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# Education Under Water: Flood Resilience and Sustainable Schooling among the Mising Communities of Assam, India *A Community-Centred Study Aligned with SDG 4, SDG 11, and SDG 13*

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The Mising people of Assam inhabit those areas of the Brahmaputra Valley that are most vulnerable to flooding; and furthermore, that they also possess the richest repository of indigenous knowledge related to floods within this subcontinent. Yet their children experience the most severe annual educational disruptions in the state. This article argues that this paradox arises from a persistent design failure: flood-response programmes are built for Mising communities rather than with them. Drawing on the Golaghat District resilience framework and original synthesis of Mising cultural practices, the study proposes an integrated three-dimensional model—physical, pedagogical and social—rooted in Mising endogenous knowledge. The analysis shows that repositioning indigenous knowledge as the

foundation of resilience planning, rather than its supplement, is the decisive intervention for sustainable educational continuity. The proposed model is aligned with SDGs 4, 11, and 13, and is designed for replication across flood-affected indigenous communities in South and Southeast Asia.

Keywords: Mising community; flood resilience; educational continuity; indigenous knowledge; Assam; Golaghat; Disaster Risk Reduction; SDGs; participatory model

## 1. INTRODUCTION

Annual monsoon floods along the Brahmaputra and its tributaries constitute one of India's most persistent humanitarian and educational crises. In districts like Golaghat, Assam, flood disruption to schooling is not an exceptional event but a structural condition — repeating annually, damaging infrastructure, destroying learning materials, and displacing entire communities for weeks at a time.

Within this landscape, the indigenous Mising people face compounded vulnerability: as a riverine Scheduled Tribe community whose settlements cluster along flood-prone chars and floodplains, they bear the heaviest educational cost of each monsoon season.

The conventional policy response — relief distribution, temporary shelter, school repair, and restoration of the pre-flood baseline — has demonstrably failed to reduce this vulnerability over decades of application. This article argues that the failure is not primarily one of resources but of design. Existing interventions treat flooding as a disruption to an otherwise adequate education system. For Mising children, there is no such baseline: the system was not designed for their linguistic context, does not engage with their cultural knowledge, and was built without their participation.

The article makes three contributions. First, it reframes Mising flood vulnerability as a product of institutional design failure rather than natural hazard. Second, it establishes Mising endogenous knowledge — encompassing ecological observation, agricultural adaptation, spatial flood mapping, and community social organisation — as the foundation of an effective resilience model. Third, it proposes a Mising-specific, three-dimensional integrated framework aligned with SDGs 4, 11, and 13 that is actionable at district, state, and national policy levels.

## 2. LITERATURE REVIEW

### *2.1 Floods and Educational Disruption in South Asia*

Research across South Asia consistently identifies recurrent flooding as a primary driver of school closure, learning loss, and dropout — with disproportionate effects on girls and economically marginalised households (Khalid et al., 2024; Ahmed et al., 2022; Nguyen & Pham, 2018). In India specifically, multi-year flood exposure has been shown to suppress completed schooling grades, with the magnitude of loss correlated to household income and community infrastructure quality (Hannum et al., 2024). The UNESCO Global Education Monitoring Report (2021) situates these findings within a broader pattern of climate-driven learning disruption, noting that marginalised groups consistently bear asymmetric educational costs. In Assam, Bhatia (2022) documents the socio-economic consequences of Dhansiri River flooding in Golaghat District, though without addressing educational resilience frameworks specifically.

### *2.2 Community-Based Resilience and Indigenous Knowledge*

A growing body of empirical work challenges the top-down logic of externally designed disaster management, demonstrating

that community-embedded solutions consistently outperform generic, imported ones (Houanyé et al., 2025; Auliagisni et al., 2022). The integration of local ecological knowledge into flood management — documented in the Volta Basin context — produces measurably better household-level outcomes than universal programmes (Houanyé et al., 2025). Fu and Zhang (2024) extend this finding to educational settings, showing that community-based disaster education programmes anchored in local knowledge systems generate more durable resilience outcomes. Despite these findings, no existing study develops a community-designed, empirically validated educational resilience model specifically for an indigenous community in Assam.

