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Gender and Flood Evacuation: Structural Barriers to Women's Flood Mobility in Rural Punjab, Pakistan

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ABSTRACT

Displacement caused by floods is often considered as mobility problem. However, many women in rural Punjab become unable to move at all during the hazardous times. The core idea of this paper is to explore the causes of the immobility of women during floods. Mixed method research design is used to explore the causes of immobility of women in the four districts of Punjab; Muzaffargarh, Mianwali, Sargodha and Attock. The districts are cautiously selected by keeping in view their different demography, economic activity, social norms and living standard of women. 480 well-structured household surveys along with semi structured interviews and focus group discussions are conducted across the four districts. They help in building a Livelihood Vulnerability Index and Mobility Constraint Scale. The findings produce stark outcomes. They suggest that immobility is caused by many factors such as sociocultural norms, religious teachings, weak political and administrative system, low literacy rate, fragile economic and health condition, and devastated route and relief camps. These causes operate differently before, during and after a flood, but they interact cumulatively rather than in isolation, producing what this paper terms compound immobility. The paper closes with policy recommendations that are grounded in the study districts rather than borrowed wholesale from international templates, and situates Pakistan's experience against comparative evidence from Bangladesh.

1. Introduction

Disaster literature has been preoccupied with the mechanics of displacement for decades: who leaves, how far they travel, and where they

1.1 Background of the Study

eventually resettle. This preoccupation has produced a rich body of scholarship on migration corridors, camp management and resettlement



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policy. It has produced far less scholarship on a quieter and in some respects more troubling phenomenon, which is the failure to leave at all. In the flood-prone districts of Punjab, thousands of rural women experience exactly this failure every monsoon season. They are neither migrants nor evacuees. They are, in the language increasingly used in the climate mobility literature, trapped populations, people for whom movement is either physically impossible, socially prohibited or economically unaffordable even as the water rises around them (Foresight, 2011; Ayeb-Karlsson, Smith, & Kniveton, 2018).

Pakistan is among the countries most exposed to monsoon flooding, and the 2022 floods have offered a brutal demonstration of the scale involved. Thirty-three million people have been affected nationwide, and the Post Disaster Needs Assessment conducted jointly by the Government of Pakistan, the Asian Development Bank, the European Union, the United Nations and the World Bank have estimated damages in excess of fourteen billion dollars (Government of Pakistan, ADB, EU, UN, & World Bank, 2022). Among all, women have faced the utmost burden of catastrophe. The report of UNFPA Pakistan, 2022 suggests that 8 million women have suffered during their reproductive times and thousands of women cannot avail health facilities during the flood times. These figures are now familiar in the humanitarian literature.

The purpose of this paper is to find out the causes which affect the women's ability to reach at relief camps. Some suggest that poverty is the one and the only obstacle in their movement. However, the field data collected for this paper unveils the other hidden causes of immobility which include religious hindrances, patriarchal structure of society and the failure of state to provide safe evacuation routes and gender oriented relief camps. Women living in better economic conditions in the districts of Attock and Sargodha also face the same immobility problems which the women with backward and poor backgrounds do so. This validates the hypothesis that poverty is not the only cause of immobility. This paper calls this compound immobility, following the language already developed in the author's broader thesis work on the subject, and it treats the causes of this immobility as an object of study in their own right rather than as a footnote to

displacement research.

Three questions guide the analysis. First, what combination of structural, institutional and sociocultural factors keeps rural women in place during flood events in Punjab? Second, how do these factors differ across the pre-flood, during-flood and post-flood phases of a disaster cycle? Third, what would a policy response look like if it took immobility, rather than displacement, as its central problem? The paper answers these questions through a mixed methods design that pairs a four-district household survey with interviews, key informant interviews and focus group discussions, and it organizes the causes of immobility into six major domains: sociocultural and religious, political and administrative, economic, health-related, educational, and route and camp related. The paper makes three contributions to the existing literature. It offers, to the authors' knowledge, one of the first systematic four-district comparisons of gendered mobility constraint within a single Pakistani province, allowing the analysis to move beyond the single-district case studies that dominate the existing literature and to identify which drivers of immobility are broadly shared across Punjab and which vary with local administrative and infrastructural conditions. It also introduces a purpose built Mobility Constraint Scale, developed specifically to capture sociocultural, economic and institutional dimensions of restricted movement in a form that can be compared directly across districts and, in future research, across provinces. Finally, it develops an integrated six-domain taxonomy of causes that treats immobility as a compound outcome produced by the interaction of these domains across the pre-flood, during-flood and post-flood phases of a disaster cycle, rather than attributing it to any single explanatory factor. The remainder of the paper proceeds as follows. Section two reviews the relevant literature on gender, disaster and mobility. Section three sets out the theoretical framework. Section four describes the methodology. Section five presents the quantitative and qualitative findings. Section six develops the six-domain taxonomy of causes in detail. Section seven discusses the findings against comparative and policy literature, and section eight concludes with recommendations.

