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Role of gender and political connectedness after extreme events in coastal Bangladesh

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Abstract

This study focuses on how gender and political engagement contribute to disaster management in Bangladesh, specifically in disaster relief and rehabilitation. It is based on empirical evidence from southwest coastal Bangladesh, particularly in Dacope Upazila, and applies a mixed-method approach. Results show that gender has a significant influence on the acquisition of post-disaster relief and rehabilitation supports. Females, including those widowed and divorced, get more relief than males. Nevertheless, older women are not given priority for aftermath disaster relief. Moreover, gender plays a vital role in the household's overall economic strength and is crucial for disaster resilience. Furthermore, respondents' families who were, in some way, closely connected with local social and political leaders, obtained more relief and aids. The results indicate that socio-political connectedness, irrespective of gender, still dominates local decision-making processes in disaster recovery. Alongside women's empowerment, regular monitoring and evaluation of relief and rehabilitation programs must improve, to reduce the traditional barriers to effective disaster management (arising from (dis)connectedness to local social power) in the face of climate change.

Keywords: Socio-economic and demographic factors, Gender, Local political engagement, Disaster relief, Coastal region, Bangladesh

Introduction

In Bangladesh, overall disaster management is challenging. Being the most vulnerable country to tropical cyclone hazards globally (IPCC, 2014) and one of the most vulnerable countries to climate change (Clement et al., 2021), disaster-affected people in Bangladesh face many environmental and social security problems. Due to its unique geographical location, high population density, and low climate resilience accelerate the vulnerability to climate change (ADW & UNU-EHS, 2015). According to the IPCC (2021) the coastal zone will face ongoing sea-level rise throughout the 21st century, intensifying the sudden onset of extreme events for instance, tidal surges and cyclones. Studies claim that Bangladesh is the country most affected by cyclone-related damages, losses, and fatalities globally. For instance, almost 40% of cyclones with death tolls above 5000 occur in Bangladesh, and even the two deadliest cyclones hit the country in 1970 with casualties of 300,000, and in 1991 with 140,000 (Bianchi & Malki-Epshtein, 2021).

However, Bangladesh has become a role model for climate-related disaster management by employing a holistic approach to disaster response and recovery in its long experience of dealing with such disasters. Nonetheless, the current disaster management in Bangladesh is based on top-down approaches, and thus the initiatives taken into consideration in all disaster vulnerable areas are not people-centered (Alam et al., 2011). In general, grassroots-level disaster management approaches mostly evade gender priorities (Masaba et al., 2017). In addition,

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the operation of the disaster relief and rehabilitation programs is significantly connected to various factors such as political connectedness, bureaucratic entanglement, political collaboration at the national and local level (Baytiyeh, 2017; Cohen & Werker, 2008; Hapeman, 2012; Islam et al., 2014; Kovach, 2013; Macrae, 2014; Sökefeld, 2012). In Bangladesh, grassroots level politics play a crucial role in post-disaster relief and rehabilitation programs (Bhavnani, 2006; Hayat & Amaratunga, 2017; Heide, 2004; Oliver & Reeves, 2015; Pelling & Dill, 2008). A study conducted by Sökefeld (2012) found that disaster's complexity with political action and power relations creates a critical situation in total disaster management. Thus, the influence of local politics on disaster management increases the people's vulnerability of that area (Gotham, 2012). Moreover, some other factors, namely economic status, religion, caste system, ethnicity, and other identity-based biases, play a vital role in disaster relief and rehabilitation distribution (Ciampi et al., 2011; Murthy, 2009).

Furthermore, gender intersects with other social attributes; for instance, women in rural areas, particularly in developing countries, mainly depend on natural resources for their livelihood, making them especially vulnerable to climate change issues (Terry, 2009). Hemachandra et al. (2018) explored the role of women in disaster risk governance and the constraints that limit these roles. They upheld that women can play a pioneering role in disaster risk governance for effective management that initiates resilience among women within a community (Roy 2020a). Gender-based discrimination persists in allocating disaster relief and rehabilitation support in the aftermath of a disaster, as does discrimination based on countless other dimensions, including religion, tradition, and culture (Enarson & Meyreles, 2004; Farrior, 2009; Roy 2020b). Women with fewer resources are the most vulnerable and most likely to be considered natural disaster victims (Lebni et al., 2020). Gender-based discrimination and violence increase after a disaster (Aryanti & Muhlis, 2020). Human rights organizations have long been working on gender and human rights, but still, gender-based discrimination is visible everywhere, including in education, housing, the workplace, healthcare, disaster relief, and more (Clar, 2019; Farrior, 2009). Takasaki (2012) highlighted that women-headed households experience more risk and vulnerabilities as they adjust to disaster devastations. In such circumstances, gender-sensitive emergency spaces are required for women to defend themselves against post-disaster violence and risks (Aryanti & Muhlis, 2020). Thus, the inclusion of gender dimensions in disaster management requires active participation and empowerment of women in local politics.

Interestingly, research shows a lack of women's involvement in disaster risk reduction-related interventions and programs (Masaba et al., 2017; Islam & Walkerden, 2017); thus, women's opinions are not considered seriously in the household decision-making process. The ability to receive post-disaster relief has a significant relationship to the disaster-affected people's socio-economic conditions, i.e., gender, age, education, occupation, income, property damages, etc. (Hapeman, 2012; Khan & Nahar, 2014). Although the inadequate financial resources, lack of human capacity, political interference, misuse of resources, lack of cooperation between the local community, and lack of security and supporting regulations are primarily responsible for weak disaster risk management (Masaba et al. 2017).

Aftermath relief, shelter, livelihood assistance like livestock, fishing boats, and services supports are provided by the local governments (Islam & Walkerden, 2017; Chipangura et al., 2017); however, many victims continue facing struggles to overcome post-disaster impacts due to social and gender discrimination as well as political instability (Buhaug et al., 2008; Enia, 2009; Goldstone et al., 2010; Kovach, 2013). Besides, many non-victims of the disaster also in-migrate to the affected area and list themselves as beneficiaries for emergency relief, thus influencing the sufferings of the real victims (Mallick & Vogt, 2012). Sometimes, relief and rehabilitation activities are undertaken by non-government organizations also favor their beneficiaries, particularly their micro-credit recipients and the local political leaders (Islam & Walkerden 2017). Thus, the exploitable structures disrupt to achieve sustainable development and threaten future disaster management by making the disaster-affected people the most vulnerable (Akinci, 2004; Ozcelik et al., 2008).