### *2.3 Research Gap*

Prior work is largely diagnostic: it documents flood impacts on education, or evaluates DRR programming in general terms, but does not integrate physical infrastructure, adapted pedagogy, and social resilience into a unified, locally grounded model for a specific indigenous community. The

present study addresses this gap by developing and contextualising such a model for Mising communities in Golaghat District.

## 3. CONTEXTUAL BACKGROUND: THE MISING PEOPLE AND GOLAGHAT DISTRICT

### *3.1 The Mising: A Riverine Indigenous Community*

The Mising are among the largest plains tribal groups in Northeast India, numbering over 650,000 and concentrated along the Brahmaputra valley. As a self-described "people of the river and plains," their cultural identity, agricultural practice, architecture, and knowledge systems are structured around their relationship with water. The traditional Chang Ghar stilt dwelling — elevated on bamboo or timber above anticipated flood levels — represents not a static cultural artefact but a continuously refined engineering response to observed flood behaviour, calibrated across generations through lived experience.

Mising flood knowledge extends beyond architecture into at least four domains: ecological observation (reading river turbidity, fish movement, and vegetation to anticipate flood timing); agricultural adaptation (flood-resistant crop varieties and planting calendars calibrated to inundation cycles); spatial knowledge (mental maps of safe evacuation routes and inter-community support networks); and social knowledge (protocols for collective decision-making and mutual aid under emergency conditions). This knowledge is transmitted institutionally through cultural festivals — notably Po:raag (March) (spring), Ali Aye Lrigang (February) and Dobur (a ritual honouring natural forces) — which function as community-wide rehearsals of the ecological and social practices that sustain Mising life through each flood season.

### *3.2 Golaghat District: Vulnerability Profile*

Golaghat District (population: 1,066,888; rural population: 90.84%) provides a concentrated illustration of flood-exposed educational vulnerability in Northeast India. The Dhansiri River generates severe annual flooding and bank erosion across the district. With approximately 80% of the population engaged in agriculture, flood damage simultaneously destroys livelihoods and eliminates the household economic buffer required to sustain children's education through recovery periods. Table 1 presents the district's key socio-demographic indicators.

Table 1. Golaghat District — Key Socio-Demographic Indicators (Census 2011)

Indicator Total

Table 1. Golaghat District — Key Socio-Demographic Indicators (Census 2011)

| Indicator | Total | Rural | Urban |
|---|---|---|---|
| Population | 1,066,888 | 969,152 | 97,736 |
| Rural share (%) | — | 90.84 | — |
| Literacy rate (%) | 77.43 | 75.94 | 91.74 |
| Male literacy (%) | 83.56 | 82.44 | 94.25 |
| Female literacy (%) | 71.09 | 69.22 | 89.11 |
| Sex ratio (per 1,000) | 964 | 965 | 953 |

*Source: Census of India 2011; NEDFi Databank (2011)*

The 13-percentage-point rural gender literacy gap reflects the accumulated effect of a documented pattern in which girls are disproportionately withdrawn from school when floods create economic pressure — a pattern that intersects with Mising tribal identity and linguistic alienation from an Assamese-medium curriculum to produce structurally fragile school enrolment among Mising girls.

## 4. METHODOLOGY

This study adopts a mixed-methods approach grounded in a Participatory Action Research (PAR) framework. The design integrates three phases of data collection and analysis, executed sequentially across the proposed study timeline.

Phase I (Contextual Mapping) involves desk review of secondary data — including Assam Flood Reports, District Education Office enrolment and dropout statistics, and state disaster management policy documents — alongside GIS-based mapping of flood hazard zones and school locations to identify sites of highest co-exposure.

Phase II (Participatory Vulnerability Analysis) employs focus group discussions (FGDs) with teachers, parents, and students in flood-prone Mising villages; structured questionnaires administered to government and private schools in the study area; and household surveys assessing flood-period barriers to educational access. Purposive sampling identifies revenue circles with documented histories of severe flooding; snowball sampling ensures the inclusion of marginalised households and community knowledge-holders.