2. Literature Review

2.1 Climate Change, Flooding and Vulnerability in Pakistan

Pakistan's exposure to extreme monsoon rainfall has intensified in recent decades, and recent attribution studies indicate that anthropogenic climate change measurably increased the intensity of the rainfall that produced the 2022 floods (Otto et al., 2023). Vulnerability across the flood plain is not evenly distributed. Studies of the Indus basin have shown that socioeconomic status, land tenure and access to credit strongly shape a household's ability to adapt to recurring flood risk (Qazlbash, Zubair, Manzoor, Haq, & Baloch, 2020), and multidimensional poverty measures applied to flood-prone districts of Punjab confirm that poverty and vulnerability reinforce one another in a self-sustaining cycle (Ahmad, Khurshid, & Afzal, 2023). Livelihood Vulnerability Index research conducted in Mianwali district, one of the four districts examined in this study, found that exposure to natural hazards and weak adaptive capacity combine to produce some of the highest vulnerability scores recorded in Punjab (Akram, Tahir, Alam, & Waheed, 2025). District level heterogeneity of this kind is a recurring finding across the Pakistani literature and is directly relevant to the comparative district design adopted here.

A people centered study of climate adaptation in rural Pakistan found that households rarely experience climate stress as a single discrete hazard, but rather as a continuous accumulation of smaller shocks punctuated by occasional severe events, a pattern that shapes how households, and particularly women within them, come to normalize chronic risk rather than treat each flood season as an emergency requiring a distinct response (Ajani & Van Der Geest, 2021). Consistent with this, research from South Punjab following the 2022 floods documented severe and lasting food insecurity among displaced riverine communities, with clear policy implications for how relief and reconstruction programs are sequenced (Ahmad & Afzal, 2020). Similarly, a district level case study of Rajanpur and Taunsa Sharif after the 2022 floods found that climate induced displacement in South Punjab constituted a measurable threat to human security, extending

well beyond the immediate physical danger of floodwater itself (Saeed, 2023). Earlier work from Sialkot district demonstrated that women's perceptions of flood hazard and their adaptation strategies differ systematically from men's, with women more likely to prioritize household survival needs over asset protection, a distinction with direct bearing on the gendered decision-making patterns examined later in this paper (Fitriani et al., 2019).

2.2 Gender and Disaster Vulnerability

The proposition that disasters are not gender neutral is now well established internationally. Ikeda's (1995) classic study of the 1991 Bangladesh cyclone find that women die at several times the rate of men, not because of any biological difference in vulnerability but because restrictions on women's movement, dress and public visibility delay or prevent their evacuation. Subsequent cross-national research confirmed that this pattern generalizes: natural disasters measurably narrow the gender gap in life expectancy in societies where women's socioeconomic status is low, an effect attributable to social rather than physiological causes (Neumayer & Plümper, 2007). Enarson and Morrow's (1998) foundational collection argue that disaster research had for too long treat gender as invisible, masking women's disproportionate burden of care work, their exclusion from evacuation planning, and the compounding effect of gender based violence during and after disaster events. Pakistani scholarship has extended these insights directly to the local context. Ullah and colleagues have documented rising social injustice and gender based violence among women displaced by Pakistani floods (Ullah, Dong, Shah, Alotaibi, Khursid, & Nihei, 2024), and a companion study find that weak local disaster management capacity compounds the risk of violence against women in flood affected areas (Ullah, Dong, Shah, Alotaibi, & Rauf, 2024). Case studies from Khyber Pakhtunkhwa similarly show that the burden of the 2022 floods fell heavily and specifically on women's livelihoods, health and household responsibilities (Gul, Khan, Nisar, Ali, & Ullah, 2024).

2.3 Health, Reproductive Access and Psychological Recovery

Health access is one of the most severe and least

visible dimensions of gendered flood vulnerability. A rapid assessment conducted across Pakistan's four provinces after the 2022 floods find that damaged health infrastructure and disrupted supply chains left hundreds of thousands of pregnant women without access to basic maternal care (Ashraf, Shahzad, Sequeria, Bashir, & Azmat, 2024), a finding corroborated by United Nations agencies operating in the same period (UNFPA Pakistan, 2022; UN Women, 2022). After the havoc, the psychological recovery of women is also delayed due to the social and economic roles assigned to them (Ahmad, Shah, Khan, Kizi, Fatima, & Malik, 2025). Reproductive health access during floods has also been documented in the wider South Asian literature, where adolescent girls in particular face heightened risk during evacuation and shelter stays due to concerns over honor and modesty (Rashid & Michaud, 2000). Research from flood affected rural Sindh found a direct and measurable association between flood displacement and increased incidence of violence against women, including within displacement camps themselves, suggesting that the safety risks documented in Punjab are not unique to that province but reflect a broader pattern across Pakistan's flood plains (Memon, 2020). A recent systematic review of the factors driving climate induced migration in Pakistan similarly conclude that health system fragility interacts with gendered social vulnerability to produce compounding risk, and call explicitly for policy responses that integrate health, gender and disaster management planning rather than treating them as separate silos (Ullah, Peng, Pervez, Rauf, Alotaibi, & Zhao, 2025). Complementary work on multi-dimensional vulnerability in Khyber Pakhtunkhwa reaches a parallel conclusion, finding that health and sanitation vulnerability consistently ranked among the most severe dimensions of flood affected communities' overall vulnerability profile (Ullah, Dong, Shah, Xu, & Alotaibi, 2025).

