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Wetland Conservation and Local Stakeholder Perception in the South-East Myllem Block, East Khasi Hills District, Meghalaya, India

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Abstract: Wetlands are among the most productive and most rapidly degrading ecosystems on earth, and in the hill states of north-east India small ponds, streams and riparian tracts sustain rural water security while remaining largely undocumented and outside formal protection. Because such wetlands lie on community-owned land, their fate depends less on statutory designation than on the knowledge, values and everyday practices of the people living beside them. This study assessed the distribution of wetlands and the perceptions of local stakeholders in the South-East Myllem Community and Rural Development block of East Khasi Hills district, Meghalaya. A mixed-methods design combined semi-structured interviews with approximately ten per cent of households across thirteen villages, sampled with the permission of village headmen, with field verification of existing and former wetland sites and GPS/GIS mapping of their locations. Ponds, streams and river reaches were recorded across three survey clusters. Awareness of wetlands and of their ecological importance was high (73–89 per cent), and support for their conservation was very high (86–96 per cent). Respondents identified land-use change, deforestation, urbanisation and pollution as the principal drivers of wetland decline, and reported dependence on wetlands for fishing, drinking water, agriculture and washing. Preference for community-led and tradition-based conservation, together with regulatory support, consistently outweighed preference for physical barriers such as fencing, and responsibility was seen as shared rather than governmental. Yet reported use of media as a source of conservation information was negligible (about one per cent), revealing a marked gap between awareness and action. The findings indicate that conservation in this landscape should build on customary institutions and community stewardship, strengthened by improved environmental communication, sustainable land-use regulation and coordinated government support.

Keywords: Wetlands; stakeholder perception; community-based conservation; traditional knowledge; ecosystem services; East Khasi Hills; Meghalaya.

I. INTRODUCTION

Wetlands are transitional zones between terrestrial and aquatic systems in which the water table stands at or near the surface for enough of the year to shape soil development and biota (Cowardin et al. 1979; Mitsch & Gosselink 2015). Despite occupying a small fraction of the earth's surface, they deliver a disproportionate share of ecosystem services: they regulate flow and recharge, mitigate floods, purify water, support biodiversity, and store carbon at densities comparable to forests (Millennium Ecosystem Assessment 2005; Bullock & Acreman 2003). Their role as carbon sinks has brought them into the centre of climate policy (Finlayson et al. 2019).

These functions notwithstanding, wetlands have long been treated as wastelands to be drained for agriculture and settlement, and they remain among the world's most threatened ecosystems. Global reviews identify agricultural conversion, urban expansion, pollution and climate change as the dominant drivers of loss (Ballut-Dajud et al. 2022; Xu et al. 2019). The Ramsar Convention on Wetlands (1971) provides the international framework for their conservation and wise use. India acceded in 1982 and now has one hundred Ramsar sites covering roughly 1.36 million hectares (Ramsar Convention Secretariat 2026); this designated area, however, represents only a small share of the country's total wetland extent, which the National Wetland Inventory and Assessment places at about 15.3 million hectares (SAC 2011). Ramsar designation confers international recognition rather than automatic domestic legal protection, and the great majority of Indian wetlands—particularly small, rural ones—fall outside both the Ramsar list and the Wetlands (Conservation and Management) Rules, 2017.

Rapid urban growth and unsustainable land use have driven substantial wetland degradation across India (Kokkal et al. 2008), and north-east India is no exception. In this region wetlands underpin fisheries, flood moderation and groundwater recharge (Debnath &

Yengkokpam 2024), yet the small ponds, springs and streams typical of the Meghalaya plateau are rarely inventoried. Meghalaya presents a distinctive governance context: most land is community- or clan-owned and administered through customary institutions such as the hima and the village durbar, so that formal state protection is weak while traditional stewardship remains locally significant. Community initiatives to revive village ponds and protect watersheds in East Khasi Hills illustrate the conservation potential of these institutions, even as piped supply, settlement expansion and septic seepage erode both the resource and its customary use.

