



# A STUDY ON THE IMPACT OF RIVER SYSTEMS ON RURAL-URBAN MIGRATION: EVIDENCE FROM PURBA MEDINIPUR, WEST BENGAL.

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**Abstract:** *This study examines the impact of river systems on rural-urban migration in Purba Medinipur, West Bengal, focusing on how environmental stressors influence household mobility decisions. Using a mixed-methods approach, primary data were collected through a questionnaire survey of 120 households and in-depth interviews with 15–20 respondents. Quantitative findings show widespread exposure to flooding, riverbank erosion, and agricultural land loss, leading to significant livelihood disruptions and income reduction. Over half of the households reported at least one migrant member, indicating migration as a common coping strategy. Thematic analysis of interview data reveals four key themes: environmental insecurity, livelihood disruption, migration as adaptation, and institutional gaps. Together, these findings demonstrate that migration in Purba Medinipur is not solely an economic choice but a response to intersecting environmental and socio-institutional pressures. The study highlights the need for strengthened river management, livelihood diversification, and more effective support mechanisms to reduce migration-driven vulnerability.*

**Key Words:** *Migration, River Systems, Rural, Urban, and Population.*

## 1. INTRODUCTION:

The term "migration" encompasses a wide range of voluntary relocations, as well as those that are more permanent in nature. From the place of origin to the place of destination and even while migratory, it significantly impacts people's economic, social, cultural, and psychological life. The term "migration" refers to the movement of people across national boundaries who have a permanent or semi-permanent residence. As stated in the Indian Constitution, residents have the freedom to move throughout the country for any purpose, including the pursuit of better prospects. For many different reasons, including social, cultural, economic, and noneconomic ones, individuals move from one place to another, sometimes accompanied by a change in domicile; this process is called migration (Muggah, 2016). In most cases, the social, cultural, economic, political, and/or physical circumstances of a people or group will cause them to migrate. Rural-urban migration is prevalent in Purba Medinipur due to the influence of various factors including poor employment opportunities, harmful impact of urbanization on agriculture, and frequent environmental disasters causing loss of habitat. Therefore, the river systems play a major role in outmigration particularly in Purba Medinipur because the local economy and livelihood are largely dependent on it. The district has a network of significant river streams like Rupnarayan, Haldi, Rasulpur, Bagui and Keleghai due to which it is called a fluvio-coastal region. However, these systems are also responsible for instabilities in these coastal areas. These instabilities are caused by frequent flooding and cyclones, coastal and riverbank erosion, intrusion of saline water. As more than 80% of the population lives in this region and relies on agriculture for sustenance, the impacts of the river systems directly affect the livelihood of the local people (Chakraborty, 2010).

Although these factors affect livelihoods, people may turn to alternative sources for income generation or sustenance. However, the region is still undergoing the process of industrialization and urbanization offering limited opportunities for alternative employment options. While these push factors force people of Purba Medinipur to leave their home and earn livelihood in places other than their home town, urban centers appear as the attractive source for livelihood due to various options for generating income (Oduro et al. 2015). These people are drawn by diverse work opportunities, specifically in the industrial towns like Haldia and Contai. They also receive higher wages and get



comparatively higher quality infrastructure and education access. On the other hand, this tendency of increasing migration accelerates urbanization that is generally witnessed by the surrounding areas such as Digha, Kanthi and Haldia (Mondal et al., 2023).

This study is a significant research that attempts to identify the major reasons of rural-urban migration in Purba Medinipur, which are specifically triggered by the river systems of the region. This can bring important insights into the understanding of not only the changing population dynamics, factors related to river systems that can be managed through structured planning, but also can protect habitats of the local people. The policy makers and governmental representatives can also obtain important information about the most to least vulnerable coastal zones or zones that are prone to flooding and loss of livelihood. Besides, this can help preserving agricultural lands that tend to be affected by flood or intrusion of saline water.