2.4 Migration, Trapped Populations and the Climate Mobility Paradigm

The climate mobility literature has moved decisively away from the assumption that environmental stress automatically produces migration. Black and colleagues argued that environmental change interacts with economic, political, social and demographic drivers to shape

migration outcomes, and that migration is often better understood as a form of adaptation than as a failure of adaptation (Black, Adger, Arnell, Dercon, Geddes, & Thomas, 2011). The Foresight report on migration and global environmental change goes further, introducing the concept of trapped populations, people who wish to move, or who would benefit from moving, but who lack the financial, social or physical capacity to do so (Foresight, 2011). Subsequent conceptual work has cautioned that the term trapped can obscure the specific mechanisms of immobility if it is not unpacked carefully (Ayeb-Karlsson, Smith, & Kniveton, 2018), and displacement scholars have similarly warned that populations trapped by crisis require distinct policy responses from those who are displaced (Black & Collyer, 2014). Within Pakistan specifically, migration in response to flooding has been shown to be constrained by both economic and social factors rather than driven by hazard exposure alone (Kamal, 2023), and mountain communities in the Eastern Hindu Kush display similarly constrained motilities shaped by terrain, livelihood and gendered household roles (Khan, Doeverspeck, & Sass, 2023).

2.5 Comparative Evidence from Bangladesh

Because Bangladesh has accumulated the deepest body of gendered disaster research in South Asia, it offers a useful comparative lens for interpreting the Punjab findings. Cannon's (2002) early work on gender and climate hazards in Bangladesh identified restricted mobility, limited access to information, and exclusion from formal warning systems as central mechanisms of women's vulnerability, mechanisms this paper finds replicated closely in Punjab. Mallick and Vogt's (2012) study of cyclone affected coastal Bangladesh find that migration decisions are made overwhelmingly by male household heads, with women's preferences rarely entering the decision at all, a pattern that recurs in the Punjab interview data reported below. Bradshaw's (2013) broader synthesis of gender and disaster scholarship across the Global South situates both cases within a common structural pattern, in which pre-existing gender inequality is the primary driver of differential disaster outcomes, and the disaster itself functions mainly as an amplifier rather than an original cause.

2.6 Gaps in the Existing Literature

Three gaps justify the present study. First, the Pakistani literature has documented gendered vulnerability extensively but has rarely disaggregated the specific causal mechanisms of immobility as distinct from vulnerability in general. Second, very little Pakistani scholarship use a formal mixed methods design that pairs an index based quantitative measure with qualitative causal mechanisms drawn from interviews, key informant interviews and focus group discussions in the same study. Third, existing work rarely compares districts systematically, despite clear evidence that vulnerability and mobility constraint vary sharply across Punjab's diverse agro-ecological and administrative zones. A fourth and related gap concerns intersectionality specifically. The existing literature studies the impacts of floods on women's immobility generally and ignores other specific, hidden and overlapping causes. This study dives deep and differentiates the experiences of a landless widow and a landowning married woman who receives remittances by using intersectional typology. It helps in identifying the variation in the severity of problem faced by women of different backgrounds. Speaking systematically, this paper sorts out the above mentioned research gaps.

3. Theoretical Framework

Four different theoretical frameworks are used to observe data completely as no single framework is sufficient in building theoretical pillars of thesis. Firstly, feminist political ecology explains that vulnerability of women does not merely germinate around the natural and biological traits rather it is exacerbated due to patriarchal norms of society that empower male to control land, wealth, work and mobility (Elmhurst, 2011). This tradition rejects the idea that women are vulnerable inherently rather it highlights that both the formal and informal institutions are responsible for the vulnerability of women.

Intersectionality, developed originally in legal scholarship by Crenshaw (1991), adds a second layer by insisting that gender cannot be analyzed as a single, undifferentiated category. A landless widow, a young mother with a migrant husband, and a woman from a landowning household experience flood risk through overlapping and distinct combinations of gender, class, marital

status, age and land tenure. The intersectional typology developed in the author's underlying thesis fieldwork, discusses further in section five, and operationalizes exactly this insight.

The capabilities approach, associated with Sen (1999) and developed further by Nussbaum (2011), reframes immobility not simply as a lack of physical movement but as a deficit in real freedom, the absence of a genuine opportunity to choose mobility even where physical movement is technically possible. A woman who could physically walk to a relief camp but who lacks permission, information or safe passage to do so is, in capabilities terms, bound with respect to mobility regardless of her physical capacity to move.

Finally, the climate mobility paradigm, and specifically the trapped populations concept developed by Foresight (2011) and refined by Black and Collyer (2014) and Ayeb-Karlsson, Smith and Kniveton (2018), supplies the vocabulary for distinguishing immobility from simple non-migration. Trapped populations are those for whom immobility is involuntary rather than a considered preference, a distinction central to interpreting the survey and interview evidence presented below. Taken together, these four frameworks converge on a single analytical claim that structures the remainder of this paper: immobility among rural Punjabi women is produced simultaneously at the level of structure, institution and lived social relation, and no single explanatory layer is sufficient on its own. This paper labels the resulting condition compound immobility, and treats it as sitting along a spectrum rather than as a binary state. At one end of this spectrum lies total entrapment, in which a woman has neither the physical capacity, nor the social permission, nor the economic means to move under any circumstances. At the other end lies what this paper terms negotiated constraint, in which movement remains possible but is subject to continuous negotiation, delay and conditionality. Most of the women encountered in this study's fieldwork occupy positions between these two poles, and the intersectional typology developed in section five is best understood as an empirical mapping of where different groups of women sit along this spectrum, and why.

3.1 Causes of Immobility: An Integrated Taxonomy

The evidence assembled through the survey, interviews, key informant interviews and focus group discussions organizes into six major domains of causation. Each domain operates across all three phases of a flood event, the period before a flood, the acute period during a flood, and the extended period after a flood, though the specific mechanism at work shifts across these phases. The taxonomy below treats each domain in turn, tracing its manifestation across the three phases.

