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Socio-economic survey of fishermen community and their utilization of fishing gears in the Pahumara River region of Bajali district, Assam, Northeast India

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Abstract
Assam is a home to a numerous number of rivers, floodplain wetlands, ponds and fishery resources. Fisheries provide livelihood to a large section of the rural population and income generation of this region. The present study is conducted to examine the socio-economic status of fishermen community of Pahumara River region of Bajali district, Assam, focusing on their dependence on traditional fishing gears. Data on income, education, housing and gear usage were collected through surveys and observation of 20 households belonging to two villages of this region. The findings reveal that while fishing is a primary livelihood, most families face economic hardship, low education levels and poor availability of essential amenities and public services. A range of indigenous gears like Maha Jaal, Dheki Jaal,Khoya etc reflects rich ecological knowledge. The study highlights the need for targeted support in skill development, infrastructure, and access to welfare schemes to improve their livelihoods sustainably.

Keywords: Pahumara river, fishing gears, socio-economic, data collection

1. Introduction
Northeast India, particularly Assam, is a hotspot of freshwater fish diversity, supported by the extensive Brahmaputra-Barak river systems and numerous wetlands, beels and ponds. Assam alone harbors over 200 indigenous and exotic fish species, including commercially important taxa such as *Labeo rohita, Catla catla*, and various Channa and Puntius species (Baruah *et al*., 2019) [1]. Fishing is deeply woven into the socio-cultural and economic fabric of the region. Approximately 90% of the ethnic communities across Northeast India consume fish as a dietary staple, and many practice artisanal fishing as a livelihood (Sugunan, 2001) [2]. Small-scale fishers, particularly in districts like Barpeta and Bajali, rely heavily on traditional knowledge and fishing techniques suited to local aquatic conditions. Indigenous Technical Knowledge (ITK) systems in aquaculture and capture fisheries—ranging from pond preparation to feed and disease management—have proven both effective and ecologically sustainable (Kalita *et al*., 2019) [3]. Community-based innovations, such as culture-based fisheries and pen culture, have significantly improved yields and income, especially among tribal and women-led cooperatives (Mrinmoy *et al*., 2019) [4].
Despite these strengths, Assam's fisheries face rising ecological threats, including climate variability, habitat degradation, and overuse of chemicals. Women contribute substantially to the fishery value chain yet often remain underrepresented in governance and resource access (Deepjyoti Baruah, 2015; ICSF, 2019-20) [5]. A holistic, inclusive approach—integrating ITK, cultural traditions, and modern science—is critical for sustainable fisheries management and the socio-economic upliftment of fishing communities.
The present study aims to make a preliminary assessment of the socio-economic condition of the fishermen community residing along the Pahumara River in the Bajali district of Assam. It also seeks to document the different types of fishing gears used by these fishermen and understand their usage patterns and cultural significance. This study is particularly important as no previous research or field survey has been conducted in this specific region focusing on these aspects. By shedding light on the livelihood conditions and traditional practices of the local fishing community, the study intends to fill an important knowledge gap and contribute

to the formulation of informed strategies for sustainable fisheries development and community welfare in the Pahumara River area.