## 2. LITREATURE REVIEW:

**Ghosh & Mal, (2017)**, Labour migration is widely recognised as a central element of economic change, particularly in rural regions of developing countries. Scholars note that the movement of workers—whether seasonal, temporary, or long-term—forms an essential part of both agricultural cycles and emerging industrial labour markets. Research consistently shows that such mobility has far-reaching implications for migrants, their families, and the communities they leave behind. Although debates on recent migration trends have expanded, the developmental consequences of rural out-migration remain insufficiently addressed in policy discourse. Empirical studies highlight that migration often becomes a coping strategy for households facing limited livelihood options. Evidence also indicates that many rural workers move with their families during peak agricultural periods, reflecting the cyclical nature of labour demand. Poverty, unemployment, and lack of land ownership repeatedly emerge as the most influential factors shaping migration decisions, underscoring the economic pressures that compel rural households to seek work elsewhere.

**Dutta & Mistri, (2020)**, Literature on development consistently highlights the need to examine both spatial and non-spatial dimensions of growth, noting that rural and urban development evolve through varying intensities of human–environment interaction. In countries such as India—where the 2011 Census records nearly 70 percent of the population residing in rural areas—understanding rural development remains central to national progress. Scholars argue that balanced and sustainable growth requires integrated strategies that address social, economic, and ecological needs simultaneously. Effective planning, therefore, depends on grounded empirical assessments of rural livelihood systems. Studies focusing on hazard-prone coastal regions, including parts of Purba Medinipur in West Bengal, emphasize the vulnerability of rural livelihoods and the necessity of context-specific interventions. Research in such areas often documents local livelihood practices, exposure to environmental risks, and the adaptive capacities of households, ultimately proposing locally tailored measures to strengthen rural resilience and promote sustainable development.

**Dutta & Chakrabarti, (2015)**, Scholarly discussions on rural–urban dynamics increasingly highlight the rural–urban continuum as a critical factor shaping patterns of mobility, employment, and regional development. Existing studies show that migration flows extend beyond the conventional rural-to-urban direction, involving substantial movement between rural areas as well as toward small towns and emerging growth centres. This body of literature also stresses that rising pressure on agricultural land is pushing rural households to seek alternative livelihoods, yet modern industries offer limited opportunities for unskilled workers. Research on West Bengal provides a particularly illustrative context, demonstrating how localized industrial initiatives can mitigate livelihood stress by generating employment closer to home. These works collectively argue that rural industrialization plays a significant role in strengthening rural–urban linkages, easing migration pressures, and supporting more equitable regional development.

**Hossain, Sk et.al. (2022)**. Extending from the Subarnarekha estuary in Odisha, India, to the mouth of the Haldi River in West Bengal, the 90.20 km coastline area was assessed. We looked assessed how susceptible the area was to biophysical and socioeconomic consequences, as well as coastal erosion, flooding, salinization, and tropical cyclones, storm surges, and eustatic sea-level rise, among other climatic extremes and variability. In order to find and execute strategies that would reduce risk, coastal vulnerability mapping was used in relation to coastal hazards. Applying the Coastal Vulnerability Index (CVI) based on Gornitz's CVI model and the Analytical Hierarchy Process (AHP) approach allowed us to comprehend the geographical distribution of physical vulnerability along this length of coast. The models were executed in ArcGIS version 10.5 with the following geological parameters: elevation, slope, bathymetry, coastal geomorphology, shoreline change, and coastal land use. Mean sea level (MSL), mean tidal range, significant wave height, and storm surge height were used as physical process variables.

**Punjabi, Bharat et.al. (2018)**. Resolving the water dispute between rural and urban areas in India: Harnessing the potential of institutional change. Institutional path dependency and neoliberal restructuring have given Indian cities more power to create new water entitlements in rural and peri-urban regions, which is driving modern water governance politics in India. This article delves into the politics of water disputes between rural and urban areas in this dynamic

political climate. It takes a look at how land rights and other agrarian institutions influence the politics of rural-urban water transfers in two of India's most populous and rapidly expanding cities, Mumbai and Chennai, and builds on the work of Schlager and Ostrom on operational and collective choice rules. In doing so, it argues that the water entitlement that Mumbai has been able to achieve is the result of a long history of institutionalized appropriation within a setting of weak and restricted tribal control over land and resources.

### 3. OBJECTIVES OF THE STUDY:

- To analyze how river systems influence the socio-economic conditions of rural households
- To investigate how changes and dynamics within river systems contribute to rural–urban migration
- To identify the patterns, destinations, and nature of rural–urban migration linked to river-system influences
- To recommend measures for managing river-system effects to reduce forced migration.