3.1.1 Sociocultural and Religious Causes

Sociocultural expectation is the single most powerful driver of immobility identified in this study, and it operates continuously across all three phases of a flood event. In the pre-flood period, prevailing norms around female modesty and household reputation discourage women from participating in community level flood preparedness activities, including early warning drills organized by local authorities, because such activities require appearing in mixed public settings. Interview respondents in Muzaffargarh and Mianwali have described a widely shared expectation that a woman's presence at such gatherings, even in an emergency preparedness context, can be read by neighbors as a breach of household honor, discouraging attendance even when preparedness information is directly relevant to family safety.

During the acute flood phase, this same expectation becomes acutely dangerous. Women in the study districts have described waiting for explicit permission from a husband, father in law or elder male relative before evacuating, even as floodwater entered the home. Where the relevant male relative has been absent, working in another city or otherwise unreachable, women frequently have described remaining in place rather than making an independent decision, out of concern that acting without authorization would be judged harshly by the extended family regardless of the outcome. Religious framing has reinforced this pattern in several interviews, where respondents have described the expectation of feminine restraint and modesty as carrying religious as well as social weight, making the decision to move independently feel like a moral as well as a social

risk. It is important to note that this dynamic reflects locally specific interpretations of religious and cultural expectation rather than any singular theological requirement, and considerable variation existed even within the same district.

In the post-flood period, sociocultural constraint shapes recovery as much as it has shaped the initial response. Widows and women without an adult male household member have described being excluded from village level recovery committees, which in every study district have been composed entirely or overwhelmingly of male elders, leaving women with no direct channel through which to advocate for their household's reconstruction needs.

The kinship network deserves particular attention here because it functions, throughout all three phases, as what this study characterizes as a double edged institution. The same extended kinship structure that provides material support in ordinary times, including shared labor, informal credit and childcare assistance, also functions as an informal surveillance and sanctioning mechanism during emergencies, monitoring and constraining women's movement precisely when independent movement may be most necessary. This dual character helps explain why respondents rarely have described kinship obligation in purely negative terms even while describing its constraining effect in detail, and it is consistent with feminist political ecology's insistence that gendered institutions cannot be read as simply oppressive or simply supportive, but must be understood as historically specific arrangements that perform both functions simultaneously (Elmhirst, 2011).

3.1.2 Political and Administrative Causes

Political and administrative causes of immobility operate at the level of formal institutions rather than household relations, but they interact closely with the sociocultural causes described above. In the pre-flood period, early warning systems administered by the Provincial Disaster Management Authority have been reported by key informants to rely heavily on mosque announcements and male community representatives, channels that reach male household heads reliably but reach women only indirectly, if at all, and often with a significant time lag. This structural feature of the warning

system, rather than any individual failure, helps explain the sharp district gap in timely warning receipt reported in section five.

During the acute phase, evacuation and rescue operations have been consistently reported to be led by male government functionaries and volunteers, with very few female staff present at the point of rescue in any of the four districts. Several respondents and key informants have described this as a direct barrier to women's rescue, since some households declined to allow female members to be evacuated by male rescue teams absent a male relative's explicit consent, a constraint with no equivalent for male household members.

In the post-flood period, administrative exclusion becomes documentary as much as physical. A substantial share of women in the poorest and most flood exposed households, particularly in Muzaffargarh, lack an independent national identity card, without which they cannot register independently for cash transfers, relief packages or reconstruction assistance, forcing continued dependence on male relatives even where those relatives are themselves displaced or unreachable. Local council representation compounds this exclusion, since local councils, despite legal gender quota requirements, have been reported by several key informants to allocate flood related development resources through informal channels that continue to favour male dominated kinship networks over the formal quota mechanism.

This finding is consistent with the author's broader research on gender quotas and local resource allocation in Punjab and Khyber Pakhtunkhwa, which has documented a recurring gap between the formal presence of women councilors and their practical influence over budget and relief allocation decisions. The mobility implications of this gap are direct. Where women councilors lack genuine control over flood related resource allocation, the formal representation intended by the quota system does not translate into a channel through which women's specific mobility related needs, including the location and design of relief camps or the routing of evacuation infrastructure, can be raised and addressed through official processes, leaving these needs dependent on informal advocacy of the kind documented in the interview data.

3.1.3 Economic Causes

Economic constraint interacts with, rather than substitutes for, the sociocultural and political causes above. In the pre-flood period, limited independent income or asset ownership means most women in the study districts have no independent capacity to invest in household level flood preparedness measures, such as raising the plinth of a home or purchasing emergency supplies, leaving such decisions entirely to male household heads whose priorities may differ from women's own risk assessment.

During the acute flood phase, economic dependency translates directly into mobility constraint. Female tenant farmers working under landowning households have described requiring the landowner's explicit permission before leaving the property, even during flood emergencies, because their household's ongoing access to land, credit and future employment depended on maintaining that relationship. This mechanism, identified clearly in the intersectional typology discussed in section five, represents one of the starkest illustrations of economic causes of immobility in the dataset.

In the post-flood period, loss of livestock and other productive assets, itself gendered because women disproportionately manage small livestock holdings within Punjabi rural households, strips women of the modest independent economic resources that in normal times provide some leverage over household decisions, deepening dependency during precisely the period when independent decision making capacity is most needed for recovery. Survey data collected for this study find that livestock loss rates are consistently higher in Muzaffargarh than in any other study district, and interview respondents have linked this loss directly to reduced bargaining power within the household during the reconstruction period that followed. This pattern is consistent with poverty focused research on flood affected Punjab, which has documented a strong association between asset loss and subsequent multidimensional poverty, an association that appears in this study's data to operate through household bargaining dynamics as much as through simple loss of income (Ahmad, Khurshid, & Afzal, 2023).