2. Materials & Methodology
2.1 Study Area

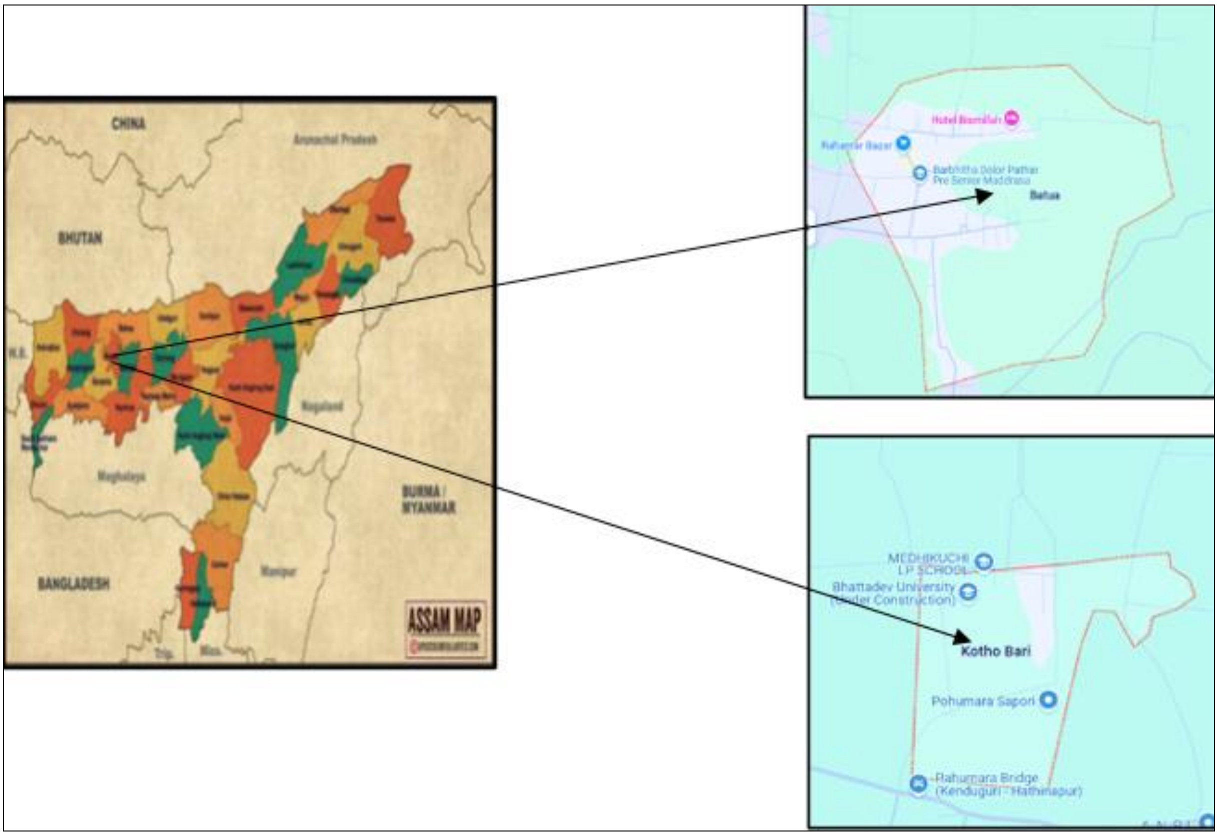


Fig 1: Images showing the map of Assam followed by the map of two villages i.e Batua and Kotho bari within the Pahumara region

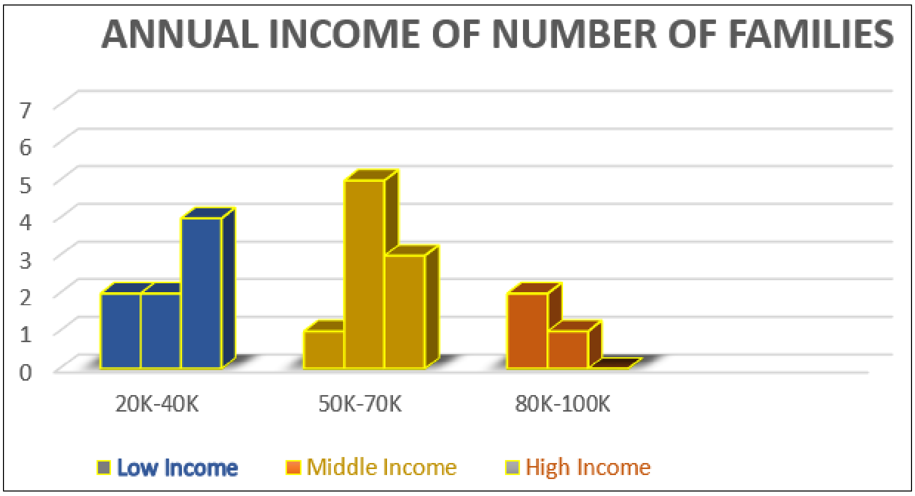
The present study was conducted for a period of seven months i.e from January, 2025 to July 2025 in two villages—Batua (26.3216° N, 90.9821° E) and Kotho Bari (26.5341° N, 91.1534° E)—located within the northern bank of the Pahumara River in the Sarupeta subdivision of Bajali district, Assam, India. Both villages are approximately 2 km from the river, which serves as a vital tributary of the Brahmaputra, supporting the region's hydrology, agriculture, and ecology.

In order to have an idea of the socio-economic condition of the fishermen of the area and also about the gears they use for fishing, data have been collected by personal interview method on the basis a pre-structured questionnaire. Random sampling method was followed to collect the required information. In addition, data and information was also obtained from several individuals connected with the fishers and personal field observation.