### 4. RESEARCH METHODOLOGY:

This study employs a mixed-methods design combining household surveys and qualitative interviews in selected riverine villages of Purba Medinipur. A total of 120 households were surveyed using a stratified random sampling approach, ensuring representation from villages affected by flooding, erosion, and saline intrusion. The structured questionnaire was used to collect data on livelihood patterns, exposure to river-related environmental stressors, migration history, and household socio-economic characteristics. From the surveyed households, 15–20 respondents were purposively selected for in-depth semi-structured interviews to capture detailed personal experiences and perceptions. Qualitative data were collected through the interview for deeper understanding of the perceptions of local people and their lived experiences. Secondary sources such as government reports and literature on riverine hazards will supplement primary data. This integrated approach enables both quantitative measurement and qualitative interpretation of how river systems shape rural-urban migration in Purba Medinipur.



Figure 1: Location Map with Important Rivers

Source: (Okeke, 2021)



**5. DATA ANALYSIS:**

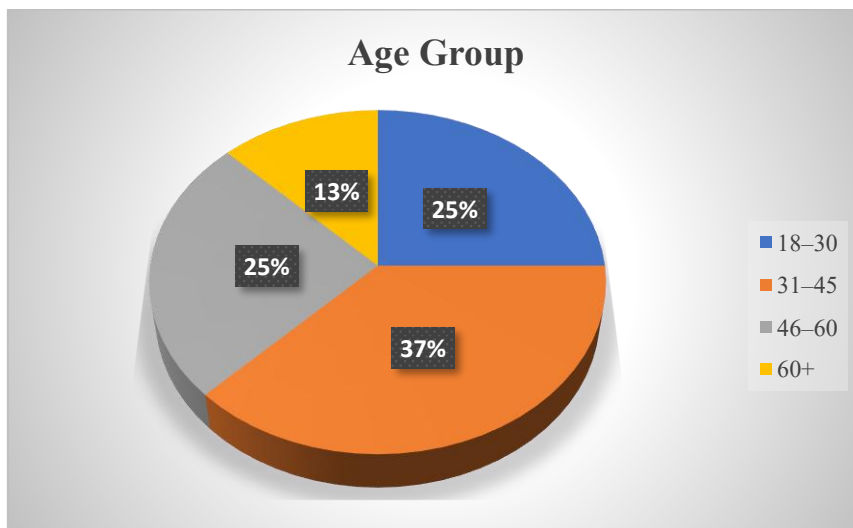
Quantitative data from the 120 household questionnaires will be coded and analyzed using simple descriptive statistics such as frequencies, percentages, and cross-tabulations to identify patterns in exposure to river-related stressors and migration behavior. These results will help highlight key relationships between environmental factors and household decisions. Qualitative data from the 15–20 interviews will undergo thematic analysis, following a systematic process of coding, categorizing, and developing themes. This will allow deeper interpretation of personal experiences, perceived risks, and motivations behind migration. Findings from both datasets will be triangulated to strengthen validity and provide a comprehensive understanding of migration drivers in Purba Medinipur.

- **Quantitative Data Analysis**

**1. Age Group**

Age Group	Frequency	Percentage
18–30	30	25%
31–45	45	37.5%
46–60	30	25%
60+	15	12.5%

**Table 1: Age of the Respondents**



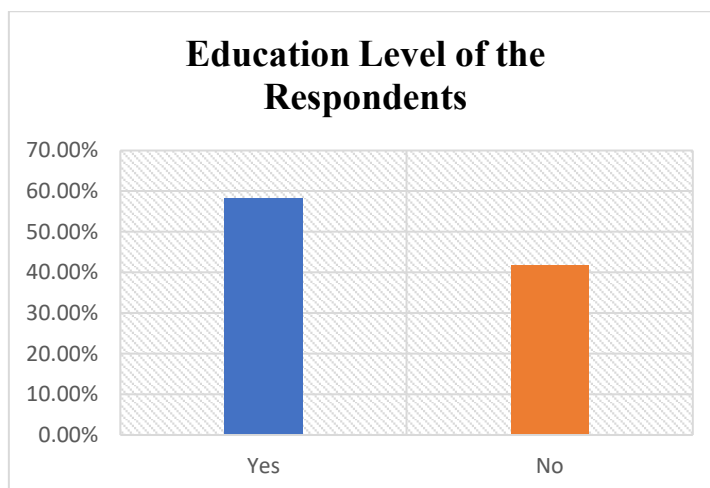
**Figure 2: Age of the Respondents**

The highest proportion of respondents (37.5%) fall within the 31–45 age group, indicating that most surveyed households are represented by working-age adults. Only a small share (12.5%) are elderly, suggesting younger and middle-aged groups are more engaged in migration-related decision-making.