3.1.4 Health-Related Causes

Health status and health system access constitute a distinct causal domain. In the pre-flood period, chronic health vulnerability, including maternal health risk among pregnant and nursing women, is rarely factored into household level evacuation planning, leaving pregnant women in a state of latent risk that becomes acute the moment a flood strikes. During the acute phase, the near total absence of accessible reproductive and maternal health services at evacuation routes and informal shelter sites has been described repeatedly by respondents and confirmed by health sector key informants, consistent with national level findings that hundreds of thousands of pregnant women lost access to maternal care during the 2022 floods (Ashraf, Shahzad, Sequeria, Bashir, & Azmat, 2024; UNFPA Pakistan, 2022). In the post-flood period, psychological recovery is itself constrained by the same sociocultural expectations discussed above, since several respondents have described reluctance to seek mental health support due to stigma, consistent with recent Pakistani research on gendered coping mechanisms following flood exposure (Ahmad, Shah, Khan, Kizi, Fatima, & Malik, 2025). Several respondents have also linked health related immobility directly to the presence of a household member with a physical disability. They have described a pattern in which the entire household, and particularly its female members, restricted their own movement in order to remain near and care for a disabled relative during and after the flood. It produces a mechanism that appears consistently across the intersectional profiles discussed in section five and that current disaster planning in the study districts does not appear to address through any dedicated provision.

3.1.5 Educational Causes

Low educational attainment functions as a background condition that magnifies every other cause of immobility rather than as an independent driver on its own. The low literacy rate restricts the women's access to the direct information regarding the flood warnings. The government issues warnings on hourly basis via radio, electronic media and social media to the people. However, the illiterate women don't have access to that information. Thus, the precious early hours

are wasted due to lack of access to such information. The consequences of illiteracy don't stop here. These women fail to comprehend the procedure of registration for relief schemes due to technicalities and bureaucratization of the procedure. After the floods, this menace heightens women's misfortune as they remain reluctant to contact local government officials who administer alternative income sources, rehabilitation and reconstruction programs. It enhances women's vulnerability and entrenched them in a web of problems. Moreover, in the flooded areas of the four districts, only young girls are withdrawn from school and they are sent to fields to increase the income. However, it is observed that young boys are sent to school to continue their studies.

3.1.6 Travel Route, Camp Condition and Physical Safety Cause

Last but not the least, the conditions of routes and camps raises more concern than the institutional inefficiency and social restrictions. The worsened physical environment multiplies women's adversities. In the districts of Muzaffargarh and Mianwali, the non-availability of safe and all weather routes make the evacuation more dangerous especially when the new born babies and aged family members are accompanied. Resultantly, respondents prefer to stay at their home and decline to move via risky and dangerous routes. The shabby condition of the relief camps also creates doubts and risks in the mind of women and they refuse to quit their homes. Additionally, several respondents describe that the male members of rescue team and other men harass them during their travel to camps, a concern that has been described in the section 3.1. In the relief camps, respondents have said that there is no segregated place for women for sleeping, eating, using bathing and toilet facilities. They have to breast feed their newborn babies in front of other men. During their menstrual cycle, women, especially adolescent girls, have to face difficulties at the relief camps. These are the findings consistent with the reports of EU, UN, World Bank, ADB and the Government of Pakistan after the food of 2022. Several respondents record that they choose to stay at home as they are well aware of the conditions at relief camp

4. Research Methodology

4.1 Research Design

The research paradigm is designed with the mixed method approach by using both the quantitative and qualitative approaches (Creswell and Plano Clark, 2018.) Firstly, the data is collected by using quantitative method such as 480 household surveys are conducted in the four the districts. 120 respondents of flood affected areas are selected through random selection procedure in each district. Secondly, in the qualitative phase, semi structured interviews are conducted by engaging key informants such as local government officials, personals from district administration and focus group discussions with the flood affected women. At the analysis stage, the data gathered through both the approaches is systematically organized and analyzed to draw the better results. During the data collection, convergence and divergence of both the sources have been observed. In the case of divergence, the quantitative data has been prioritized against the qualitative data as the surveys are considered more reliable source of data than that of the interviews.

4.2 Study Districts and Sampling

The selection of four districts like Muzaffargarh, Mianwali, Sargodha and Attock for data collection is made purposively. There are three main factors which are considered in choosing the district; risk factor of excessive flooding, patriarchal social control over women and distance from provincial headquarter. Muzaffargarh faces more floods and it is socially more conservative than the other districts. Attock is represented due to random flooding and comparatively better living conditions for women. However, Sargodha and Mianwali are located in Central Punjab and face overflow of water in Chenab and Indus rivers respectively. For data collection, only those union councils have been selected which have been officially declared as flood affected area at least once in the last 3 Monsoon seasons. Moreover, within the union council, the selection of women has been based upon their marital status, economic conditions and land ownership. Qualitative respondents for the semi-structured interviews and focus group discussions have been drawn from within the same sampling frame using a purposive sub-sampling strategy, selecting respondents whose

survey responses have indicated particularly high or particularly low mobility constraint scores, so that the subsequent qualitative phase can probe both the mechanisms producing severe constraint and the mechanisms that appeared, in the more resilient cases, to mitigate it. This nested sampling structure is what allows the sequential explanatory design to move from description in the quantitative phase to explanation in the qualitative phase, rather than treating the two phases as independent exercises.

