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Hazards to women in rural flood affected region: A case study of Balrampur district in Uttar Pradesh

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Abstract:

Uncertain meteorological condition provokes climate change which accelerates flood events. These events lead to large-scale damage to property, loss of lives, social crisis, and hampering national development. Flood damages property and hinders socioeconomic development, particularly for women, as well as agricultural growth in the region. Societal damage management and preparedness strategies involve the use of traditional knowledge. However scientific prediction and developed management techniques are required for reducing the risk of fore-coming flooding. Gender disparity is quite vigilant in flood mitigation measures leading to various stress and abuse of females during and post-disaster. This study focuses on societal hindrances and constraining situations faced by females in flood-prone areas.

Introduction

Global warming increases significant risk of calamity worldwide which leads to inhibiting community growth (Rakib et al., 2017, Alam and Rahman, 2018).Uncertain meteorological conditions and anthropogenic activities bring about instability in the environment, having a significant impact on atmospheric makeup by adding greenhouse gases. These activities act as catalysts provoking unstable conditions in atmospheric parameters like relative humidity, temperature, rainfall, and vapor pressure. Uncertainty in atmospheric conditions indicates frequent flooding events in this century.

The severity and frequency of climate-related disasters, including as heat waves, droughts, floods, and cyclones, have been seen to have significantly increased over the previous few decades, indicating poor national development and slowing economic growth. The first assessment report of the Indian Network of Climate Change Assessment (INCCA, 2010) and the fourth assessment

report of the Intergovernmental Panel on Climate Change (IPCC, 2007) confirm in future climate change would increase the occurrence of climatic hazards, variability in monsoonal pattern, and emergence of hazards turning into disasters, such as rising sea level and newer vulnerabilities with different spatial and socio-economic impacts on communities. About 40 million hec.of land or one-eight of India's total area comprising parts of 23 states are vulnerable to flooding (Mall and Srivastava, 2012; Sam et al., 2017). In 1954 it lead to the development of the Flood Control Program. During 1953-2010, floods caused annual damages of more than Rs 1800 crore, in addition to loss of lives and livestock(Planning Commission, 2011).

Floods lead to thousands of mortality each year, dislocating millions of people, in addition to significant damage to infrastructure. Recurring flood inflictsloss of lives, financial loss, disrupt the local development process, results in evacuation and rehabilitation of communities, and reinvestment for community growth. Floods directly worsen the socioeconomic condition of local communities (Rakib et al., 2017). Economic damage comprises an estimated cost of destroyed infrastructure, agricultural crops, animals, early recovery and relief procedures, and other fiscal losses to individual assets as well as community resources.Rather than the damages and loss, it is also true that flood brings alluvial soil to the Tarai region which is great for agriculture and behaves as the natural form of irrigation (Khattri, 2017). In the coastal region of India monsoonal floods result over 90% of the loss of lives and property. Developing countries are more susceptible to natural disasters due to vague institutional frameworks, inadequate coping mechanisms, low preparedness and mitigation measures leading to massive physical damage, higher dependency on natural resources for survival, and constrained economic and technological growth which hinders adaptation processes (Sam et al., 2017).

Flood also has a direct impact onthe societal organization. Females are more vulnerable to natural disasters than males (Azad et al., 2013; Hamidazada et al., 2019).Among the main things that render women vulnerable are a lack of educational opportunities, social norms, limited access to resources, unfavorable economic circumstances, and cultural issues. Women's roles, demands, levels, and perceptions of risks, vulnerabilities, and talents differ from men's due to the patriarchal culture (Menon, 2021).Gender disparity neglects the involvement of women in capacity-building training programs and policymaking (Reyes and Lu, 2015; Shah et al., 2022). This emphasis needs

on understanding the vulnerability and risk of flood-prone areas and its negative consequences on females to develop the best coping mechanism and policies.

Flood and its spread

Floods are mainly caused by heavy rainfall, high floodwater discharge, river bank overflow, and inadequate rainwater drainage facilities for perennial streams and rivers. Some other causes of floods are landslides leading to blockage of streamsor ice jams, and cyclones. Floods may be categorized into riverine,coastal, estuarine, flash, hill torrential, or skewed urban practices. In South Asia,specific hydro-meteorological parameters and monsoonal effects are significant causes of floods in the area. The southwest monsoon, which normally lasts from June to September, brings about 70–80% of the rainfall. While the Inter-Tropical Convergence Zone (ITCZ) affects the southern fringe, particularly Sri Lanka, certain nations in the northern section of South Asia receive rainfall from western disturbances rather than the southwest monsoon. According to recent studies, South Asian countries' rising sea levels make heavily populated shoreline settlements more vulnerable to coastal flooding. However, adverse effects of climate change include cloud bursts that enhance flash floods in mountainous and foothill regions, or the melting of glaciers in the Himalayan-Hindukush region.