**2. Level of Education**

Education Level	Frequency	Percentage
No formal schooling	20	16.7%
Primary	40	33.3%
Secondary	35	29.2%
Higher Secondary+	25	20.8%

**Table 2: Education Level of the Respondents**



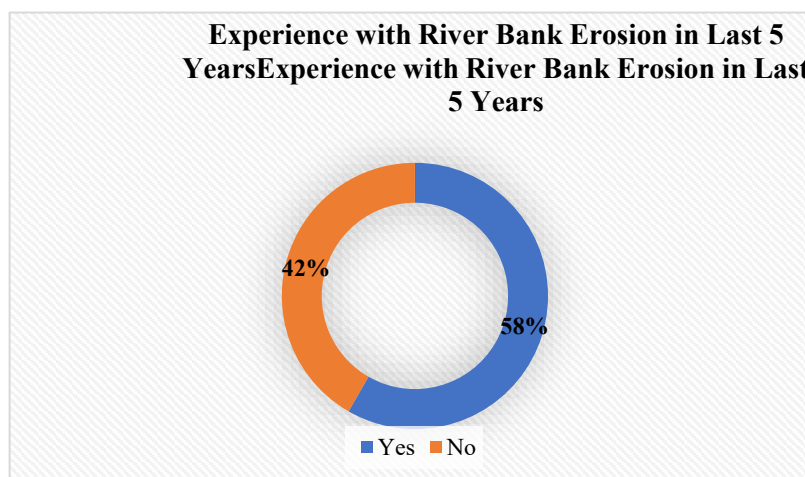
**Figure 3: Education Level of the Respondents**

Most respondents have primary (33.3%) or secondary education (29.2%). Only 20.8% have higher secondary or above, indicating generally low educational attainment. This limited education may influence livelihood options and vulnerability to river-related hazards.

**3. Has your household experienced riverbank erosion in the past 5 years?**

Response	Frequency	Percentage
Yes	70	58.3%
No	50	41.7%

**Table 3: Experience with River Bank Erosion in Last 5 Years**



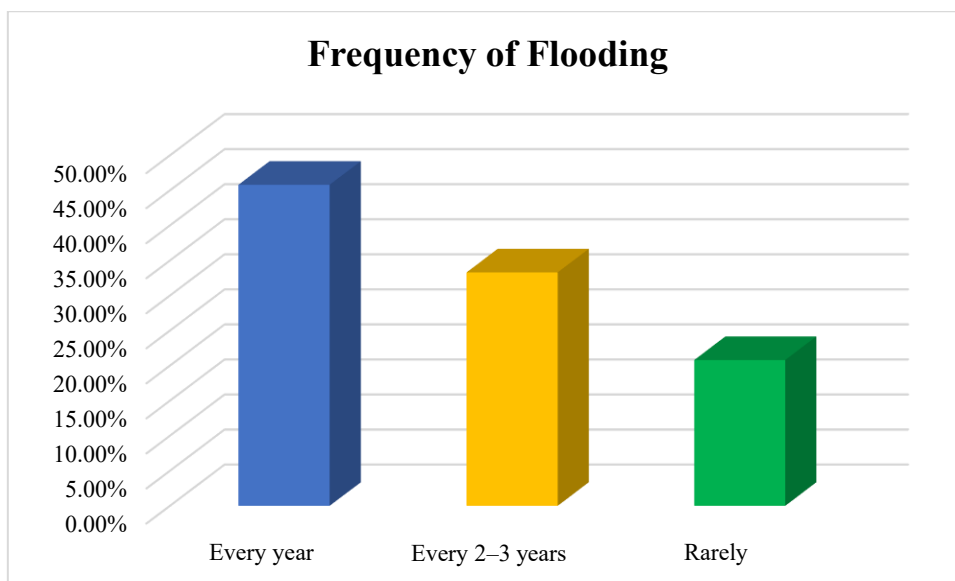
**Figure 4: Experience with River Bank Erosion in Last 5 Years**

A significant majority (58.3%) experienced riverbank erosion in the last five years, indicating widespread environmental degradation. Erosion directly threatens housing, land ownership, and livelihood security. The 41.7% not affected may be located in relatively stable or elevated areas. Overall, the data show that erosion is a major environmental stressor influencing household decisions, including migration.