4.3 Instruments

Three instruments have been used. The household survey instrument has measured socio-demographic status, livelihood strategy, social network strength, health status, food security, water and sanitation access, and exposure to natural hazards, following an adapted Livelihood Vulnerability Index structure, alongside a purpose built Mobility Constraint Scale covering sociocultural, economic and institutional dimensions of restricted movement. The semi-structured interview guide has explored individual experiences of decision making before, during and after flood events, including who made the decision to evacuate or remain, what information respondents received, and what barriers they encountered on evacuation routes or at relief points. Key informant interviews have been conducted with union council representatives, staff of the Provincial Disaster Management Authority, and local health workers, to triangulate the institutional perspective against household level accounts. Two different sessions are held for young and aged women separately so that the spectrum of data collection can be widened.

4.4 Data Analysis

Quantitative data have been analyzed descriptively and comparatively across districts to construct the Livelihood Vulnerability Index and Mobility Constraint Scale reported in section five. The Livelihood Vulnerability Index has followed the standard IPCC framework of exposure, sensitivity and adaptive capacity (Adger, 2006; Cutter, Boruff, & Shirley, 2003), while the Mobility Constraint Scale has been constructed specifically for this study to capture socio-cultural, economic and institutional barriers to movement. Qualitative data from interviews, key informant interviews and focus group discussions

have been analyzed using Braun and Clarke's (2006) six phase reflexive thematic analysis procedure, involving familiarization, initial coding, theme development, theme review, theme definition and final write up. Coding has been conducted manually and cross-checked for consistency. The resulting themes have been then organized, together with the quantitative index results, into the six-domain taxonomy of causes presented in section six. Integration between the two strands of data have achieved through a joint display matrix in which each qualitative theme is cross-tabulated against the relevant quantitative sub-index, allowing the research team to identify points of convergence, where qualitative accounts directly have explained a quantitative pattern, and points of divergence, where the two data strands appear initially to conflict and require closer examination of the underlying interview transcripts to resolve. This integration step is what allows the taxonomy in section six to move beyond simple description of index scores and toward an account of the causal mechanisms that produce them.

4.5 Ethical Considerations

Verbal informed consent has been obtained from all respondents prior to participation, and respondents have been informed of their right to withdraw at any point without consequence.

Interviews touching on sensitive subject matter, including household decision making, gender based violence and reproductive health, have been conducted by female research staff in private settings selected by respondents themselves. All data has been anonymized at the point of transcription, and no individually identifying information is reported in this paper.

5. Findings

5.1 Quantitative Findings: Vulnerability and Mobility Constraint across Districts

Table 1 reports the composite Livelihood Vulnerability Index and Mobility Constraint Scale scores across the four study districts. The pattern is consistent and, in several respects, striking. Muzaffargarh records the highest composite vulnerability score of the four districts, driven particularly by extreme exposure to natural disaster and severe food security vulnerability, while Attock records the lowest scores on almost every sub-component. The Mobility Constraint Scale shows an even sharper gradient than the vulnerability index itself, with Muzaffargarh's socio-cultural constraint sub-score reaching 0.89 against 0.57 in Attock, indicating that sociocultural restriction on women's movement, rather than economic constraint alone, is the primary driver of the district gap.

Table 1: *Comparative Livelihood Vulnerability Index and Mobility Constraint Scale, District Profiles (n = 480)*

Measure	Muzaffargarh (n=120)	Mianwali (n=120)	Sargodha (n=120)	Attock (n=120)	Four-District Mean
Composite Livelihood Vulnerability Index (LVI)	0.80	0.69	0.55	0.48	0.63
LVI-IPCC: Exposure	0.91	0.79	0.63	0.61	0.74
LVI-IPCC: Sensitivity	0.79	0.68	0.55	0.47	0.62
LVI-IPCC: Adaptive Capacity (inverted)	0.75	0.63	0.51	0.45	0.59
Mobility Constraint Scale (MCS): Socio-cultural	0.89	0.82	0.65	0.57	0.73
MCS: Economic	0.84	0.71	0.60	0.51	0.67
MCS: Institutional	0.76	0.72	0.60	0.55	0.66
MCS Composite Score	0.83	0.75	0.62	0.54	0.69
% reporting no role in evacuation decision	89%	81%	71%	62%	76.6%
% accessing formal relief camp	18%	24%	31%	39%	28%
% receiving timely flood warning	31%	36%	44%	52%	41%

Source: *Field survey data (n = 480), 2025. Higher LVI and MCS scores indicate greater vulnerability and mobility constraint.*

Three figures embedded in the survey data deserve particular attention because they speak directly to the causes of immobility rather than merely to its distribution. Eighty-nine percent of women surveyed in Muzaffargarh reported having no role whatsoever in the household decision to evacuate during the most recent flood event, compared with sixty-two percent in Attock, a difference of twenty-seven percentage points that cannot be explained by economic variables alone. In Muzaffargarh, only 18 percent women have access to relief camps while 39 percent women have that facility in Attock. Moreover, the percentage of receiving early warnings of flood has been 39 and 52 in Muzaffargarh and Attock respectively. The recorded data suggests that the two districts have unequal facilities which produce uneven results.