A structural framework was employed by Bhavnani (2006) to investigate the conflicts of disasters and found that illegal resource acquisition was significantly connected to the aftermath disaster relief distribution. In their study on cyclone Aila of 2009 in Bangladesh, Mahmud and Prowse (2012) observed that the post-disaster relief and rehabilitation programs had been manipulated by locally politicized favoritism, nepotism, and corruption. Thus, people often move to the cities searching for work and food security, especially those who do not get enough relief and rehabilitation support (Care, 2008). Mallick and Vogt (2012) have similar findings identified in their study that demonstrated mismanagement in relief and rehabilitation after cyclone Aila, which influenced many disaster victims to migrate to a new place. Thus, a holistic approach was required to manage the disaster's impact from a rescue operation to relief intervention to ensure effective disaster risk reduction by including every social group in the intervention (Mendoza,

2014). Parvin et al. (2019) proposed a comprehensive supply chain management of disaster relief based on the response of personnel (employees of GOs, NGOs, and foreign donor organizations) involved in relief and rehabilitation intervention.

Although several studies in Bangladesh have discussed gender and the problem of relief distribution, there is hardly any study available that deals with gender involvement in local politics and its diversity in the local level disaster management. And at present, how gender and political affiliation contribute to local-level disaster management in Bangladesh has become an emerging issue. Therefore, this study focuses on the roles of gender in disaster management to investigate how to progress disaster management and climate change adaptation. The following research questions are raised:

- How do socio-economic and demographic factors affect disaster management, and how does it differ among the respondents?
- How much does gender- and individual-level engagement in local politics contribute to disaster management?

These questions are presented based on empirical evidence from southwest coastal Bangladesh, particularly in Dacope Upazila of Khulna district. The following section describes the methodology, and section three presents the results and discussion. Section four concludes with the future outlook.

Materials and methods
Study area
The southern part of Bangladesh stands on the Bay of Bengal and represents one-third of the country's land surface; and is also highly susceptible to environmental hazards like a cyclone, tidal surges, flooding, and erosion. About 28% of the country's population lives in this coastal region, and during the last 100 years, 508 cyclones originated in the Bay of Bengal, and 17% of these cyclones hit Bangladesh. On average, the country faces one high-speed tropical cyclone every 3 years. For instance, the communities were affected by cyclone Sidr of 2007 and cyclone Aila of 2009 but did not experience similar damages and losses. After these two consecutive cyclones in this southwestern region of the country, massive interventions program have been implemented. Such programs include relief and rehabilitation supports, primary healthcare, housing, and disaster management skill training. How those programs were implemented and to what extent gender played a role in the distribution and management of those programs are the key questions for this research, and therefore, we focused on selecting the communities which have longer-term inhuman conditions after the cyclone Aila of 2009. Several studies show that the Gabura Union of Shyamnagor Upazila in Satkhira district and the Sutarkhali union of Dacope Upazila in Khulna district were submerged more than 6 months after Aila, and the livelihood conditions were severely disrupted in those villages (Mallick et al., 2011; Auerbach et al., 2015). Considering the accessibility (remoteness), proximity to rivers, and rurality in nature, and after all, the long-standing severity and inhuman conditions after cyclone Aila compared to other villages in nearby Upazilas, we selected the villages in Sutarkhali Union from Dacope Upazila.

Four villages were selected based on these criteria: Gunari, Sutarkhali, Nalian, and Kalabogi of Sutarkhali Union, under the Dacope Upazila of Khulna district (Fig. 1). Rivers surround the Sutarkhali Union, and the most significant river is the Shibsa River which flows on the west side of the Sutarkhali Union. The total amount of land in this union is about 12,092 acres. The world's largest mangrove forest, the Sundarbans, is located close to the study area, where one can access the Sundarbans by crossing the surrounding rivers. The total population is about 30,060 (male 15,205, female 14,855). About 73% of the people are Muslim there. The study area's average literacy rate is about 49.5% (male 56.3%, female 42.6%) (BBS, 2011).

Razzaque et al. (2019) found that the study villages are the most vulnerable to natural and climate-induced disasters, such as tropical cyclones, floods, tidal surges, salinity intrusion, and riverbank erosion. The height of river water was about 13 feet above the land surface during Cyclone Aila, which hit coastal Bangladesh in 2009 and damaged many embankments in several places. Many people in these areas lost their lives and were severely affected then (Mallick & Vogt, 2014). The marginal people mainly depend on natural resources for their bread and butter, and thus, they have become the most sufferer in the aftermath of disaster (Biswas & Mallick, 2020). In addition, gender discrimination was an issue everywhere during the aftermath of relief and rehabilitation programs (Razzaque et al. 2019). This disaster-prone region has political instability, which aggravates its vulnerabilities in post-disaster recovery interventions (Sultana et al., 2021). Therefore, this region has been selected as the study area due to the existing research gap on gender and the politics of aftermath disaster management from a sociological view.

Data collection
A mixed-method approach was applied in the data collection process. Quantitative data were obtained by conducting household surveys where all sorts of households were considered, i.e., single-headed, nuclear, and extended families. In total, two hundred thirty respondents

