (frequently hungry in whole day) (88.7)	Less security (having meal for one time in a day) (10.0)	Moderate security (having meal for two times in a day) (1.0)	Secured enough (having meal for three times in a day) (0.3)	Highly secured (three times meal with extra food) (0.0)
Infrastructural facilities	Very low housing system (84.4)	Water facility (13.6)	Road facility (0.1)	Health facility (0.6)	Power supply (1.3)
Broader organizational support	Moderate political support (44.1)	NGO support (34.7)	Responsive local government (19.5)	Enabling legislative support (1.4)	International organization (0.3)
Knowledge about disaster	Very little knowledge (57.7)	Having local knowledge (33.2)	Public information to prevent (8.1)	Knowledge about early warning (0.7)	Training of rescue (0.3)
Emergency responses	To save life (24.5)	To reduce health impacts in family (33.5)	Contribute in economic solvency (34.2)	To ensure public safety (7.6)	To meet subsistence needs of the people (0.1)

Most of the respondents (75.1%) in the study area live in slums characterized by tenure insecurity and controlled by land lords who charge exorbitant rates for basic services. During disaster 19.4 percent respondent's family could take shelter in their house and 1.3 percent respondents had the access to own secured place. More than 68 percent respondents had no security of income during disaster and 9.6 percent respondents could benefit from production facilities.

Table 5: Regression coefficients

Independent variables	Dependent variable: Cumulative Empowerment Index (CEI)		
	Coefficients	t (Significance level-0.000)	Standard Error
(Constant)	5.250	11.476	0.561
Housing support	0.621	66.144	0.015
Income security	0.422	45.867	0.031
Food security	0.171	19.834	0.035
Infrastructural facility	0.201	12	0.062
Knowledge about disaster	0.137	-1.983	0.374
Sex	0.029	3.333	0.104
N= 707; Adjusted R^2 = 0.949; F= 2209.70 (Significance Level: 0.000)			

Considering seven indicators the regression model (Table 5) and regression coefficients has been made. The data indicate that the aforesaid variables have 95 percent influences on disaster situation. Among these housing support has the greater contribution (62%) to reduce the disaster risk in the locality than income security (42%), infrastructural facility (20%) and food security (17%). Gender difference in access to and control over resources are discussed in the following paragraphs (Table 6).

In the study area, 85.31 percent of woman headed households suffer from shelter deprivations. These relate to the lack of durable housing, insufficient living space, poor access to clean water, inadequate sanitation or insecure tenure. Among the respondents 53.90 male household heads had to rely on public accommodation during disaster. More than 23 percent male heads had the access to stay at their own house where in case of female respondents the percentage is only 4.20 (Table 6).

It is found that during disaster 90.21 percent female household heads could not earn sufficient income where 63.48 percent male respondents were in this group. More than 11 percent male household heads had the access to production facilities but only 2.10 percent female had this access. Regarding food security it is noticed that 86.88 percent male respondents had no security of food during disaster and 95.80 percent female headed household were in this group. Among the female household heads no one had the access to secured food and 1.06 percent male respondents could maintain moderate security that means having two times in a day during disaster.

More than 44 percent male respondents reported that they are supported by local political leaders during disaster and 47.55 percent female respondents had the access to the facilities of NGOs. Among the respondents 48.25 percent female household heads reported about having traditional knowledge and 5.59 percent had access to public information to prevent disaster. Furthermore, 2.09 percent female participants answered that they had Knowledge about early warning.

Table 6: Gender difference regarding access to and control over resources during disaster