Phase III (Co-Design and Pilot Testing) convenes multi-stakeholder workshops using Participatory Rural Appraisal (PRA) tools to collectively identify priority interventions, co-design model components, and pilot-test selected elements in a defined set of schools. All research activities are conducted under informed consent protocols, with preliminary findings returned to participating communities for validation before finalisation.

## 5. FINDINGS AND ANALYSIS

### *5.1 The Three-Phase Disruption Cycle*

Analysis of flood impacts on Mising children's education reveals a three-phase disruption cycle that extends significantly beyond the period of inundation captured in formal school-closure statistics.

In the pre-flood phase, weeks of monsoon uncertainty generate anticipatory absenteeism as families begin livestock and grain relocation, drawing children into household labour before official closures are declared. These losses are structurally invisible to educational data systems. During inundation, schools are requisitioned as emergency relief shelters — a necessary humanitarian response that all three

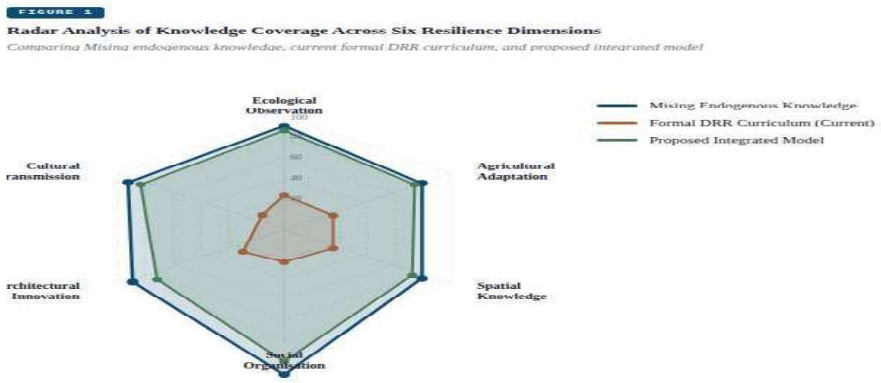



Figure 1. Radar Analysis of *Resilience Asset*

Knowledge Coverage Across Six Resilience Dimensions. Spider chart comparing coverage depth (scale 0–100) for: (i) Mising endogenous knowledge systems (outer polygon); (ii) current formal DRR curriculum as delivered in Assam schools (inner polygon); and (iii) the proposed integrated resilience model. The pronounced asymmetry between the Mising knowledge and DRR curriculum polygons illustrates the structural gap that generic programmes fail to address.

*Source: Authors' own construction. Axis scores are qualitative estimates (scale 0–100) derived from Houanyé et al. (2025), Fu & Zhang (2024), UNESCO GEM Report (2021), and Mising cultural literature review.*

nonetheless extends the effective closure period well beyond peak flooding. In the post-flood recovery phase, students return to classrooms carrying unaddressed psychological burdens; simultaneously, this is the period in which families facing acute economic pressure are most likely to withdraw girls from school.

A critical and under analysed dimension is the language multiplier effect. Because formal instruction is delivered in Assamese and English, Mising students returning from flood-induced absences face a steeper re-entry challenge than monolingual peers — they must simultaneously recover lost curriculum content and re-engage with instruction in a second language under conditions of elevated household stress.