Where wetlands lie on community land, their fate depends on how local people understand, value and use them. Studies elsewhere show that education, income dependence on wetland resources and cultural values jointly shape conservation behaviour (Dingha et al. 2025), and that durable outcomes rest on community-based management, policy integration and traditional knowledge (Kumari et al. 2020). Stakeholder perception is therefore not peripheral to wetland conservation in such settings; it is the operative variable. The South-East Myllem block, on the outskirts of the expanding Shillong urban agglomeration, is ecologically rich yet effectively unstudied in this respect.

This study was undertaken to (i) identify and map the wetlands of the South-East Myllem C&RD block; (ii) assess the extent and nature of human activities affecting them; and (iii) explore community perceptions, traditional knowledge and ongoing conservation initiatives relating to wetland management.

II. MATERIALS AND METHODS

A. Study Area

The study was conducted in the South-East Myllem Community and Rural Development (C&RD) block of East Khasi Hills district, Meghalaya. The block lies on the Shillong plateau immediately south-east of the state capital, within the upper catchment of the Uiam river system, at elevations broadly between about 1,100 and 1,900 m. The climate is sub-tropical monsoonal with very high seasonal rainfall, and the landscape is an undulating mosaic of settlement, cultivation, plantation, degraded grassland and remnant forest, including community-protected sacred groves. Wetlands in the block are small and dispersed: village ponds, spring-fed streams and short river reaches rather than the large lacustrine or floodplain systems that dominate the national wetland inventory. Thirteen villages were surveyed. For analysis these are treated as three clusters distinguished by their dominant wetland type (Table 1). The block's proximity to Shillong exposes it to peri-urban pressures—settlement expansion, quarrying, solid waste and wastewater—while land remains largely under community and clan tenure administered through customary institutions.

B. Sampling and data collection

A mixed-methods design combined quantitative and qualitative techniques to assess community knowledge, perception and the ecological condition of wetlands. Permission was obtained from the headman of each village before fieldwork. Semi-structured interviews were administered to approximately ten per cent of households in each selected village. Interviews were conducted face to face, lasted fifteen to thirty minutes, and combined guided and open-ended questions covering awareness of wetlands, perceived ecological importance, observed changes, perceived drivers of decline, patterns of household use and dependence, preferred conservation measures, attribution of responsibility, and sources of environmental information.

Field surveys were then carried out at both existing and former wetland sites identified by respondents. At each site, direct observation was recorded, geotagged photographs were taken, and coordinates were captured. Instruments comprised a GPS camera for geotagged imagery and the Geo Tracker application for coordinate capture; wetland locations and surveyed villages were subsequently mapped in ArcGIS. Interview responses were transcribed and compiled, and analysed descriptively in Microsoft Excel.

C. Data analysis and limitations

Responses were summarised as percentage frequencies within each survey cluster and are reported as such throughout Section 3. Because the household questionnaire was administered independently in each cluster, percentages are cluster-specific and are not pooled; comparisons across clusters are therefore indicative rather than statistical.

Where a question permitted more than one response, the reported shares represent the distribution of responses rather than of respondents. No inferential testing was performed, and the design does not support causal inference: the results describe stated perceptions at one point in time, not measured ecological change. Reported drivers of wetland decline are perceived drivers, and should be read as such.

Cluster	Villages surveyed	Wetland type	No. of villages
A	Mawnarian, Mawpynthih, Mawsing, Mawkhar	Pond	4
B	Umiew, Rangbihbih, Mawtharia, Mawbyinna, Umsaw, Rngi Shillong, Liewlong	River, stream, pond	7
C	Laitkor Nongdaneng, Rngi, Mawrie	Stream	3

Table 1. Survey clusters, villages and dominant wetland types in the South-East Myllem C&RD block. Rngi appears in both clusters B and C as reported in the field records.

III. RESULTS

A. Wetlands of the block

Wetlands recorded across the surveyed villages were uniformly small and locally managed. Cluster A comprised village ponds; cluster B contained a mixture of ponds, streams and river reaches; and cluster C was dominated by streams (Table 1). Field visits also documented former wetland sites—locations identified by residents as ponds or channels that no longer hold water—indicating that loss within living memory is a feature of the block. Because these systems are small, dispersed and situated on community land, none carries statutory wetland protection.