Every year a vast landmass of India experience flood, mainly in coastal states and the plains of northern India. Additionally, the coastal states are at risk for flooding brought by monsoons, storm surges from cyclones, or coastal inundation (Ghosh and Ghosal, 2021). Rapid urbanization and land reclamation along riverbanks have brought new dimensions of urban flooding witnessed in Mumbai (2005) and Delhi in 2011. Increasing anthropogenic pressure, deforestation, urbanization, and over-exploitation of resources disturb climatic parameters which increased flash floods in the Himalayan region. Over the period many regions in India have experienced flood events, majorly states susceptible to flooding are Assam,Bihar,Odisha, Uttar Pradesh, and West Bengal (Sam et al., 2017).Some recent extreme flooding in India is: in 2013 in Uttarakhand, Srinagar (2014), Chennai flood in 2015, Gujurat (2017), and Uttar Pradesh (2021).After Bihar and Bengal, Uttar Pradesh is the state in India with the most flood damage. Uttar Pradesh has a total area of 294.36 lakh hectares, of which 73.36 lakh hectares are at risk of flooding (Usama, 2015). Due to its

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location in the foothills of the Himalayas, the Barampur district of Uttar Pradesh frequently floods from the Rapti, as well as other rivers and nalas.

Study Area:

One of Uttar Pradesh's 75 districts is Balrampur. It stretches from 82º2' to 82º49' east longitude to 27º08 to 27º54' north latitude (Kumaret al., 2003). It extends about 3349 square kilometers. The district's administrative division is divided into three tehsils: Balrampur, Tulsipur, and Utraula. The district has also been split up into 9 development blocks, including HarayaSatgharwa, Balrampur, Tulsipur, Gesari, Pachperwa, Shri DuttGanj, Utraula, Gaindas Buzurg, and Rehra Bazar. It has a total population of 21,48,665 people, 11,14,721 of whom are men and 10,33,944 of whom are women. Only 7.7% of the district's residents live in cities. The district's 49.5 percent literacy rate is lower than the state average (67.68 percent). The gender ratio in the district is 928 females per 1000 males (DCHB, 2011). In 2017 flood affected more than 300 hundred villages in the district and cause enormous loss to the lives and infrastructure (Singh, 2018). In Oct 2022 flood affected about 287 villages (Hindustan times, 2022).

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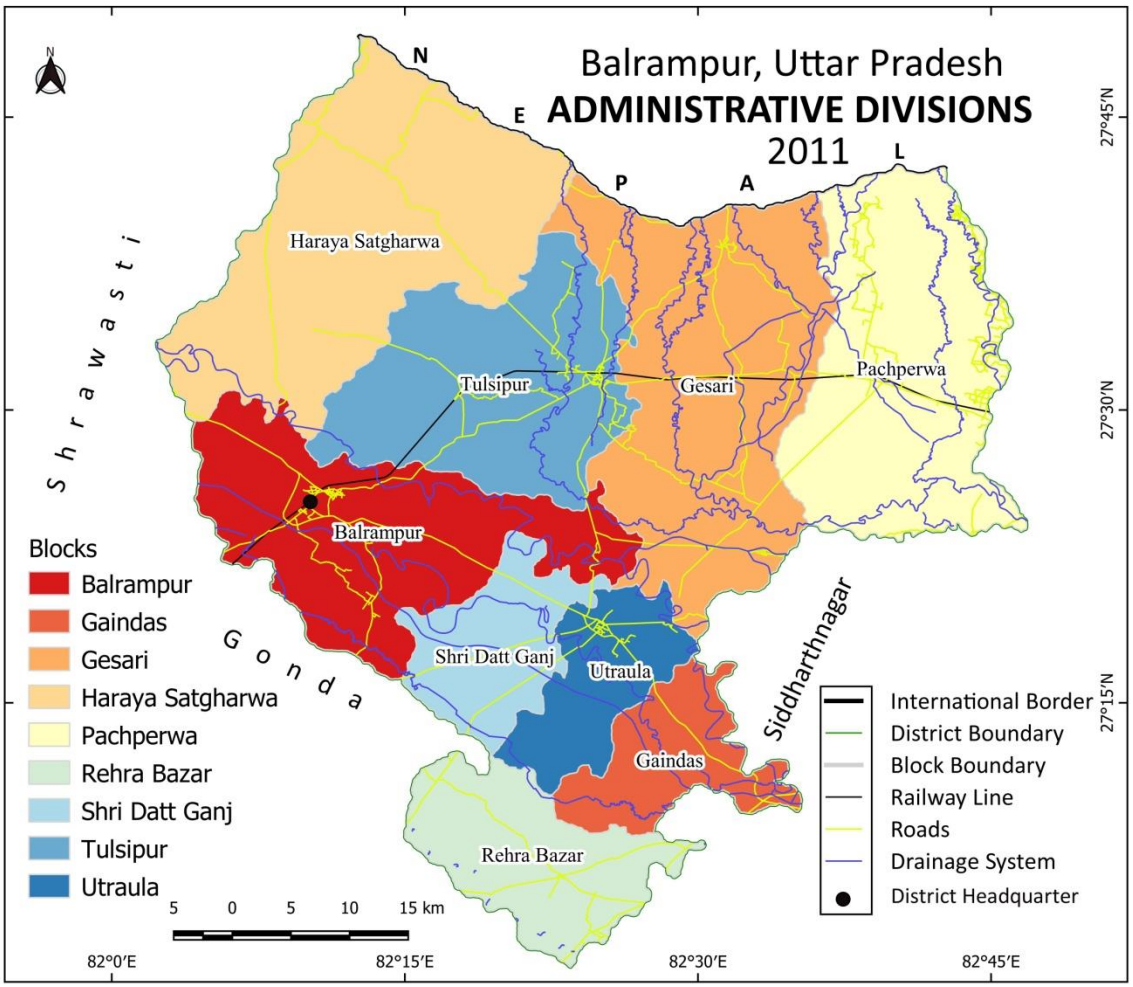