Access to shelter	Percentage distribution of the respondents				
	Male		Female		Total
	No.	Percent	No.	Percent	percent
Public school/community center	304	53.90	122	85.31	60.3
Relative's house	98	17.38	14	9.79	15.8
Own house	131	23.23	6	4.20	19.4
Own house with 2 decimal space	22	3.90	1	0.70	3.3
Own safe location	9	1.60	0	0	1.3
Income security					
Income not sufficient	358	63.48	129	90.21	68.9
Access to adequate income	126	22.46	11	7.69	19.4
Production facilities	65	11.52	3	2.10	9.6
Adequate production	8	1.42	0	0	1.1
Savings	7	1.24	0	0	1.0
Food security					
No security	490	86.88	137	95.80	88.7
Less security	66	11.70	5	3.50	10.0
Moderate security	6	1.06	1	0.70	1.0
Secured enough	2	0.35	0	0	0.3
Highly secured	-	-	-	-	-
Organizational support					
Moderate political support	250	44.33	62	43.36	44.1
NGO support	177	31.38	68	47.55	34.7
Responsive local government	126	22.34	12	8.39	19.5
Enabling legislative support	9	1.60	1	0.70	1.4
International organization	2	0.35	0	0	0.3
Knowledge about disaster					
Very little knowledge	345	61.17	63	44.06	57.7
Having traditional knowledge	166	29.43	69	48.25	33.2
Public information to prevent	49	8.69	8	5.59	8.1
Knowledge about early warning	2	0.35	3	2.09	0.7
Training of rescue	2	0.35	0	0.0	0.3
Emergency responses					
To save life	108	19.15	65	45.45	24.5
To reduce health problems in family	180	31.91	57	39.8	33.5
Contribute in economic solvency	224	39.72	18	12.2	34.2
To ensure public safety	51	9.04	3	2.10	7.6
To meet subsistence needs of the people	1	0.70	0	0.0	0.1
Infrastructural facilities					
Very low housing system	471	83.51	126	88.11	84.4
Access to water facility	79	14.01	17	11.89	13.6
Access to road facility	1	0.18	0	0	0.1
Access to health facility	4	0.71	0	0	0.6
Access to electricity facility	9	1.60	0	0	1.3

More than 19 percent male respondents reported that they contributed to saving life during disaster and 39.8 percent female respondents participated in health related problems in family whereas only 2.10 percent female respondents participated in ensuring public safety. Furthermore 1 male respondent could contribute to meeting subsistence needs of the people. Both male and female respondents (more than 80 percent) reported about low housing facility that means low sanitation and poor drainage system at the time of water logging and fire accident (Table 6). The respondents are also deprived of heath facility and power supply during disaster.

Table 7 highlights that the male respondents participate more in community decision making process during the disaster period than the female counterparts.

Table 7: Gender difference regarding participation in decision making to emergency at community level

Level of Participation	Number and percentage distribution of the respondents regarding Sex				Total percent
	Male		Female		
	Number	Percent	Number	Percent	
Very low	65	45.45	108	19.15	173 (24.47)
Low	57	39.86	180	31.91	237 (33.52)
Moderate	18	12.59	224	39.72	242 (34.23)
Highly participate	3	2.10	51	9.04	54 (7.65)
Very highly participate	0	0.0	1	0.18	1 (0.18)
Total	143	100.0	564	100.00	707 (100.0)

Several strategies were proposed by the beneficiaries involved in the activities for managing risk, which have been listed in Fig. 2.

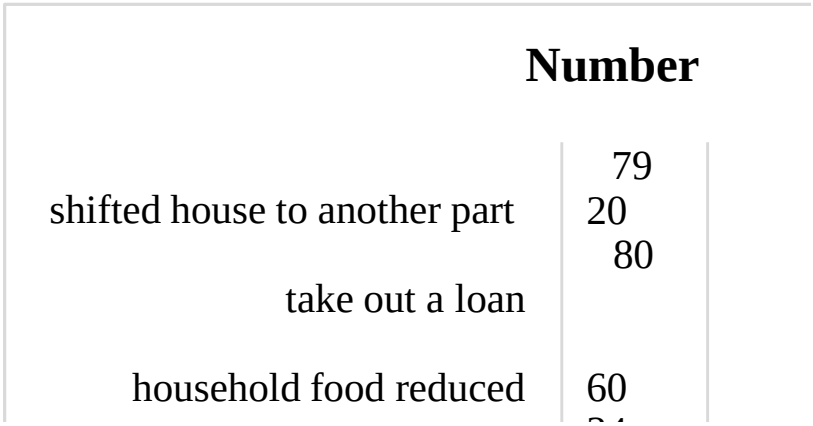

Fig. 2: Household coping strategies (multi- response)

Nearly half of the respondents (350) reported that taking out loan is a mitigation strategy of disaster risk reduction. The only exception was if grain stores were affected, then about 60 of households said that they also had to reduce household consumption. Often these strategies were formulated and undertaken in conjunction with each other, such as taking a child out of school and sending them to live or work elsewhere, tree plantation and searching another part of shelter (Fig. 2).