B. Awareness and support for conservation

Awareness of wetlands and their ecological importance was high across all clusters, and support for conservation was higher still (Table 2). In cluster A, 89 per cent of respondents were aware of wetlands and their importance, and 96 per cent supported their protection. In cluster B, 73 per cent were aware of wetlands and 78 per cent recognised their importance, while 22 per cent remained uncertain; 86 per cent nevertheless supported conservation. In cluster C, 93 per cent agreed that protection efforts should be undertaken. The consistent pattern—support exceeding awareness in every cluster—suggests a broadly favourable disposition towards conservation that does not depend on detailed ecological understanding.

Indicator	Cluster A	Cluster B	Cluster C
Aware of wetlands	89%	73%	—
Recognise ecological importance	89%	78%	—
Uncertain about importance	—	22%	—
Support wetland conservation	96%	86%	93%

Table 2. Awareness of, and support for, wetland conservation by survey cluster. Dashes indicate items not recorded for that cluster.

C. Perceived drivers of wetland decline

Respondents attributed wetland decline overwhelmingly to anthropogenic land-surface change rather than to direct exploitation of the water body (Table 3). In cluster B, land-use change (42 per cent) and deforestation (29 per cent) together accounted for the large majority of attributed causes, with pollution (14 per cent) and overfishing (8 per cent) recognised but not regarded as principal threats. In cluster C the burden was distributed almost evenly among deforestation (34 per cent), pollution (33 per cent) and urbanisation (33 per cent). Respondents in cluster C additionally identified everyday domestic use of streams for washing, with its associated contamination, as a contributing pressure (34 per cent), noting that such activities are integral to livelihoods yet accelerate degradation when unmanaged. These attributions align closely with the global evidence that land-use conversion, rather than in-situ resource extraction, is the dominant proximate cause of wetland loss (Ballut-Dajud et al. 2022).

Perceived driver	Cluster B	Cluster C
Land-use change	42%	—
Deforestation	29%	34%
Pollution	14%	33%
Urbanisation	—	33%
Overfishing	8%	—

Table 3. Perceived drivers of wetland decline, as a percentage of attributed causes within each cluster.

D. Household Dependence and wetland use

Wetlands in the block serve multiple livelihood functions simultaneously. In cluster B, respondents reported using wetlands for fishing (30 per cent), drinking water (25 per cent), agriculture (20 per cent) and a residual category of other ecological and cultural services (25 per cent) (Table 4). The prominence of drinking water and agriculture confirms that these are not amenity resources but working components of the household economy, while the sizeable “other” share indicates that cultural and regulating services are recognised alongside provisioning ones. In cluster C, streams were reported to be used routinely for washing (34 per cent), a use that is both a dependence and, as respondents themselves observed, a source of pollution.

Reported use	Share of responses	Service category
Fishing	30%	Provisioning
Drinking water	25%	Provisioning
Agriculture / irrigation	20%	Provisioning
Other (ecological, cultural)	25%	Regulating / cultural

Table 4. Reported household uses of wetlands, cluster B, classified against the Millennium Ecosystem Assessment (2005) service categories.

E. Preferred conservation measures and attribution of responsibility

Asked how wetlands should be protected, respondents favoured socially embedded instruments over physical ones (Table 5). In cluster A, traditional conservation practices (30 per cent) and strict rules (29 per cent) were the two leading preferences, followed by NGO involvement (22 per cent) and fencing (19 per cent). Cluster C showed the same ordering, with promotion of traditional conservation methods (34 per cent) marginally ahead of strict law enforcement (32 per cent). That fencing—the most tangible and capital-intensive option—ranked last is notable: respondents preferred community-derived and policy-backed solutions to concrete barriers. The same communitarian orientation appears in the attribution of responsibility. In cluster A, 33 per cent favoured collaboration with local communities and 31 per cent endorsed shared duty, while government (24 per cent) and NGOs (17 per cent) were seen as important but secondary. Across the block, respondents regarded wetland protection as a collective obligation rather than a service to be delivered by the state.

Item	Response	Cluster A	Cluster C
Preferred measure	Traditional practices	30%	34%
	Strict rules / enforcement	29%	32%
	NGO involvement	22%	—
	Fencing	19%	—
Responsibility	Collaboration with community	33%	—
	Shared duty	31%	—
	Government	24%	—
	NGOs	17%	—

Table 5. Preferred conservation measures and attribution of responsibility, by cluster.