Fig. 1 Study area
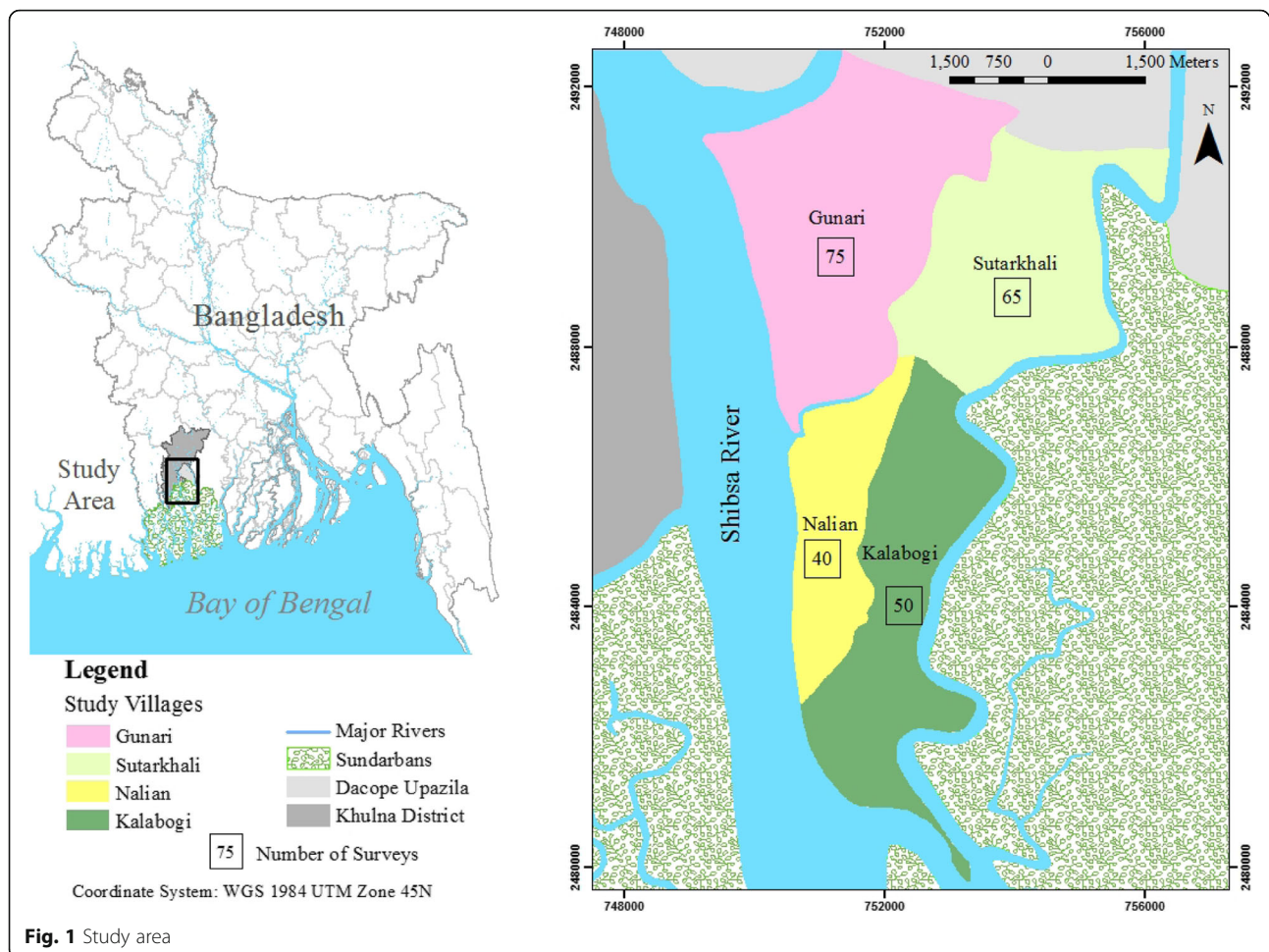
were interviewed from four villages of Sutarkhali Union; among them, 130 respondents were female, and the remaining 100 respondents were male. Based on random sampling, we selected 40 respondents from Nalian, 65 from Sutarkhali, 75 from Gunari, and 50 from Kalabogi. The final survey was conducted in March 2019. Before that, a reconnaissance survey was done in December 2018. This initial visit to the study area was used to determine the suitability of the proposed study. As the study required informative, in-depth, and detailed data, a 'face to face' mode was selected for administering the survey to the respondents. The survey questionnaire was semi-structured to thoroughly clarify the quantitative findings on respondents' socio-economic condition, political involvement, and gender influences and experiences during the relief and rehabilitation interventions in the aftermath of cyclone Aila.

Furthermore, two unique and informative qualitative methods were used to supplement the quantitative data findings. One focus group discussion (FGD) was conducted in each village, consisting of ten respondents.

Respondents were selected from those who knew and were involved in the aftermath rehabilitation program. Likewise, four key informant interviews (KII) or in-depth interviews were conducted purposively of respondents who know disaster management well. The results from the FGDs and KIIs have been summarized at the end. Research ethics principles, reliability, and validity were rigorously maintained to keep a sound methodology for this study.

Data characteristics and analysis

The list of essential variables used in the study and their characteristics are shown in Table 1.

A logistic regression model, comprised of socio-demographic, economic, and political features, has been employed to determine how individuals get relief support after a disaster. Here, the receiving relief has been regarded as a dependent variable, dichotomous in manner. The following Eq. 1 indicates the logistic regression model.

Sultana *et al. Climate Action*   (2022) 1:7

Page 5 of 12

Table 1 Variable characteristics

Demographic variables	
Variable name	**Values (scale and range)**
Age (in years)	*C*: 25 to 78
Gender	*N*: 1 = Male; 2 = Female
Religion	*N*: 1 = Muslim; 2 = Hindu; 3 = Christian
Education level	*O*: 1= Illiterate; 2 = Primary; 3 = Secondary
Marital status	*N*: 1 = Married; 2 = Widow; 3 = Divorced
Type of family	*N*: 1 = Single headed; 2 = Nuclear; 3 = Extended
Family size (in number)	*C*: 1 to 8
Socio-economic and socio-political variables	
Occupation	*N*: 1 = Farming; 2 = Business; 3 = Day laborer; 4 = Service
Monthly income (BDT)	*C*: 1000 to 13,000
Monthly expenditure (BDT)	*C*: 3000 to 40,000
Monthly savings (BDT)	*C*: 500 to 4000
Earning members of the family (in number)	*C*: 1 to 2
Receiving relief	*O*: 0 = No; 1 = Yes
Source of relief support	*N*: 1 = GO; 2 = NGO; 3 = Both
Satisfaction with local government initiative	*O*: 0 = No; 1 = Yes
Engagement in politics	*O*: 0 = No; 1 = Yes
Political leaders having any nepotism tendency	*O*: 0 = No; 1 = Yes
Receiving help from political leaders	*O*: 0 = No; 1 = Yes