2.2 Data collection
Data were collected using questionnaire form where information such as Household Number, Household Owner Name, DOB, Age, Religion, Housing Condition, Family Composition, Education, Areas Of Engagement, Types of fishing gears used etc were included. Questionnaires were collected from 20 household owners of 20 families. The data were collected two times every month. Morning time was the best to meet the fishermen so the data collection was done in the morning.

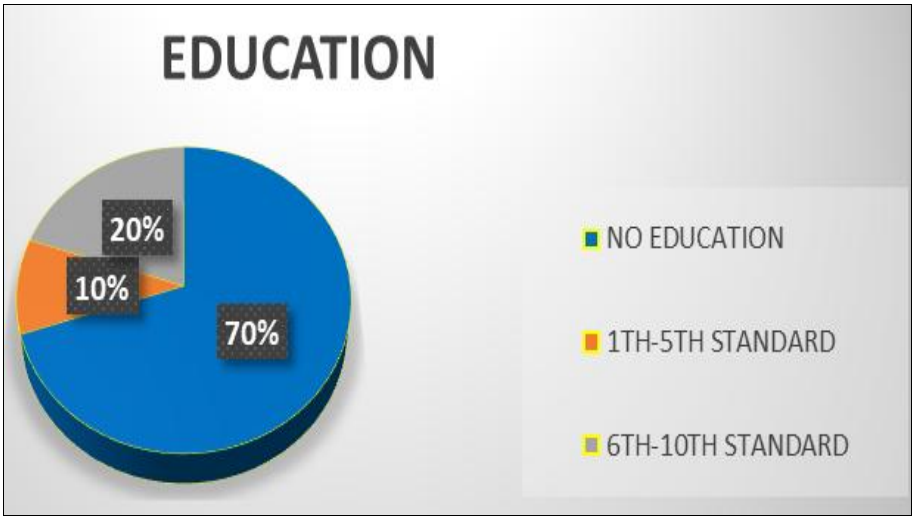
3. Results
To understand the livelihoods of traditional fishing communities, a field survey was conducted in Batua and Kotho Bari villages along the Pahumara River. The survey focused on aspects like income, education, housing, fishing gears, and fish species caught. These findings help assess their socio-economic status and support future development planning. The section below presents a comparative analysis of fishermen in both villages based on: i) Annual income ii) Education iii) Gender iv) Area of Engagement.

3.1 Annual income
In the survey it was found that out of 20 Families recorded 8 families have a annual income between 20K-40K, 9 families have a annual income between 50K-70K income and 3 families have a annual income between 80K-100K.



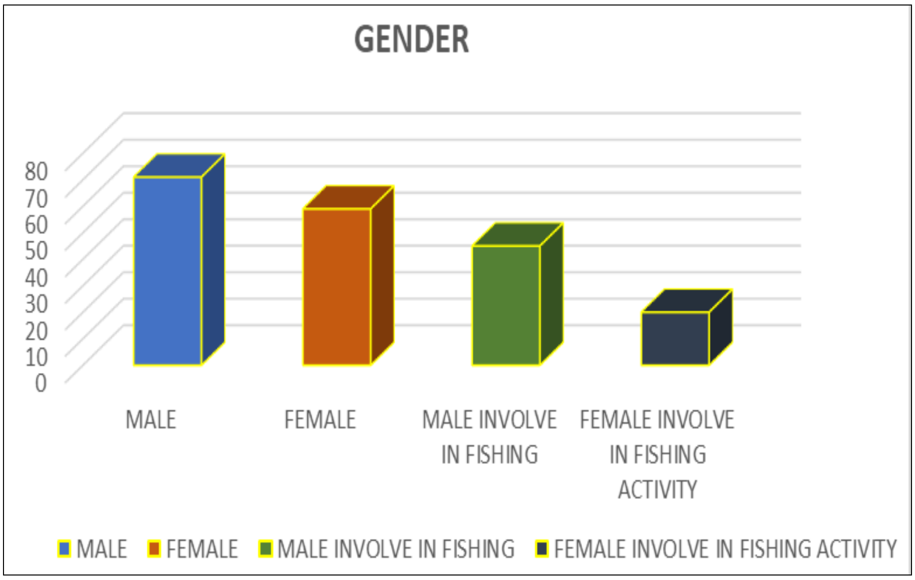
3.2 Education

Among the 20 families surveyed, 14 household heads (70%) had no formal education, 2 (10%) had completed primary education, and 4 (20%) had reached the secondary level. The low level of education is largely due to poor accessibility to educational institutions. Colleges are located 11-12 km away, and during the rainy season, the situation worsens as flooding from the Pahumara River damages roads and makes them slippery and unsafe. This creates major barriers for villagers, especially the younger generation, in pursuing higher education.