**4. How frequently does flooding affect your village?**

Frequency of Flooding	Frequency	Percentage
Every year	55	45.8%
Every 2–3 years	40	33.3%
Rarely	25	20.8%

**Table 4: Frequency of Flooding**



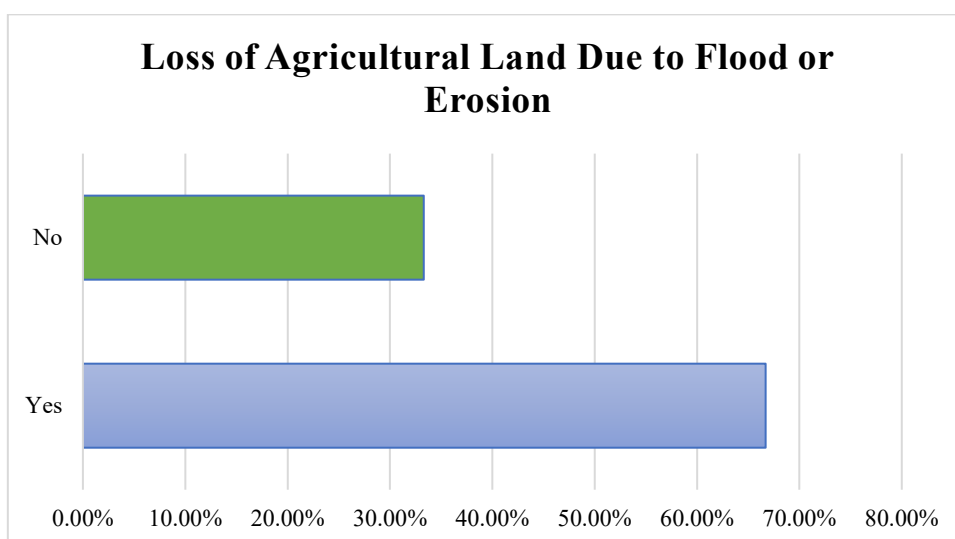
**Figure 5: Frequency of Flooding**

Nearly half of respondents (45.8%) face annual flooding, signaling chronic exposure to water-related hazards. This frequency disrupts agricultural cycles, infrastructure, and household safety. One-third (33.3%) experience flooding every 2–3 years, which still poses recurring risks. Only 20.8% experience rare flooding, highlighting uneven vulnerability across villages. This pattern shows that flooding is a persistent part of life for many households.