These three different mechanisms are discussed in the qualitative data which has been discussed

below. The livelihood vulnerability index makes the picture bleaker as it separates the vulnerability into three IPCC components like exposure, sensitivity and adaptive capacity. Exposure to floods is high in all four districts ranging from 0.61 to 0.91 in Attock and Muzaffargarh respectively. It proves that all the districts have the risks of being flooded. However, sensitivity and adaptive capacity are different in all the districts which show that the living standard and socially developed districts have less mobility constraints. They have better household and administrative facilities which make their mobility smoother and safer. The findings help in drawing the policy for eradicating the flood related losses. Merely, the embankment of rivers cannot protect women rather policies should be designed to enhance capacity and adaptive capabilities. Resultantly, hazards will come and go but the losses will not be borne.

The three components of the Mobility Constraint scale are required to be studied individually. In this way, it will help in pointing out the core of the problem. The socio cultural constraints show the more devastated results in all three sub components. They suggest that the socio cultural expectations are more influencing in comparison with the economic factors. The economic constraint scale tells a different story as 0.51 and 0.84 in Attock and muzaffargarh respectively are the readings to show economic constraints. However, the institutional constraints are seen ranging from 0.55 to 0.76. This last finding is important because it suggests that institutional barrier, including documentation requirements and the design of relief distribution systems, impose a meaningful baseline level of constraint even in the comparatively less constrained district of Attock, implying that institutional reform is likely to matter across all four districts rather than only in the most severely constrained ones.

5.2 Qualitative Findings: An Intersectional Typology of Constraint

The interview, key informant interview and focus group data have converged on a small number of recurring intersectional profiles, summarized in Table 2. These profiles matter because they show that immobility is not experienced uniformly even among women who share a district and a flood event. The most severely constrained profile identified in the fieldwork is the landless widow of advanced age, particularly common in Muzaffargarh, whose mobility constraint score of 0.92 reflects the simultaneous operation of gender, class, kinship status and age. Respondents in this category consistently have described a total absence of independent authority over evacuation decisions, compounded by exclusion from relief distribution systems that were designed around male household heads.

Table 2: District Comparison of Compounding Mobility Limits

Intersectional Profile	Predominant District (% of sample)	Mean MCS Score	Primary Constraint Mechanism	Key Policy Implication
Landless widow of advanced age, marginalized kinship status	Muzaffargarh (19%)	0.92	Compound immobility: gender, class, kinship status and age operate simultaneously	Dedicated widow registration systems; female-only relief distribution; land rights reform
Young mother (18-30), migrant husband, pregnant or nursing	Muzaffargarh and Mianwali (13%)	0.88	Absent male authority creates a decision-making vacuum; reproductive health access excluded	Mobile maternal health units; female health worker deployment; remote consent protocols
Landless female sharecropper, husband present	Muzaffargarh (31%)	0.83	Economic dependency: landowner mediates all resource access	Direct benefit transfer to women; community organization support
Widow with a household member who has a disability	Mianwali (12%)	0.79	Protective immobility enforced by kin; physical evacuation barriers	Disability-inclusive evacuation planning; female community mobilisers; accessible shelter
Middle-aged married woman, some land access	Sargodha (26%)	0.63	Negotiated partial constraint; moderate economic dependence; weak institutional access	Identity documentation drives; mobile banking access; women's relief registration desks
Married woman, husband present, remittance household	Attock (33%)	0.54	Institutional constraints persist despite material resilience	Digital literacy programs; female-led early warning networks
Married woman, husband absent, remittance household	Attock (21%)	0.68	De facto authority undermined by remote male veto during emergencies	Emergency female decision-making protocols; support networks for migrant-husband households

Source: Qualitative fieldwork conducted for this study (2025).

In Mianwali and Muzaffargarh, another young mother with her husband describes that the presence of male in the house has not been a blessing in the distressed times. Rather, the interviews of key informants suggest that the male authority turns into decision making vacuum which restricts the mobility of women. A third profile, the female tenant farmer working under a landowning household in South Punjab, has

displayed a mobility constraint driven overwhelmingly by economic dependency on the landowning family, whose permission is required for almost any movement outside the household, including movement to seek medical care. By contrast, the profile with the lowest recorded constraint score, the married woman with land access and a remittance income in Attock, illustrates that economic resilience and modest

institutional access, including possession of a national identity card, can meaningfully reduce, though not eliminate, mobility constraint.

Across all profiles, three cross-cutting mechanisms have recurred in the qualitative data regardless of district or intersectional position. The first is what several respondents in Mianwali and Muzaffargarh have described, in slightly different words, as a permission gap, a delay between the moment a woman recognizes danger and the moment she receives authorization from a male relative to act on that recognition. According to key informants, this gap makes the secure evacuation impossible. The kinship network plays two edged roles: first, it becomes the source of information and material in normal times; second, it creates mobility constraints during emergency times as well; Thirdly, the formal relief infrastructure has been dominating by men which makes difficult for women to get through the registration desks, distribution points and other facilities there. Consequently, the women remain unable to get the aid due to administrative and social barriers.

6. Discussion

The above mentioned findings build three pillars of argument. First, the rural women in Punjab face systematic yet compound immobility. All the domains such as sociocultural, political, economic, health and education related don't work singularly but they interact with each other. For instance, a woman who is dependent economically upon landlord is facing social and cultural constraints at the same time. Later on, these restrictions make the immobility difficult due to unsafe routes. This helps in laying out policy designs as if single domain is treated individually and the other domains remain unnoticed then there are chances that the immobility constraint will be remained a permanent threat to women in the rural Punjab.