C continuous, *O* ordinal, *N* nominal
Source: Field Survey, 2019

$$L_i = \ln\left[\frac{P_i}{1-P_i}\right] = \beta_0 + \sum_{i=1}^{m} \beta_i X_{ji} + \varepsilon_i \quad (1)$$

where,

$$j = 1, 2, 3 \ldots \ldots M; i = 1, 2, 3 \ldots \ldots n$$

P_i indicates the likelihood of getting relief. Y_i is the relief status (if people get relief, $Y = 1$ and if do not $Y = 0$). In Eq. 1, $\ln\left(\frac{p_i}{1} - p_i\right)$ and β_0 indicate the log of the odds ratio and intercept respectively. X_{ji} is a set of predictor variables, and ε_i is the error term. The regression analysis has encompassed a total of ten demographic, economic, and political characteristics. Firstly, in socio-demographic variables, we included the age (X_1), gender (X_2), marital status (X_3), religion (X_4), and size of the household (X_5). Along with the religion, to understand the relief access of the people in various education levels, we also classified the education variable (X_4) (Secondary,

Primary, and Illiterate) and incorporated in the model. Secondly, as socio-economic indicators such as the occupation of the respondents (X_7), earning members (X_8), and total monthly income of the household (X_9) have been comprised in the model. Finally, a binary socio-political variable, whether engaged in politics or not (X_{10}), has been included in the regression analysis.

The variance inflation factor (VIF=1.42) and Pearson correlation tests have been employed to detect the magnitude of collinearity and cross-correlation among the regressors. The highly connected variables have been detached (i.e., proxy variables) from the model to fit the model better. Furthermore, before picking the final model, we examined the heteroscedasticity problem of our data and used robust standard error. To analyze data in our study, we have used several statistical tools such as STATA14 and SPSS$_{22}$ (Statistical Package for the Social Sciences). To prepare the map and indicate the geographical location of the study villages, we also used ArcMap 10.5.

Results

Profile of the respondents

The demographic, socio-economic, and socio-political variables are incorporated in Table 2. Among the three age groups, around half of the respondents (50%) belong to the age group of 25–40 years, whereas the age group of 61-78 contains only about 3.5%. Approximately three-quarters of the respondents (about 68%) are married, and divorced respondents cover 9.6%. More than half of the respondents (56.5%) are female. Around 50% of the households are Muslims, whereas Hindus and Christians follow with 36.1% and 13.9%. The average household size is about 4. The highest level of education of the respondents is secondary, but only about 5% have this. Most households are headed by one or two earning members, and their monthly average income level is below 5000 BDT. The primary occupation for maintaining their livelihood is day-labor (70%), besides which they do farming (about 28%) and business (about 2%).

The key finding from Table 2 is that the average monthly expenditure is more than the respondents' monthly average income. This indicates that the respondents might take loans to bear their daily expenses. The findings also demonstrate that about 55% of people have access to relief, which indicates the rest do not receive relief after a disaster. Only 5.7% of the total respondents are engaged in local politics. Since women in the village usually do not participate in politics, this 5.7% political engagement likely belongs to the male respondents. Among the male respondents, those engaged in local politics receive relief in the post-disaster intervention.

Table 2 Demographic, socio-economic, and socio-political profile of the respondents

Variables	Mean	Std. Dev.
Age		
25–40	.5	.501
41–60	.465	.5
61–78	.035	.184
Gender	.565	.497
Marital status		
Married	.678	.468
Widow	.226	.419
Divorced	.096	.295
Religion		
Muslim	.5	.501
Hindu	.361	.481
Christian	.139	.347
Education		
Illiterate	.457	.499
Primary	.491	.501
Secondary	.052	.223
Number of family members	3.913 [1~8]	1.171
Occupation		
Farmer	.278	.449
Business	.022	.146
Day-labor	.7	.459
Number of earning members	1.513 [1~2]	.501
Monthly income of the family	4776.087 [1000~13,000]	2372.255
Monthly expenditure of the family	5830.435 [3000~40,000]	3037.169
Relief status	.552	.498
Engage in politics	.057	.231

Source: Field Survey, 2019

Post-disaster situation in general

Affected communities require financial, institutional, and infrastructural support after a disaster. The sources of relief support are the government and non-government organizations. People usually receive relief from one or the other but sometimes get support from both. Most of the respondents who live in the study area have a good relationship with their neighbors. However, people are not satisfied with the local government initiatives since they do not receive their required facilities from the local government. At least fifteen thousand people in Kalabogi village face the extreme threat of climatic disaster in the upcoming monsoon season due to the lack of adequate cyclone shelters. Describing them as floating hyacinth, Sefali Begum (42 years old, a house-wife in Sutarkhali village) said lack of space was one of the significant problems in the cyclone shelter. She also disclosed, "There is no separate toilet for women in the cyclone shelter, so very often our girls and women face sexual harassment when they go outside at midnight to use the common". When asked how this problem should be addressed, she said they must be rehabilitated from this small island as early as possible. Besides, the government must construct a sustainable and women-friendly cyclone shelter.

Furthermore, Ruhul Amin, a fisherman, 35 years old, said he faced some difficulty during cyclone Aila, when he took his pregnant wife to a cyclone shelter four miles away from his house. "It is hard to describe the ordeal I had faced due to the lack of a cyclone shelter nearby. We have been denied every basic right, from drinking water to medical care to education to shelter. We are not given anything for years," he said. Many people have migrated in response to such livelihood difficulties, including after losing their households to natural calamities. Social organization is an integral element of

reducing poor people's suffering (Kazal et al., 2017). However, people in this area are reluctant to participate in social organizations like associations or clubs. They pointed out that these organizations work for the people engaged in politics, and therefore, engagement in local politics usually creates opportunities for getting an enormous amount of post-disaster relief and rehabilitation support.

How do the socio-economic and demographic factors affect post-disaster relief activities, and how does it differ among the respondents?

The pairwise Pearson correlation coefficient is incorporated in Table 3 to indicate the degree of correlation among the variables at correspondingly at 1%, 5%, and 10% level of significance. The correlation coefficient implies that age and family are negatively correlated with relief status, whereas gender (0.44) is moderately correlated with relief status at a 1% significance level. Under marital status, widowed (0.28) and divorced (0.23) women exhibit a positive correlation with relief access, but married women (− 0.40) show a negative association

with relief status. This significant correlation between the widowed and divorced women with overall relief status indicates that they receive more relief than married women. In the case of other variables, it is found that earning members of a family (0.26), monthly income (−0.27), monthly expenditure (0.36), engagement in politics (0.17), etc. also have a positive and negative relationship with another set of variables that might have multiple direct or indirect impacts on relief status. The result asserts that the variables' overall correlation coefficient rejects the null hypothesis and indicates that other factors govern relief accessibility.