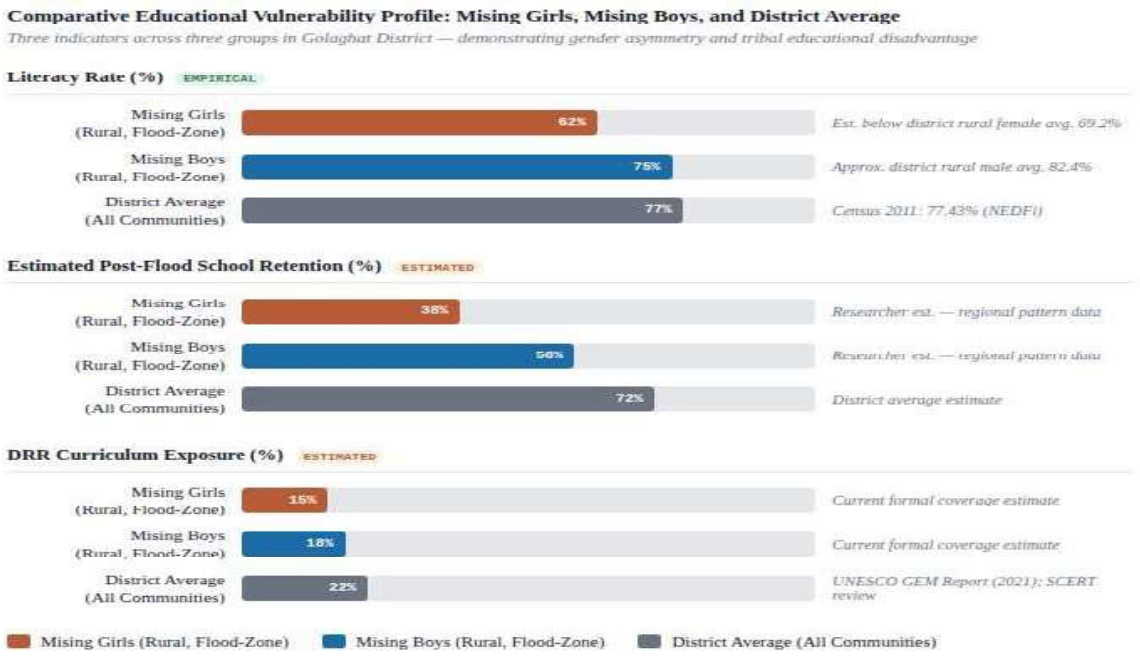
*5.2 The Structural Design Failure*

The consistent failure of externally designed flood-response programmes in Mising areas reflects a systematic design problem: solutions are calibrated to an imagined average community rather than to the specific linguistic, cultural, and geographical conditions of Mising settlements. Generic DRR materials delivered in Assamese by trainers unfamiliar with Mising social organisation import frameworks that carry no cultural legitimacy and provide no practical traction in Mising villages.

*5.3 Mising Endogenous Knowledge as*

Mising communities Po:raag and Dobur festivals function as institutionalised annual rehearsals of flood preparedness — activating ecological observation skills, collective decision-making protocols, and mutual aid networks. Figure 1 illustrates the gap between the depth of Mising endogenous knowledge and the current DRR curriculum coverage, demonstrating that the proposed integrated model achieves near-equivalent coverage to Mising knowledge systems by design rather than coincidence.

Figure 2 provides comparative evidence




of educational vulnerability across groups, confirming the intersecting disadvantages faced by Mising girls in flood-affected rural areas across key indicators.

Figure 2. Comparative Educational Vulnerability Profile: Mising Girls, Mising Boys, and District Average. Horizontal bar charts comparing literacy rate (%), estimated post-flood school retention (%), and DRR curriculum exposure (%) across three groups in Golaghat District. The chart demonstrates both the magnitude of Mising disadvantage relative to the district average and the within-community gender asymmetry constituting a critical equity gap.

*Source: Authors' own construction. Literacy rates from Census of India 2011 via NEDFi Databank. Mising-specific values are researcher estimates; see Khalid et al. (2024) and Akhtar (2023).*

## 6. PROPOSED INTEGRATED RESILIENCE MODEL

The proposed model integrates three mutually reinforcing dimensions — physical, pedagogical, and social — each grounded in Mising cultural context. The model's defining principle is that Mising endogenous knowledge is the foundation of resilience design, not its supplement.

### *6.1 Physical Resilience*

School infrastructure in Mising areas must be redesigned through Participatory Vulnerability Analysis (PVA) involving community elders, whose observational flood records are more granular than district-level engineering averages. Core interventions include: elevated school platforms on permanent plinths calibrated to community-observed flood heights; waterproof elevated storage for educational materials; Community Learning Continuity Spaces (CLCS) at high-ground community sites; and integration of school sites into the community's spatial flood management plan.