F. Information channels and the awareness–action gap

Despite near-universal endorsement of conservation, respondents in cluster C reported negligible reliance on the media channels through which environmental information ordinarily circulates: social media, television news and newspapers were each cited by only about one per cent. The juxtaposition is the single most striking result of the study. Ninety-three per cent of the same respondents agreed that wetlands should be protected, yet almost none identified a channel through which conservation information reaches them, and specific measures such as strict enforcement (32 per cent) or promotion of traditional methods (34 per cent) commanded no clear majority. Support for conservation is therefore broad but unmobilised: it is not translated into agreed, specific action, and the deficiency appears to lie in communication infrastructure and access rather than in willingness.

IV. DISCUSSION

Three findings deserve emphasis. First, the communities of South-East Myllem are neither ignorant of wetlands nor indifferent to them. Awareness runs between 73 and 89 per cent and support for conservation between 86 and 96 per cent—figures that compare favourably with perception studies elsewhere in north-east India (Mahanta et al. 2020). Any assumption that rural wetland loss reflects a knowledge deficit is not supported here.

Second, respondents' causal model of wetland decline is broadly correct. They attribute loss principally to land-use change, deforestation and urbanisation, and only secondarily to pollution and overfishing—precisely the ordering established in global syntheses of wetland loss (Ballut-Dajud et al. 2022; Xu et al. 2019). This convergence between local and scientific understanding is itself a conservation asset, since it means that interventions addressing land-use change will be legible to, and endorsed by, the communities affected. It also locates the problem outside the wetland boundary: protecting these systems requires regulating what happens on the slopes and settlements around them, not merely enclosing the water.

Third, and most consequentially, there is a pronounced gap between awareness and action. Near-unanimous endorsement of protection coexists with negligible engagement with conservation information channels and with no settled agreement on which measures to adopt. This pattern—high latent support, low mobilisation—is characteristic of settings in which environmental communication is weak and enforcement is inconsistent. It cautions against interpreting favourable survey responses as evidence of an effective conservation regime. The clear preference for traditional practices and community collaboration over fencing and top-down provision is consistent with the wider literature on community-based wetland management (Kumari et al. 2020; Mahamuni 2024) and with Meghalaya's institutional reality, in which land is held communally and administered through customary bodies. Community-led revival of village ponds elsewhere in East Khasi Hills demonstrates that these institutions can deliver measurable ecological outcomes when supported. At the same time, the respondents' own diagnosis—that everyday washing and waste disposal degrade the streams on which they depend—illustrates the difficulty of relying on custom alone where peri-urban pressures have outpaced customary norms. What the data support is neither pure community management nor pure regulation, but the combination the respondents themselves endorse: tradition-based stewardship, backed by rules, with shared responsibility across community, state and civil society. Several limitations qualify these conclusions. The percentages reported are cluster-specific and descriptive, drawn from a ten per cent household sample without inferential testing; the study measures stated perception rather than observed ecological change; and the wetland inventory, though mapped, is not presented here as an area-based assessment. Repeat mapping against historical imagery, and quantification of water quality at the sites identified as degraded, would convert these perceptions into a measurable baseline.

V. CONCLUSION AND RECOMMENDATIONS

Wetlands in the South-East Myllem block are small, community-owned, ecologically significant and formally unprotected. The communities that live beside them are well informed, correctly identify land-use change and deforestation as the principal threats, depend on these systems for fishing, drinking water, agriculture and washing, and overwhelmingly support their conservation, preferring tradition-based and community-led approaches backed by rules over physical enclosure. Wetland loss here is thus not a failure of awareness or of will, but of mobilisation: support is broad, unfocused and poorly served by environmental communication, while enforcement of both statutory and customary norms is weak.