Extent of the influence on disaster management by gender and individual-level engagement in local politics

A binary logistic regression model has been employed, where the socio-economic variables and the socio-political status of the household head have been incorporated, presented in Table 4.

A binary logistic regression model has been delineated in Table 4 where demographic, socio-economic, and socio-political attributes have been incorporated to

Table 3 Pairwise correlation of the selected variables

Variables	(1)	(2)	(3)	(4)	(5a)	(5b)	(5c)	(6a)	(6b)	(6c)	(7)	(8)	(9)	(10)
(1) Relief status	1.00													
(2) Age	− 0.14***	1.00												
(3) Gender	0.44***	− 0.13	1.00											
(4) Family members	− 0.26***	0.24***	− 0.19***	1.00										
(5) Marital Status														
(5a) Married	− 0.40***	0.19***	− 0.55***	0.31***	1.00									
(5b) Widow	0.28***	− 0.11	0.45***	− 0.20***	− 0.78***	1.00								
(5c) Divorced	0.23***	− 0.15**	0.23***	− 0.20***	− 0.47***	− 0.18**	1.00							
(6) Religion														
(6a) Muslim	− 0.11	0.01	− 0.11	− 0.10	0.15**	− 0.04*	− 0.18**	1.00						
(6b) Hindu	0.04	0.06	0.00	0.05	0.07	− 0.06	− 0.03	− 0.75***	1.00					
(6c) Christian	0.11	− 0.11	0.15**	0.08	− 0.31***	0.14**	0.30***	− 0.40***	− 0.30***	1.00				
(7) Earning members	0.08	0.26***	0.16**	0.05	− 0.37***	0.26***	0.23***	− 0.09	0.01	0.12	1.00			
(8) Monthly income	− 0.27***	− 0.03	− 0.22***	0.27***	0.54***	− 0.42***	− 0.26***	− 0.01	0.06	− 0.06	− 0.41***	1.00		
(9) Monthly expenditure	− 0.12	0.36***	− 0.01	0.51***	0.26***	− 0.20***	− 0.13*	− 0.13*	0.12*	0.02	0.05	0.43***	1.00	
(10) Engage in politics	0.11	0.00	− 0.17**	− 0.14**	0.17**	− 0.13*	− 0.08	0.09	− 0.03	− 0.10	− 0.03	0.13*	− 0.02	1.00

Source: Field Survey, 2019
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Sultana *et al. Climate Action*   (2022) 1:7

Page 8 of 12

Table 4 Predictors of access to relief intervention

Dependent variable = relief status (yes = 1 and no = 0)	Odds ratio	Robust Std. Err.	t value	P value	Sig
Age (Z_1): (25–40)^R					
41–60	2.063	.777	1.92	.055	*
61–78	.704	.522	− 0.47	.636	
Gender (Z_2)	5.13	2.106	3.98	0	***
Marital Status (Z_3): (Married)^R					
Divorced	2.117	1.253	1.27	.205	
Widow	6.309	5.483	2.12	.034	**
Religion (Z_4): (Muslim)^R					
Hindu	1.91	.679	1.82	.069	*
Christian	1.855	1.158	0.99	.323	
Number of family members (Z_5)	.853	.129	− 1.05	.293	
Education (Z_6): (Illiterate)^R					
Primary	1.041	.376	0.11	.911	
Secondary	28.056	26.138	3.58	0	***
Occupation (Z_7): (Farmer)^R					
Business	13.2	18.175	1.87	.061	*
Day labor	.958	.417	− 0.10	.921	
Earning members of the family (Z_8)	.424	.18	− 2.02	.043	**
Monthly income of the family (Z_9)	1	0	− 2.95	.003	***
Engagement in politics (Z_{10})	5.23	5.181	1.67	.095	*
Constant	4.535	4.623	1.48	.138	
Number of observations					230
Pseudo *r*-squared					0.30
Chi-square					81.08

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$ and ^{R} indicates the reference categories
Source: Field Survey, 2019

determine the relief support status under different reference categories. The results exhibit that several variables are significantly associated with the outcome variables. The logistic regression model's odds ratio suggests that the person whose age ranges from 41 to 60 years receives more relief than people of other age groups. The demographic variable gender has a significant positive relationship with the outcome variable, demonstrating that females have greater access to the relief program than males at 1%. Similarly, widowed and divorced women have more access to relief opportunities than married women.

Interestingly, there was also evidence of a lack of support for drinking water. For instance, Karimon Bibi (25 years old housewife in Kalabogi) claimed that after Aila water was supplied through a local agent in their village, they could not pay the required fees for water supply. Therefore, her husband spent almost 8 h collecting drinking water from Chalna (Upazila town) to their village Kalabogi. She mentioned, "We faced an extreme financial crisis after being hit by cyclone Aila that detached us from the main village of Kalabogi. Moreover, we cannot pay the money to the local agent of the water supply company. Actually, we do not have any alternative jobs, only catching fish and crabs from the river. It is difficult to buy water or pay a bribe for water with this earnings." Such realities add an extra burden to the life of these poor people who struggle daily to ensure their meals, forcing them to work even harder to avail themselves of drinking water after a devastating disaster.

Again, the regression model shows that families with fewer than two dependents (particularly girls elderly) earn comparatively more than the families with more dependents. Although religion doesn't significantly affect relief acquisition, education plays a vital role here as people who have secondary education in this region receive more relief than primary level education or illiterate people. Surprisingly, a businessman receives more relief than a farmer or day laborer, whose livelihoods are more likely to face the harsher realities of

disaster. Similar observations were found during the discussion with the farmers and fishers groups. For instance, Md. Abdul Halim (45 years, a fisher from Gunari village) described, "I went to a NGO listing for providing building (house), but they did not put me in their list because I could not pay the money they asked for registration. But our local leader has received two houses from them." This reflects the way of manipulating the relief and rehabilitation activities. We also asked if gender plays any role in distributing such houses during the group discussion. Some participants claimed that the NGO/GO usually writes the wife's name on the paper, but getting the house money was more important than the gender.

On the contrary, the regression model shows that the number of family members and the family's monthly income is negatively and significantly associated with access to relief. It depicts the differences in the selection process of the recipients based on the scale and level of investment in relief and rehabilitation programs. As described above, the wealthier people received quality housing than the poorer, whereas the poorer received more relief goods than the wealthier. Thus, the poorer can solve their immediate food problems but hardly receive any stable housing options, which manifests their dependency on external support during every extreme event.