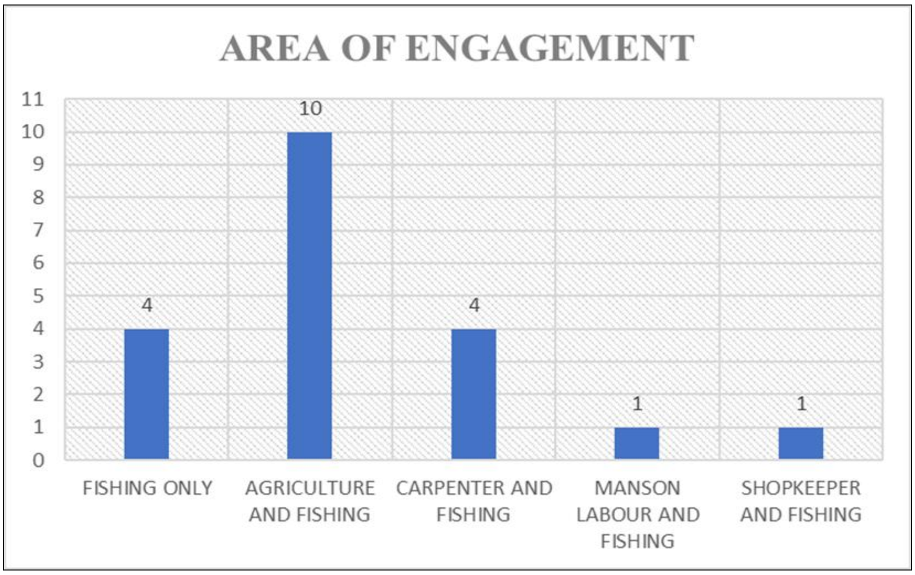


3.3 Gender

In the survey it was found out that out of 20 families (of 130 individuals) the ratio of men to women is 71:59. However the ratio of men to women that are indulge in fishing activity is 45:20.



3.4 Area of engagement
In the survey conducted in the two villages it was found that the household owners of the 20 families are not only involved in fishing but also in different area of work. 10 household owner are involved in both agriculture, 4 household owner works as carpenter, 1 household owner works as manson labour, 1 household owner is a shopkeeper and the 4 household owners are involved only in fishing activity.



3.5 Fishing Gears
The survey carried out in Batua and Kotho Bari Village indicated that the local fishing community people relies on fourteen distinct types of fishing gear, which include various forms of nets, hooks, and bamboo traps. These tools are predominantly traditional and locally made, differing in size, design, mode of use and effectiveness.

Table 1: Different fishing gears used by the fishermen and their utility

Sl. No.	Gear name (local name)	Gear type	Main fishes caught	No. of person operating the gears	Time period of gear operation	Cost of fabrication in (Rs.)	Total income from the gear (Rs.) Per year
1.	Dheki Jaal	Lift net	Small to medium	9	At night/day	800-2000	25000-30000
2.	Maha Jaal/Ber Jaal	Drag net	All kind of fishes	8	At night/day (8hrs)	2000-5000	≈70000
3.	Langi Jaal	Cast net	Small to medium	7	At night/day	500-1500	30000-40000
4.	Sewali jaal/ Falon jaal	Fixed net	Small to medium	7	Night/Day	600-1200	20000-40000
5.	Fesi jaal/Moshari jaal	Gill net	Medium to Large	6	Day/ Night	400-900	35000-45000
6.	Haath jaal/Porongi jaal	Hand net	Small to medium	5	Day/Night	700-1500	20000-30000
7.	Khoya	Trap Net	Small to medium	4	Day	300-500	15000-20000
8.	Barasi	Hook and lines	All kinds of fishes	15	Day	200-400	25000-35000
9.	Juluki	Small basket trap	Small size	7	Day/Night	200-300	10000-20000
10.	Bana	Barrier trap/Fence	Medium to large	13	Day	1500-2000	1000-2000
11.	Chepa	Winding roller(Trap)	Small to medium	8	Day	2000-2500	≈30000
12.	Jakhoi	Scooping gear	Small to medium	12	Day	1000-1500	≈25000
13.	Khuka	Trap gear	Small	7	Day	100-200	≈20000
14.	Hufa	Trap gear	Small to medium	9	Day	250-500	15000

4. Discussion
The present study offers critical insights into the socio-economic status, livelihood patterns, and fishing practices of the fishermen community residing along the Pahumara River in the Bajali district of Assam. It reveals that out of 20 surveyed families, 8 earn an annual income between ₹20,000-₹40,000, 9 between ₹50,000-₹70,000, and only 3 between ₹80,000-₹100,000. Such low and varied income levels underscore the economic vulnerability of riverine fishing communities in small inland ecosystems, a finding consistent with studies by (Natarajan *et al.,* 1969) [6] and (*Sarkar et al*., 2018) [7], who noted that small-scale inland fishers across India often live close to the poverty line.