**5. Has flood or erosion ever caused loss of agricultural land?**

Response	Frequency	Percentage
Yes	80	66.7%
No	40	33.3%

**Table 5: Loss of Agricultural Land Due to Flood or Erosion**



**Figure 6: Loss of Agricultural Land Due to Flood or Erosion**

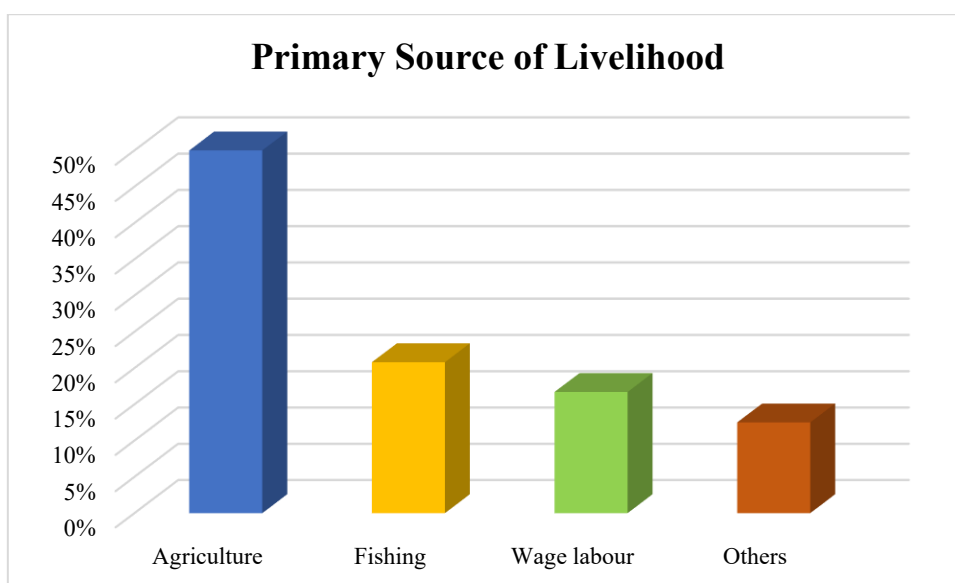


Two-thirds (66.7%) have lost agricultural land, demonstrating the severity of environmental change in the region. Land loss directly impacts food security and income stability. The remaining 33.3% may either have non-agricultural livelihoods or reside in less affected areas. This pattern strongly supports the linkage between environmental stress and economic push factors driving migration.

**6. What is your primary source of livelihood?**

Livelihood Type	Frequency	Percentage
Agriculture	60	50%
Fishing	25	20.8%
Wage labor	20	16.7%
Others	15	12.5%

**Table 6: Primary Source of Livelihood**



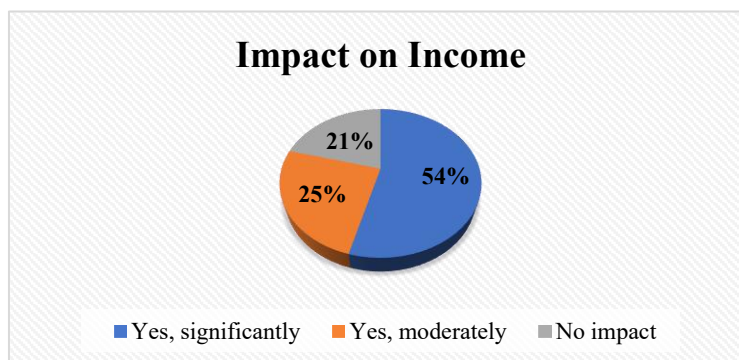
**Figure 7: Primary Source of Livelihood**

Half of the respondents rely on agriculture, while 20.8% depend on fishing—both highly sensitive to river behavior. Environmental disturbances directly threaten these sectors, increasing household vulnerability. Wage labor (16.7%) and other diversified activities (12.5%) represent smaller segments. The dominance of natural-resource-dependent livelihoods explains why environmental stress translates quickly into economic pressure.

**7. Has environmental stress (flood/erosion) affected your income?**

Response	Frequency	Percentage
Yes, significantly	65	54.2%
Yes, moderately	30	25%
No impact	25	20.8%

**Table 7: Impact on Income**



**Figure 8: Impact on Income**

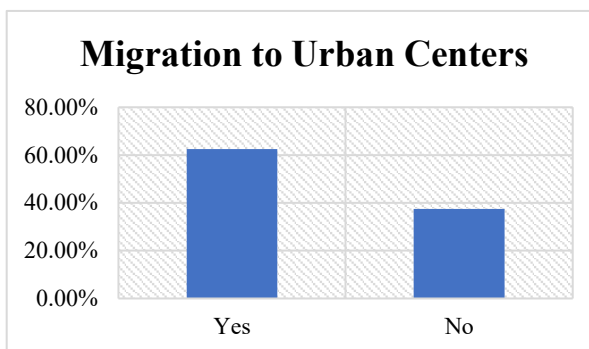


A substantial 54.2% report significant income loss, highlighting the economically disruptive nature of floods and erosion. Another 25% face moderate income reduction, showing that even less severe events still affect livelihoods. Only 20.8% experience no impact, likely due to alternative income sources or less exposure. This pattern confirms the strong economic push behind migration decisions.