Finally, the logistic model predicts that people engaged in politics have more significant opportunities for receiving relief. However, there is no significant evidence that gender differences in politics play any role in getting extra relief. It was because of the remoteness of study villages which also shows the cultural barriers to women's openness in society. The following section presents more details of these socio-cultural and political aspects in post-disaster society based on the group discussion and key informant's interviews.

Discussion

This study explains whether gender plays any role in getting post-disaster relief and rehabilitation support. Most people are illiterate or have a primary education level and lack proper knowledge of disaster management and climate change adaptation. A significant relationship has been found between gender and relief support. Women receive more relief than men, but widows and divorced couples are prioritized, and married women receive minimal relief. Likewise, older people do not receive much relief in the aftermath of a disaster. Families having fewer dependent members earn more and become more resilient than families with many dependent members.

Actually, pre-disaster political trajectories are the most significant influence on post-disaster outcomes (Mallick, 2014), also reported in our study's findings. Involvement in politics plays a role in getting relief. However, our study did not explain if a female involved in local politics has higher chances of getting more relief than a male in politics.

Again, the political elites in Bangladesh use disaster events to strengthen their resilience to future disasters in the affected areas (Mallick & Vogt, 2012), which was also reported in our study. In such cases, the use of wife's name in getting stable and durable housing facilities is very regular, reflecting the nepotism and manifestation of the dependency on the external resources for the vulnerable groups.

In rural society, political nepotism is to some extent accepted and overlooked (Mallick, 2012), and is also a barrier to effective disaster management at the grassroots level. The primary forms of nepotism and favoritism influence the mismanagement of the relief and rehabilitation process and illegal resource acquisition connected to the relief distribution (Khan & Rahman, 2007; Azad & Khan, 2015; Bhavnani, 2006). When a natural disaster strikes, it simply actualizes potential instability already present in the governing regime and is determined by the limitations of the adaptive capacity of political institutions (Goldstone et al., 2010). The vulnerability or adaptive capacity of the political institutions of a governing regime determines the likelihood of civil conflict in the aftermath of a natural disaster (Buhaug et al., 2008; Enia, 2009). Thus, resource allocation filters through unequal distribution, extortion, nepotism, lawlessness, and abuse of political power, which are deeply embedded within the political system in Bangladesh (TIB, 2020), which extends the inequitable distribution of resources exacerbating existing inequalities and resource shortages for various communities. So it is very much essential to know the overall disaster management knowledge and practices in the affected communities and how it differs among different socio-economic groups. In response to strengthening the community's resilience to disaster management, after cyclone Aila 2009, different NGOs and the government have started a series of training and campaign programs to increase disaster preparedness (Sadik et al., 2018). Again, households' affiliation with either government or non-government is the key to securing more external supports during disaster management. Another significant factor, which is not considered in our study, is the trust in the government's responsibility. In their study, Ackerly et al. (2015) claims that those who did not show any trust in the responsibility of the ruling government get more external support, confirmed the local politician wants to win the next election. Therefore, they provided more assistance to those who did not trust their activity. Future studies need to revisit such dynamics of political

Sultana *et al. Climate Action*   (2022) 1:7

Page 10 of 12

engagement and opposition's trust in the ruling party's role in post disaster relief and rehabilitation activites.

Conclusion

The significant findings of this study delineate that the aftermath disaster relief and rehabilitation intervention are closely connected to the demographic, socio-economic, and socio-political factors; mainly, the acquisition of disaster relief is mostly gender and political connectedness biased. The root cause of natural disasters in the study area is its unique geographical location: the surrounding rivers. Among the surrounded rivers, the Shibsa River is the largest and significantly influences natural disasters. During tidal surges, excess water from the river often enters the area and causes floods every year. The affected people lose their valuable assets and often lead miserable life having no or very few livelihood options. Therefore, they require aftermath disaster relief and rehabilitation support from both the GOs and NGOs for their life improvement and livelihood opportunities, especially to adapt to the adverse effects of the disasters and reduce the future vulnerability of upcoming disasters. However, in reality, they suffer much in the aftermath of the disaster, not having the expected support from the local government and other organizations. As a result, the overall disaster management interventions at the grassroots level are not satisfactory to the local people. Nepotism tendency, corruption, illiteracy, lack of awareness, and responsibility are critical factors influencing the instability of the disaster management activities there. The male respondents who are engaged in politics receive aftermath disaster relief support. Thus, it is observed that social supremacy still dominates the local decision-making processes.

In a nutshell, people's socio-political characteristics and engagement in local-level politics, irrespective of gender, influence disaster politics and management issues when a natural disaster strikes (Mallick & Vogt, 2012; Roy, 2020b). Therefore, measuring the impact of social and political factors through research is vital for future disaster management and climate change adaptation planning. Alongside women's empowerment, regular monitoring and evaluation of relief and rehabilitation programs should reduce the traditional barriers to adequate disaster management and relief arising from (dis)connectedness to local social and political power. Moreover, eradicating corruption, nepotism, and bureaucratic entanglement should be considered in the disaster management policy agenda.

Code availability
Not applicable.

Availability of data and materials
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
In this study, the steps/procedures for data collection, treatment, and analysis have been provided. Equally, the free prior informed consent of all participants was sought before data collection. Prior informed consent of all participants was sought before data collection.

Consent for publication
Prior informed consent for publication of all participants was sought before data collection.

Competing interests
The authors declare that they have no competing interests.