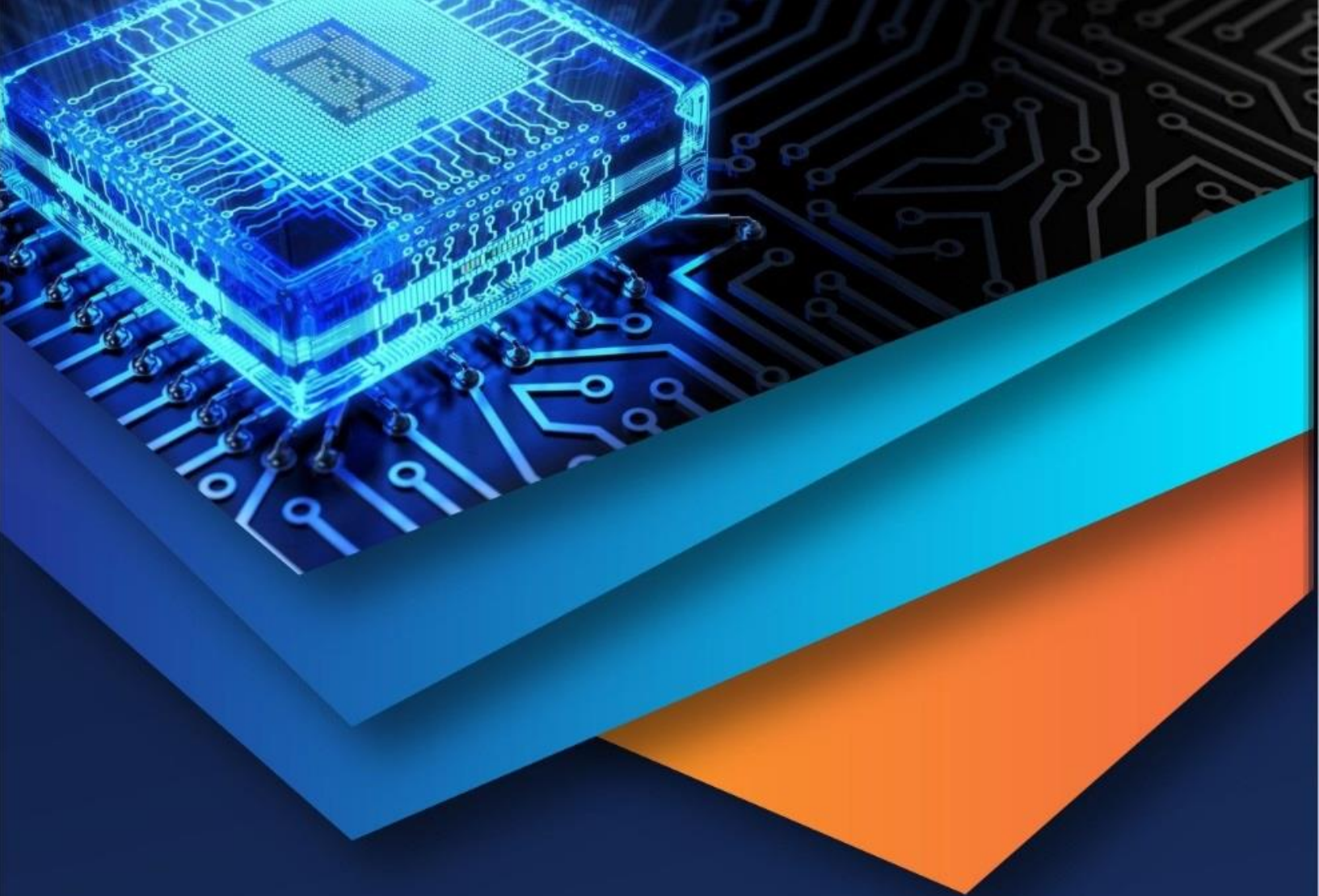
Four recommendations follow. First, environmental communication should be strengthened through channels that actually reach these villages—the durbar, schools and village institutions rather than mass media—so that latent support becomes specific action. Second, conservation should be built on the customary institutions the respondents already trust, formally recognising village-level stewardship of ponds and streams. Third, because the drivers lie outside the water body, sustainable land-use regulation covering deforestation, construction and waste disposal in wetland catchments is essential, coordinated between traditional bodies and the state. Fourth, the wetland inventory begun here should be extended into a monitored baseline, combining repeat GIS mapping with water-quality measurement, so that change can be detected rather than merely perceived. The block is ecologically rich and under-researched; documenting it now, while both the wetlands and the knowledge attached to them persist, offers the clearest route to conserving the ecosystems and the livelihoods that depend on them.

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