Discussion

To identify the access to and control over resources in this study collected data have been used to demonstrate women's lack of securing access to resources, including land, income, food, infrastructural facility, different organizational support, information and participation in emergency situation. The regression analysis indicates that the aforesaid variables have 95 percent influences on disaster situation (Table 5).

The process of empowerment differs from situation to situation of vulnerability. Thereby empowerment depends on challenging change agents and communities based upon the extent of the presence or absence of empowerment elements such as access to knowledge and skills, access to income, assets and credit facilities and access to entitlements over land. In the southwest coast including the study area, women often face inequitable access to control over resources and income generation opportunities. Women are more vulnerable to the impacts of climate change since they are often not allowed to participate in the public activities and discussions, and therefore are less likely to receive critical information for emergency preparedness. Women have very limited access to information and training which restrict their capacity of adapting to climate change impacts (Table 6).

As a United Nations Environment Programme study explains: Women contribute work and energy towards income generation and carry out a disproportional amount of daily labour compared to men in household and community spheres, such as cooking, cleaning, child care, care of older or sick family members, providing work for collective projects and during weddings, funerals and other cultural ceremonies (Nellemann *et al*., 2011).

Globally women and girls are systematically excluded from education, particularly those of lower socioeconomic status: "876 million people in the world are illiterate, of whom two third are women" (United Nations, 2009). Gender inequities can be evident in a lack of, or inadequate, early warning information targeting women and evacuation procedures and arrangements. Indeed, knowledge of early warnings and the decision to evacuate may be the exclusive domain of men. In some cases, women may be ill-informed about natural hazards and not allowed to make the decision to evacuate. This was the case, for example, in Bangladesh's Cyclone Gorky in 1991 in which women accounted for 90 percent of the 140,000 fatalities (Ikeda, 1995). From the focus group discussion it is recognized that "women felt that the most reliable information sources were their neighbors and community members, second leading source is mass media and family then relatives coming in third most reliable source". Suraya (58), a woman in Tutpara informed that "the gender difference and economic condition play influential role in disaster management. Moreover household members who planted vegetable (like papaya, brinjal, Solanum lycopersicum, gourd) could participate more in disaster management than those having less or no access to natural resources". The focus group discussion found evidence that community diversity (in wealth, ethnicity, and power) hinders participation in community-level disaster mitigation strategies. For example, a respondent Ayesha (20) who was asked about the cause for not addressing the maintenance of sluice gate by the

community. She answered that especially the owners of ice factory locked the gate to preserve water for their factory and in most cases that is the cause of flooding.

The frequent and different types of disaster management with the shift of paradigm from emergency response to proactive disaster risk reduction have been observed (Nasreen, 2011). While women may not hold positions of visible political leadership (for example, as mayors), women are key to a society's social fabric and hence, its capacity for resilience. They shape behavior and transmit culture and knowledge through kin and social networks, which are critical to risk prevention and response efforts. During the response phase of a disaster, needs relating to gender and diversity are often overlooked. They can be seen as an 'addon' or secondary to what would be considered 'essential' relief, for example distributing food and shelter. It is well demonstrated that gender and diversity is a priority in the emergency phase of a response, that it adds quality, reach and accountability to operations.

Conclusion

Sustainable cities support the equal participation of women and men, especially in urban planning and management, as well as in governance. The study shows that women have been participated in fulfilling basic need especially in their family, but there is still persistent under-representation by women decision-making at the time of emergency in disaster management. Disaster response strategies that protect and assist women as well as men are better for the community as a whole. Women should be effectively engaged in disaster and climate risk management prevention, planning, decision-making and implementation efforts. Moreover governments' engagement of women's civil society organizations must be incentivized as a way to overcome their exclusion from decision-making. These initiatives could play a strong role in reducing gender difference in access to and control over resources during disaster and helping the cities to develop sustainable living environments of the urban poor.

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