**8. Has any member of your household migrated to an urban area?**

Response	Frequency	Percentage
Yes	75	62.5%
No	45	37.5%

**Table 8: Migration to Urban Centers**



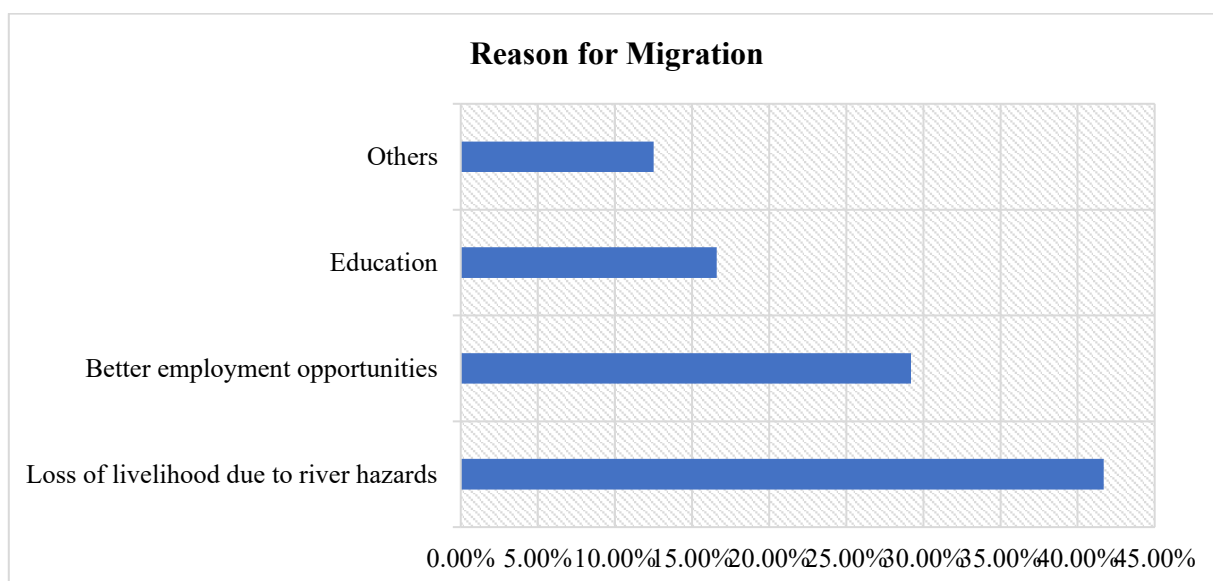
**Figure 9: Migration to Urban Centers**

A large portion (62.5%) of households have migrants, indicating that migration is a common adaptive response. This suggests both environmental push and urban pull factors at work. The remaining 37.5% may lack resources to migrate or have stable livelihoods locally. The prevalence of migration reflects broader socio-economic transformations driven by river-related stresses.

**9. What was the main reason for migration?**

Reason for Migration	Frequency	Percentage
Loss of livelihood due to river hazards	50	41.7%
Better employment opportunities	35	29.2%
Education	20	16.6%
Others	15	12.5%

**Table 9: Reason for Migration**



**Figure 10: Reason for Migration**

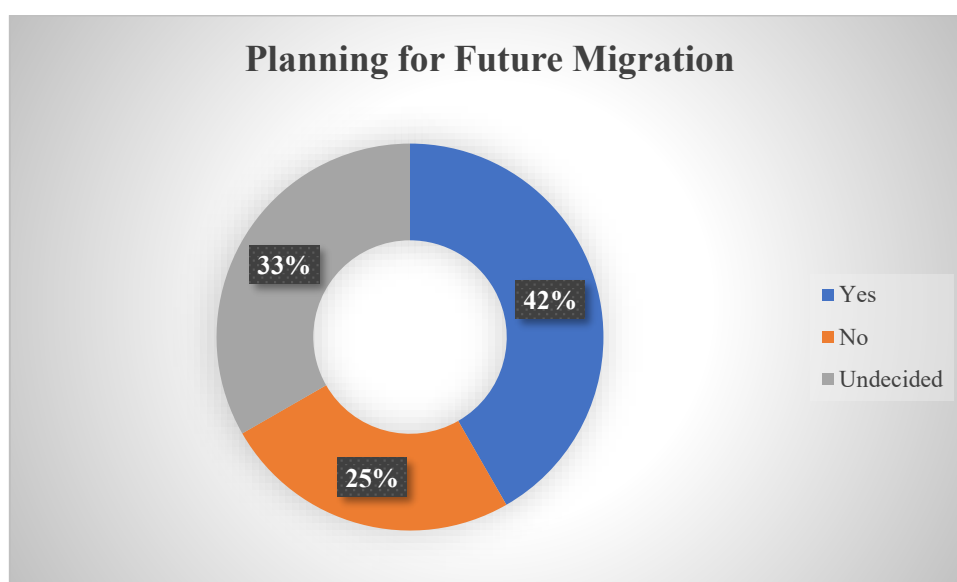


Nearly half of the population (41.7%) migrated due to environmental livelihood loss, showing a strong environmental push factor. A significant portion (29.2%) moved for better urban employment, highlighting economic aspirations. Education-related migration (16.6%) remains low but shows the presence of long-term strategic migration. Overall, environmental instability appears deeply intertwined with economic motivations.