Figure: 1 Study area map

Women and flood

Women are considered as weak, helpless, destitute, and socially isolated, and they "stoically carry the burden of existence as subsistence food producers, bearers of water and fuelwood, and guardians of home food security" (Rao et al., 2017). Women experience more natural disasters than men do, and they are better at swallowing unpleasant pills (Ruszczyk et al., 2020).If women were given the opportunity for risk management during or after post-disaster occurrence they may deal better with their traditional knowledge, networking skills, and monetary management, which help towards their empowerment and status development in society. In rural communities, women and adolescent girls have more flood experience being the most vulnerable group (Rakib et al., 2017). According to the International Decade for Natural Disaster Reduction (IDNDR), women familiarity with local people and ecosystems, their skills and abilities, social networks, and

community organizations help in better dealing with hazardous conditions, effectively responding to disasters occurrence, and rebuilding resilience to future disasters effects (Alam and Rahman, 2017).Studies indicate impoverished and vulnerable women have expertise in resilience; skills to adjust to social and natural changes, collective problem-solving abilities, traditional knowledge, and improvising abilities to tackle difficulties.The involvement of women in local-level planning can aid in long-term nation building and lessen vulnerability of livelihoods (UNDP, 2010; Prabhakaran and Kartha, 2020).

Although having flood-resilient skills, females suffer more than malesduring the flood because of less concern about the early warning system, dressing style restricted swimming, running, etc for a quick escape, responsibility of each member ofthe household (Alam and Rahman, 2017). According to vulnerability, females are considered as more likely victims than males because of traditional socialization and workplace habits.During floods like calamities comparatively less strength of female than men further, worsen their societal condition. Studies highlight that post-disaster risks for women includeloss of livelihood opportunities,increased domestic violence and workload,inadequate health care facilities, reproductive and sexual health issues, deprivation of relief supplies, victim of suffering, shortage of drinking water, food, and medicines (Enarson, 2001;Paul, 2009; Ahmad, 2012; Dhungel and Ojha, 2012; Alam and Rahman, 2017; Hamidazada et al., 2019).Prioritizing their family and children women suffer from malnutrition due to a shortage of food resources during the flood. They are even forced to sexual abuse, mental torture, and verbal misuse as an alternative means of their survival during the disaster (Azad et al., 2013; Das, 2020). Due to contaminated drinking water, numerous diseases were spread throughout flood-affected communities. Women have to spend a lot of time and effort gathering water from a distance due to the lack of clean water used for household chores.The prohibition of female educational opportunity limit their access to resources and inhibit better decision-making ability during adisaster (Hamidazada et al., 2019). Rather than that socioeconomic profile and privilege of males dominate over females in the decision-making process and make them vulnerable (Hyder and Mahmood, 2015). In addition females in rural communities help their husbands on agricultural land, and take care of their children and other family members. So during flooding, they try to help their husbands on agricultural land, preserve food for their children and collect other necessary elements to satisfy their family needs which indirectly risk their lives(Yulianti and Hastuti, 2019).

The absence of female training staff in flood preparedness measures restricts female involvement in the local communities.