Educational attainment among the surveyed households was notably low. Of the 20 household heads, 70% had no formal education, while only 20% had reached the secondary level. Geographic isolation and poor infrastructure were major barriers. During the monsoon, flooded and damaged roads due to the overflowing Pahumara River make educational institutions nearly inaccessible, especially since the nearest colleges are located 11-12 km away. This situation mirrors observations in similar rural communities where physical inaccessibility limits educational progression (Mishra *et al*., 2014) [8].

In total, the 20 families comprised 130 individuals, with a male-to-female ratio of 71:59. However, involvement in fishing activities was skewed—45 men versus only 20 women were directly engaged. This gendered division of labor aligns with findings by which highlight that although women are less visible in active capture fisheries, they play crucial roles in pre- and post-harvest operations like net preparation, fish sorting, drying, and marketing.

The occupational pattern among these fishermen also reflects income diversification, a key strategy for resilience in river-

based rural communities. Of the 20 household heads, only 4 were exclusively dependent on fishing. Ten practiced both fishing and agriculture, four were carpenters, one worked as a mason laborer, and one was a shopkeeper. Similar patterns have been observed in other riverine and wetland systems in Assam and West Bengal, where fishing is seasonal and secondary occupations are essential (Hazarika *et al*., 2018) [9].
In terms of fishing practices, a range of traditional and semi-mechanized fishing gears were recorded in use:

- Gill nets (Phansijal) - commonly used in deeper waters for species like Labeo rohita and Cirrhinus mrigala.
- Cast nets (Jhaki jal) - thrown manually in shallow or moderately deep water.
- Drag nets (Ber jal) - used by groups to encircle fish in shallow areas.
- Hook and line (Borsi) - used for targeted fishing, especially for carnivorous species.
- Bamboo traps (Jakoi, Polo) - used in stagnant or slow-flowing waters.

These gears reflect the integration of indigenous knowledge systems with environmental rhythms, a pattern also highlighted in (Vass *et al*. 2010) [10]. The selection and deployment of gears vary seasonally and are often influenced by water levels, fish behavior, and flood patterns.
Unlike larger rivers such as the Brahmaputra, the Pahumara River has received little scholarly attention. No previous socio-economic or fishing gear-specific studies were found in literature pertaining directly to this area, making this survey the first of its kind. As such, it establishes an important baseline and contributes to a growing understanding of small-scale inland fisheries in under-documented regions of Assam. The findings can help inform localized policy interventions for sustainable fisheries management and rural development, in line with recommendations by (Baruah *et al*. 2019) [1].

5. Conclusion
This study reveals that the fishermen residing near the Pahumara River in Bajali district of Assam live in close harmony with their natural environment, relying heavily on traditional fishing practices passed down through generations. Their use of a wide variety of indigenous fishing gears such as Maha Jaal, Dheki Jaal, Fesi Jaal, and Khoya reflects a deep understanding of seasonal cycles, water behavior, and fish ecology. However, despite this rich ecological knowledge and cultural heritage, the socio-economic conditions of these communities remain precarious.
Most of the fishermen face challenges such as low and unstable income, limited education, poor health and sanitation facilities, and lack of access to modern infrastructure or government schemes. Fishing continues to be the primary livelihood for many, yet their dependence on natural water bodies makes them vulnerable to seasonal changes and environmental degradation.
To uplift these communities, it is essential to implement integrated development strategies that combine traditional wisdom with modern advancements. This includes promoting skill development, better market access, infrastructure support, healthcare, education, and awareness of welfare schemes. Sustainable gear modernization and eco-friendly fishing practices must also be encouraged to preserve the river's biodiversity while improving catch efficiency.
In essence, the well-being of the fishermen is deeply tied to the health of the river. Therefore, any developmental approach must balance ecological sustainability with socio-economic progress. This study serves as a crucial foundation for future research and policy-making aimed at empowering inland fishing communities and ensuring a more secure and dignified livelihood for them.

Fig 2: Images of some fishing gears used by the fishermen community of Pahumara River region

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