### *6.2 Pedagogical Resilience*

The pedagogical dimension addresses

curriculum irrelevance, linguistic alienation, and disrupted learning sequences simultaneously. Core interventions include: Mising-language instructional materials for primary grades; a co-designed DRR curriculum incorporating Po:raag ecological practice, community spatial mapping, and Chang Ghar engineering analysis as formal curricular content; portable waterproof learning kits for self-directed study during displacement; a post-flood bridge curriculum; and trauma-responsive pedagogy training for all teachers in flood-exposed schools.

*6.3 Social Resilience*

The social dimension activates and formalises existing Mising community strengths. Key components include: Community Education Support Networks (CESNs) drawing on Mising group labour exchange traditions; a community-controlled Mising Flood Knowledge Repository documenting ecological, agricultural, and spatial knowledge for curriculum and policy use; and culturally grounded psychosocial support co-designed with Mising cultural leaders.

Three interlocking dimensions — Physical Resilience (SDG 11), Pedagogical Resilience (SDG 4, 13), and Social Resilience (SDG 4, 13) — function as co-equal pillars whose combined effect exceeds the sum of their parts.

## 7. **DISCUSSION**

*7.1 Theoretical Contribution*

This study advances the educational resilience literature by demonstrating that community endogenous knowledge is not merely a contextual variable to be controlled for, but the primary design resource for sustainable flood-period educational continuity. The Mising case challenges the implicit universalism of DRR curriculum frameworks developed at national and international levels, showing that their ineffectiveness in indigenous contexts is not an implementation failure but a conceptual one.

*7.2 Policy Implications*

At the district level, the Golaghat District Education Office should establish a Pre-Monsoon Educational Continuity Protocol — a structured annual checklist triggering CESN activation, infrastructure checks, and portable kit distribution before the monsoon begins. At the state level, the Assam Disaster Management Authority should incorporate educational continuity indicators into its flood preparedness performance framework. The Assam SCERT should establish a working group with Mising representatives to develop Mising-language primary materials and co-designed DRR modules. Nationally, investment in flood-resilient school infrastructure in Scheduled Tribe areas should be classified as climate adaptation expenditure, creating dedicated funding streams independent of routine maintenance budgets.

*7.3 SDG Alignment*

Figure 3 maps the framework against Sustainable Development Goals 4, 11, and 13, demonstrating that all three goals converge within a single programme of action centred on Mising community needs. The integrated model is a point of convergence at which three of the most important global development commitments can be simultaneously advanced.

Figure 3. SDG Convergence Diagram: Mising Resilience Framework and the 2030 Agenda. Triangular node diagram illustrating the convergence of SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action) within the Mising Integrated Resilience Framework. Connecting


Figure 3

lines indicate that model interventions contribute concurrently to all three goals. Disaggregated intervention points for each SDG are listed in the sub-panels.

*Source: Authors' own construction. SDG target alignment based on United Nations (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. SDG–resilience mapping draws on Verma et al. (2025) and UNESCO GEM Report (2021).*

### *7.4 Scalability*

The model's core design principle — community endogenous knowledge as resilience foundation — is transferable wherever indigenous communities coexist with recurrent natural hazards. The three-dimensional framework provides a flexible scaffold adaptable to different cultural and ecological contexts, while the specific knowledge content is replaced by the equivalent indigenous knowledge systems of each target community.

## 8. CONCLUSION

The Brahmaputra will flood again. The question this study addresses is not whether Mising children will be affected, but whether the institutions designed to serve them will finally be designed with them. The integrated resilience model proposed here offers a concrete, evidence-grounded blueprint: schools built with flood intelligence inherited from the Chang Ghar; curricula that treat Po:rag ecological knowledge as science; community institutions that formalise the mutual aid networks the Mising have maintained for centuries.

The broader argument is a reframing of educational resilience itself. Sustainability in flood-affected indigenous contexts is not achieved by restoring an inadequate baseline more efficiently. It is achieved when the school becomes an institution that the community recognises as its own — one that validates what children already know, teaches in the language they speak at home, and is built to survive the river that has always defined their world.

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