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References
Ackerly BA, Anam MM, Gilligan JM (2015) Environment, political economies and livelihood change. In: Etzold B, Mallick B (eds) Environment, migration and adaptation: Evidence and politics of climate change in Bangladesh. AH Development Publishing House (AHDPH), Bangladesh, pp 27–40
ADW, & UNU-EHS. (2015). ADW(Alliance DevelopmentWorks) and UNU-EHS (United Nations University - Institute for Environment and Human Security), World Risk Report 2015. Available online: http://www.worldriskreport.org/ (accessed on 08 Feb 2021).
Akinci F (2004) The aftermath of disaster in urban areas: An evaluation of the 1999 earthquake in Turkey. Cities 21(6):527–536. https://doi.org/10.1016/j.cities.2004.08.010
Alam K, Shamsuddoha M, Tanner T, Sultana M, Huq MJ, Kabir SS (2011) The Political Economy of Climate Resilient Development Planning in Bangladesh. IDS Bull 42(3):52–61. https://doi.org/10.1111/j.1759-5436.2011.00222.x
Aryanti T, Muhlis A (2020) Disaster, gender, and space: Spatial vulnerability in post-disaster shelters. IOP Confer Series 447(1). https://doi.org/10.1088/1755-1315/447/1/012012

Auerbach LW, Goodbred SL Jr, Mondal DR, Wilson CA, Ahmed KR, Roy K, Steckler MS, Small C, Gilligan JM, Ackerly BA (2015) Nature Climate Change

Azad MAK, Khan MM (2015) Post Disasters Social Pathology in Bangladesh: A Case Study on AILA Affected Areas. Sociol Anthropol 3(2):85–94. https://doi.org/10.13189/sa.2015.030203

Baytiyeh H (2017) Socio-cultural characteristics: the missing factor in disaster risk reduction strategy in sectarian divided societies. Int J Disaster Risk Reduct 21:63–69. https://doi.org/10.1016/j.ijdrr.2016.11.012

BBS. (2011). Bangladesh Bureau of Statistics Population and housing census.

Bhavnani R (2006) The author would like to thank Doug Bond, Joe Bond, Jennifer Leaning, and Gary King for comments on this project. Harvard University, Cambridge

Bianchi E, Malki-Epshtein L (2021) Evaluating the risk to Bangladeshi coastal infrastructure from tropical cyclones under climate change. Int J Disaster Risk Reduction 57(4):102147. https://doi.org/10.1016/j.ijdrr.2021.102147

Biswas B, Mallick B (2020) Livelihood diversification as key to long-term non-migration: evidence from coastal Bangladesh. Environ Dev Sustain. https://doi.org/10.1007/s10668-020-01005-4

Buhaug H, Gleditsch NP, Theisen OM (2008) Implications of climate change for armed conflict. In social dimensions of climate change. https://doi.org/http://siteresources.worldbank.org/INTRANETSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper_Conflict.pdf. Accessed 08 July 2021

Care. (2008). Care (Cooperative for Assistance and Relief Everywhere).

Chipangura P, Van Niekerk D, Van Der Waldt G (2017) Disaster risk problem framing: Insights from societal perceptions in Zimbabwe. Int J Disaster Risk Reduction 22:317–324. https://doi.org/10.1016/j.ijdrr.2017.02.012

Ciampi MC, Gell F, Lasap L, Turvill E (2011). Gender and Disaster Risk Reduction: A training pack. http://reliefweb.int/sites/reliefweb.int/files/resources/Full_report_116.pdf. Accessed 14 July 2021

Clar C (2019) How demographic developments determine the management of hydrometeorological hazard risks in rural communities: The linkages between demographic and natural hazards research. Wires Water 6(6):1–20. https://doi.org/10.1002/wat2.1378

Clement V, Rigaud KK, de Sherbinin AJB, Adamo S, Schewe J, Sadiq N, Shabahat E (2021) Groundswell Part 2 : Acting on Internal Climate Migration. World Bank, Washington, DC © World Bank. https://openknowledge.worldbank.org/handle/10986/36248; License: CC BY 3.0 IGO. Accessed 25 February 2022

Cohen C, Werker ED (2008) The Political Economy of "Natural" Disasters. J Conflict Resolut 52(6):795–819. https://doi.org/10.1177/0022002708322157

Enarson E, Meyreles L (2004) International Perspectives on Gender and Disaster: Differences and Possibilities. Int J Sociol Soc Policy 24:1–26. https://doi.org/10.1108/01443330410791064

Enia J (2009) Shaking the Foundations of Violent Civil Conflict: Institutions, Disasters, and the Political Economies of State-Rebel Interaction

Farrior S (2009) Human rights advocacy on gender issues: Challenges and opportunities. J Human Rights Pract 1(1):83–100. https://doi.org/10.1093/jhuman/hup002

Goldstone JA, Bates RH, Epstein DL, Gurr TR, Lustik MB, Marshall MG, Ulfelder J, Woodward M (2010) A Global Model for Forecasting Political Instability. Am J Polit Sci 54(1):190–208. https://doi.org/10.1111/j.1540-5907.2009.00426.x

Gotham KF (2012) Disaster, Inc.: Privatization and post-Katrina rebuilding in New Orleans. Perspect Politics 10(3):633–646. https://doi.org/10.1017/S153759271200165X

Hapeman K (2012) The effects of politics on natural sisasters: lessons learned from Bangladesh. https://www.du.edu/korbel/crric/media/documents/katie_hapeman1.pdf. Accessed 24 January 2021

Hayat E, Amaratunga D (2017) The Role of Local Government in Post-Disaster Road Reconstruction: Assessment of Factors Affecting Local Government Road Maintenance Capacity. In: Djalante R, Garschagen M, Thomalla F, R. (eds) Shaw (Eds.), Disaster Risk Reduction in Indonesia. Springer, pp 255–279. https://doi.org/10.1007/978-3-319-54466-3

Heide E (2004) Common misconceptions about disasters: Panic, the "disaster syndrome," and looting. In: O'Leary M (ed) The first 72 hours: a community approach to disaster preparedness. iUniverse Publishing, Lincoln, pp 340–380

Hemachandra K, Amaratunga D, Haigh R (2018) Role of women in disaster risk governance. Procedia Eng 212(February):1187–1194. https://doi.org/10.1016/j.proeng.2018.01.153

IPCC (2014) Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press,

Cambridge, United Kingdom and New York, NY, USA. https://doi.org/10.1017/cbo9780511976988.002

IPCC. (2021). AR6 Climate Change 2021: The Physical Science Basis in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

Islam ARMT, Tasnuva A, Islam T, Haque R (2014) Management Approach to Disaster Scenario in Bangladesh: An overview. Int J Sci Res Publ 4(3):1–7

Islam R, Walkerden G (2017) Social networks and challenges in government disaster policies: A case study from Bangladesh. Int J Disaster Risk Reduction 22:325–334. https://doi.org/10.1016/j.ijdrr.2017.02.011

Kazal MMH, Rahman S, Hossain MZ (2017) Poverty Profiles and Coping Strategies of the Haor (Ox-bow lake) Households in Bangladesh. J Poverty Alleviation Int Dev 8(1):167–191