**10. Are you planning future migration due to increasing river-related risks?**

Response	Frequency	Percentage
Yes	50	41.7%
No	30	25%
Undecided	40	33.3%

**Table 10: Planning for Future Migration**



**Figure 11: Planning for Future Migration**

Approximately 41.7% planning to migrate indicates rising uncertainty about future environmental risks. Many households anticipate worsening conditions due to increasing floods or erosion. The 33.3% undecided group reflects cautious consideration, perhaps due to financial or social constraints. Only 25% firmly intend to stay, suggesting that long-term demographic shifts may occur if environmental pressures intensify.

- Qualitative Data Analysis**

Theme	Description	Key Interview Indicators
Environmental Stress & Insecurity	Constant exposure to floods, erosion, saline intrusion	Fear of displacement, damaged houses, uncertainty
Livelihood Disruption	Declining agricultural/fishing income	Crop loss, reduced catch, daily-wage instability
Migration as Adaptation	Migration as coping or long-term strategy	Seasonal work, relocation of youth, remittances



Institutional Gaps	Insufficient protective measures and support	Weak embankments, delayed relief, lack of schemes
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**Table 11: Thematic Analysis**

The qualitative interviews were analyzed using a thematic analysis approach following familiarization, coding, categorization, and theme development. Interview transcripts were first read repeatedly to identify recurring patterns related to environmental stress and migration decisions. Initial codes such as “loss of land,” “fear of floods,” “unstable livelihood,” “seasonal migration,” and “lack of government support” were noted. These codes were then organized into broader categories reflecting household experiences, perceptions, and responses to river-induced disturbances. Through comparison and refinement, four major themes emerged that capture the interactions between environmental pressures and migration motivations. The first theme, Environmental Stress and Insecurity, reflects widespread anxiety about repeated flooding, erosion, and land loss. Respondents described the river as both a livelihood source and a constant threat. The second theme, Livelihood Disruption, highlights how agricultural loss, declining fish availability, and reduced income undermine household stability. Many participants linked their economic insecurity directly to environmental hazards. The third theme, Migration as Adaptation, shows how households increasingly perceive migration as a necessary coping strategy. Interviewees often framed migration as a temporary or seasonal measure initially but later becoming long-term due to persistent stress. The final theme, Institutional Gaps and Limited Support, captures perceptions of inadequate government intervention, delayed compensation, and poor embankment maintenance, which further push households toward migration. In summary, these themes indicate that migration in Purba Medinipur is not merely an economic choice but a complex response to intertwined environmental and institutional factors.

## 6. CONCLUSION

The findings of this study demonstrate that river systems play a critical role in shaping rural-urban migration patterns in Purba Medinipur. The quantitative data reveal a high degree of environmental vulnerability, with most households experiencing frequent flooding, riverbank erosion, and loss of agricultural land. These disruptions directly affect livelihood stability, particularly for communities dependent on agriculture and fishing, resulting in significant income loss for the majority of respondents. Consequently, migration emerges as a common household strategy, with more than half reporting that a family member has already moved to urban areas. The qualitative thematic analysis further strengthens these observations by showing that migration is not merely driven by economic aspirations but is significantly influenced by environmental insecurity, livelihood disruption, and inadequate institutional support. Repeated exposure to hazards, combined with delayed or insufficient government intervention, intensifies household uncertainty and pushes people toward temporary or permanent relocation. The study concludes that rural-urban migration in Purba Medinipur is best understood as an adaptive response to intertwined environmental and socio-economic pressures. As river-related risks continue to rise, future migration is likely to increase, as indicated by a substantial portion of respondents expressing intentions to move. Addressing this challenge will require stronger environmental management, livelihood diversification, and more responsive institutional support systems.

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