Increasing flood frequency led to large number of migrations of men population from their homes.Flood-affected areas reduce space for MNREGA activities which again prioritizes migration (Khattri, 2017). Migration is considered a better adaptation strategy for flood-prone areas to cope with economic conditions, but wage disparity and safety concern aggravates male migration rather than women. This migration increase suffering of women because they are compelled to lead life of prolonged hard work, loneliness, and helplessness (Jetley, 1987; Menon, 2021).Further social marginalization, limited resource access, and political negligence force female-led households to live in flood-prone areas (Gaillard et al.,2008).A case study conducted in eastern Uttar Pradesh (UP)marks about 90% male population migration from rain fed or flooded rural areas due to loss of livelihood, which increases female headship in the family (Paris et al., 2005). These females have constrained access to newer technologies, better quality seeds, and restricted movements due to their dependency on their families and agricultural work. As a result of losing their source of income, people become more susceptible to malnutrition, lost opportunities for education, etc., which starts a downward spiral toward poverty and debt.Female-headed households are more vulnerable than male-headedones due to gender-biased education provisions, rights, and opportunities (Sam et al., 2017).

Women in rural flood-affected areas of Balrampur, Uttar Pradesh

Women in the district face many problems directly or indirectly due to floods. Flood destroys agriculture and the mental and physical burden on women. About 90 percent of households out of 200 households have at least one or two family membersmigrating to Mumbai or Delhi in search of a job. The number of main and marginal female workers in the district are 2,25,921 and 90798 respectively; female cultivators and agricultural laborers in the district are 65,890 and 1,18,567 these data show that females support the economic development of the family along with their children, and old members care of the family. Female literacy in the district is very low (38.43%) which is the result of flood along with other factors. Due to flood and being the social and

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economic backbone of the family most of the females are unable to continue their education after marriage.

Flood management measures

In order to reduce the damage to infrastructure and loss of lives various flood management strategies have been adopted in flood-prone areas. Some structural measures built to address flood damage include constructing flood levees to prevent river bank overflow, checking downstream water flow through dams and effective flood water discharge routes, building check dams to reduce sediment, gabion walls and dykes to ensure aligned and directed flood water flows,spurs to train river flows, bypass channels to discharge flood water which decrease pressure on main control structures, etc.Complementary to these structures, some non-structural measures were also adopted as flood management measures like reforestation and afforestation in upper catchments to reduce runoff, contour plantation, and terracing.

Flood forecasting and early warning systems are currently the focus of researchers, governmental agencies, and other development groups because they assist minimize damage and save lives before floods occur. Precipitation runoff models, numerical models, weather surveillance radars, quantitative precipitation measurement radars, high-resolution picture transmission systems, high-frequency radio transmission, and other tools are used in flood forecasting and early warning systems. Through a network of weather monitoring stations, the Indian Meteorological Department (IMD) and Central Water Commission (CWC) issued flood warnings in India. Under the Disaster Management Act of 2005, the National Disaster Management Authority (NDMA) was established to oversee prompt preparation and provide forecasts and alerts to district administration via state disaster management organizations. Building up a resilient society without hampering its structural and functional elements through the improvement of health care facilities, surveillance, organizational infrastructure, water supply, sanitation, drainage systems, climate-proofing of infrastructure, better education and awareness can help to reduce flood vulnerability (Boon, 2014). Social networking institutions like NGOs, credit institutions, schools, and hospitals are an indicator of the adaptive capacity of society toward flood risk and quick access to reduce household vulnerability (Sam et al., 2017).

Additionally, gender mainstreaming is necessary to reduce the vulnerability of females. Females must be protected during disasters from abuse and harassment. Their status may be improvised through the provision of educational facilities, skill development, and setting up vocational income sources in houses to make up their economical status (Yulianti and Hastuti, 2019). Special emphasis on female lead households in providing flood relief and facilities for securing the financial condition of those families aftermath of a disaster. The involvement of females in disaster response training should be brought into focus as it would add benefits to society and reduce loss percentage. The development agenda must include efforts for reducing disaster vulnerability and increasing coping mechanisms within the community.

Conclusion

In recent days disaster risk management is a major challenging issue and unexpected changing pattern of atmospheric variables leading to climate change is provoking natural disaster frequencies. Lack of effective disastermanagementand mitigation techniques results in increased susceptibility conditions for lives and infrastructure. It mainly damages farming and other livelihood activities leading to the economic crisis, food scarcity, deteriorating local lifestyle, and triggering social crisis. Traditional knowledge used for disaster preparedness and recovery highlights the importance of scientific alerts for informing the community ofimpending disasters. Local community involvement in flood mitigation makes a noteworthy contribution, however,significant differences are marked in gender equality. Despite significant contributions by females in disaster risk reduction, mitigation and recovery, their involvement in adaptation strategies and policy-making are hindered by social constraints within or outside the family. Holistic approach to flood risk administration and participatory action in mitigation and risk reduction strategies would enrich traditional knowledge and safeguard losses.

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