Khan MMH, Nahar N (2014) Natural disasters: socio-economic impacts in Bangladesh. Banglavision 13(1):58–67

Khan MR, Rahman MA (2007) Partnership approach to disaster management in Bangladesh: a critical policy assessment. Nat Hazards 41:359–378. https://doi.org/10.1007/s11069-006-9040

Kovach T (2013) The Politics of Disaster Response: Disaster Diplomacy and the Responsibility to Protect after Cyclone Nargis

Lebni JY, Khorami F, Ebadi Fard Azar F, Khosravi B, Safari H, Ziapour A (2020) Experiences of rural women with damages resulting from an earthquake in Iran: A qualitative study. BMC Public Health 20(1):1–13. https://doi.org/10.1186/s12889-020-08752-z

Macrae D (2014) Managing a political crisis after a disaster: how concern assessment can address the political aspects involved in framing a solution. J Risk Res 19(8):1036–1042. https://doi.org/10.1080/13669877.2014.910693

Mahmud T, Prowse M (2012) Corruption in cyclone preparedness and relief efforts in coastal Bangladesh: Lessons for climate adaptation? Global Environ Change 22(4):933–943. https://doi.org/10.1016/j.gloenvcha.2012.07.003

Mallick B (2012) Social disparities in disaster-induced migration process. Available at SSRN: https://ssrn.com/abstract=2173166. Accessed 15 Oct 2021

Mallick B (2014) Cyclone shelters and their locational suitability: an empirical analysis from coastal Bangladesh. Disasters 38(3):654–671. https://doi.org/10.1111/disa.12062

Mallick B, Rahaman KR, Vogt J (2011) Coastal livelihood and physical infrastructure in Bangladesh after cyclone Aila. Migr Adapt Strateg Global Change 16(6):629–648. https://doi.org/10.1007/s11027-011-9285-y

Mallick B, Vogt J (2012) Cyclone, coastal society and migration: empirical evidence from Bangladesh. Int Dev Plan Rev 34(3):217–240

Mallick B, Vogt J (2014) Population displacement after cyclone and its consequences: Empirical evidence from coastal Bangladesh. Nat Hazards 73:191–212. https://doi.org/10.1007/s11069-013-0803-y

Masaba S, Mungai DN, Isabirye M, Nsubuga H (2017) Implementation of landslide disaster risk reduction policy in Uganda. Int J Disaster Risk Reduction 24:326–331. https://doi.org/10.1016/j.ijdrr.2017.01.019

Mendoza MJ (2014) The Policies, Practices and Politics of Dealing with Disasters: An Analysis of How Disaster Risk Reduction Policies and Actions are Framed in the Philippines

Murthy RK (2009) Review of Sexual and Reproductive Health and Rights in the Context of Disasters in Asia. In: Asian Pacific Resource and Research Centre for Women (ARROW). https://doi.org/10.13140/RG.2.1.3925.5201

Oliver AJ, Reeves A (2015) The politics of disaster – Nicaragua. In: Scott R, Kosslyn S (eds) Emerging Trends in the Social and Behavioral Sciences. Wiley, pp 1–8. https://doi.org/10.1111/j.1467-7717.1985.tb00949.x

Ozcelik H, Langton N, Aldrich H (2008) Doing well and doing good: The relationship between leadership practices that facilitate a positive emotional climate and organizational performance. J Manag Psychol 23(2):186–203. https://doi.org/10.1108/02683940810850817

Parvin GA, Sakamoto M, Shaw R, Nakagawa H, Sadik MS (2019) Evacuation scenarios of cyclone Aila in Bangladesh: Investigating the factors influencing evacuation decision and destination. Prog Disaster Sci. 2(100032):1–12. https://doi.org/10.1016/j.pdisas.2019.100032

Pelling M, Dill K (2008) Disaster Politics : from Social Control to Human Security. In: Environment, Politics and Development Working Paper Series

Razzaque MA, Alamgir M, Rahman MM (2019) Climate Change Vulnerability in Dacope Upazila, Bangladesh. J Sci Res Rep 21(4):1–12. https://doi.org/10.9734/jsrr/2018/45471

Roy S (2020a) Post-cyclone Aila and Mobility Rights of the Shora Muslim Women of the Bangladesh Sundarbans Forest. In: Leal FW, Nagy G, Borga M, Chávez MP, Magnuszewski A (eds) Climate Change, Hazards and Adaptation Options.

Climate Change Management. Springer, Cham. https://doi.org/10.1007/978-3-030-37425-9_32

Roy S (2020b) Transforming Gendered Lives and Livelihoods in Post-disaster Settings in the Bangladesh Sundarbans Forest. In: Leal FW, Nagy G, Borga M, Chávez MP, Magnuszewski A (eds) Climate Change, Hazards and Adaptation Options. Climate Change Management. Springer, Cham. https://doi.org/10.1007/978-3-030-37425-9_24

Sadik MS, Nakagawa H, Rahman R, Shaw R, Kawaike K, Fujita K (2018) A Study on Cyclone Aila Recovery in Koyra, Bangladesh: Evaluating the Inclusiveness of Recovery with Respect to Predisaster Vulnerability Reduction. Int J Disaster Risk Sci 9(1):28–43. https://doi.org/10.1007/s13753-018-0166-9

Sökefeld M (2012) Exploring the Link between Natural Disasters and Politics: Case Studies of Pakistan and Peru. Scrutiny 6:1–32. https://doi.org/10.5282/ubm/epub.22296

Sultana Z, Mondal P, Roy T, Biswas B, Mallick B (2021) Socio-political Distancing Amid Disaster: Empirical Evidence from Bangladesh. In: Alam GMM, Erdiaw-Kwasie MO, Nagy GJ, Leal FW (eds) Climate Vulnerability and Resilience in the Global South. Climate Change Management. Springer, Cham. https://doi.org/10.1007/978-3-030-77259-8_18

Takasaki Y (2012) Natural disasters, gender and handicrafts. J Dev Stud 48(1):115–132. https://doi.org/10.1080/00220388.2011.598509

Terry G (2009) No climate justice without gender justice: An overview of the issues. Gender Dev 17(1):5–18. https://doi.org/10.1080/13552070802696839

TIB. (2020). Annual Report - Transparency International Bangladesh (TIB).

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