Second, the comparison among four districts indicates that compound immobility is not merely a cultural phenomenon yet it is the product of multi layered problems which include administrative and governmental failure. Comparatively speaking, Attock has lower mobility constraint score against Muzaffargarh. However, both of them have faced floods and both are male dominated societies. It shows that

administrative and institutional infrastructure can also create the difference in the mobility constraints score. In Attock, from early warnings to the road safety, from shelter homes to rehabilitation packages, the district administration performed more efficiently than that of the Muzaffargarh. These findings suggest that the immobility can be reduced by bringing abrupt administrative and institutional reforms while the sociocultural reforms can go at snail's pace. These findings can change the lenses through which the mobility constraint is required to be seen by the policy makers.

A further point of discussion concerns the relationship between the quantitative and qualitative strands of the study itself. The joint display integration described in section four has revealed a small number of instances in which the two strands have been appeared initially to diverge, most notably in Sargodha, where quantitative mobility constraint scores are moderate but qualitative interviews described several cases of severe individual level constraint. Closer examination of the underlying transcripts suggests that this divergence reflects genuine intra-district heterogeneity rather than measurement error, with a small number of intersectional profiles, particularly widows with household disability, experiencing constraint far above the district average even where the average itself is moderate. This finding argues for caution in relying on district level averages alone when designing interventions, and supports the intersectional typology approach developed in section five as a necessary complement to district level quantitative comparison.

These findings also speak directly to Pakistan's stated commitments under the Sustainable Development Goals, particularly Goal 5 on gender equality and Goal 13 on climate action, both of which require attention to the differentiated impact of climate hazards on women. The persistent gap in decision making authority, formal relief access and identity documentation documented in this study represents a measurable and addressable obstacle to progress on these goals, and the district level variation identified here provides a concrete evidence base for targeting interventions where they are likely to have the greatest effect.

7. Policy Recommendations

The compound nature of the immobility documented in this study implies that policy responses must operate across multiple domains simultaneously rather than relying on any single intervention. Several specific recommendations follow directly from the findings.

First, early warning systems administered by Provincial Disaster Management Authorities should be redesigned to reach women directly rather than relying primarily on male dominated community channels, including through mobile based alert systems and the deployment of female community mobilisers, an approach that directly addresses the timely warning gap documented in section five.

Second, relief and evacuation operations should include dedicated female rescue personnel in every district, addressing the documented reluctance of some households to permit female evacuation by all male rescue teams, and should be paired with a dedicated registration mechanism for women without independent identity documentation, so that lack of a national identity card does not become an additional barrier to relief access during an emergency.

Third, there must be separate bathing and toilet facilities so that the women can feel safe in settling down at an unknown place. Satisfactory facilities at shelter homes or relief camps will encourage the other women who have not decided to step out of their homes.

Fourth, drastic reforms should be brought into the local government system by enhancing women quota and providing them with specific and direct fund for flood relief programs.

Fifth, despite giving relief packages to male members of family, the distribution of relief packages should be directly delivered to women who would avoid economic dependency during mobility.

Sixth, the roads and routes should be developed in physical and security perspectives as soon as it is possible. It will help women to convince their male head of family to move toward the safer place before floods.

8. Limitations

There are several limitations in this study.

Primarily, the survey data collected in the four districts can vary from the other flood prone districts of Punjab and Pakistan. It has been established in the study of these districts that each of the district has its own demographic, political, institutional and social barriers which become the causes of immobility of women. Thus, before applying this data on other districts, a well-organized data collection procedure should be adopted. The Mobility Constraint Scale, though grounded carefully in the qualitative fieldwork that preceded its finalization, is a study specific instrument rather than a previously validated international measure, and future research would benefit from testing its components against other established vulnerability and mobility measures. Finally, because data collection necessarily took place after the flood events being described, some responses are subject to the ordinary limitations of retrospective recall, particularly regarding the precise sequence of decisions taken during the acute phase of a fast-moving flood event.

9. Conclusion

This paper set out to answer a question that disaster research has approached only indirectly: why do rural women in flood-prone Punjab remain in place even when remaining is dangerous? The answer developed here is that immobility results from the simultaneous operation of sociocultural and religious expectation, political and administrative exclusion, economic dependency, weak health access, low educational attainment, and unsafe evacuation and shelter conditions, interacting across the pre-flood, during-flood and post-flood phases of a disaster cycle to produce what this paper has termed compound immobility. The four district comparison undertaken here shows that this compound immobility, while shaped by a shared cultural and religious context, varies measurably with administrative proximity and infrastructure quality, offering a concrete entry point for policy intervention. Future research should extend this district level comparative design to other flood-exposed provinces of Pakistan, and should track whether the specific policy interventions proposed here measurably reduce mobility constraint scores over successive flood seasons, providing a direct empirical test of the causal account developed in this paper.

More broadly, the case developed here suggests that disaster policy debates in Pakistan, and in comparable South Asian settings, would benefit from treating immobility as a distinct object of analysis alongside displacement, rather than as its residual or opposite category. The policy which only deals with the management of mobility is insufficient because the main issue still remains unsolved. The question that women are not allowed to leave the house or she herself doesn't

feel safer during travel, are the main concerns for policy makers. The data collected in the four districts reveals the hidden truth that women are incapable of moving to relief camps and their number is not negligible rather their number is larger than that who leave their homes. Thus, the policy makers should reform social, institutional and administrative reforms to eradicate the plague of immobility.

Conflict of Interest

The authors showed no conflict of interest.

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