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Sustainable Fisheries Governance in Assam: Protecting Traditional Fishing Communities and Indigenous Rights

Abstract

The traditional fishing communities of Assam —comprising indigenous, scheduled caste, and other marginalised groups—have long depended on the state's rich aquatic ecosystems for livelihoods, cultural identity, and ecological stewardship. However, rapid developmental interventions, hydrological disruptions, lease-based privatisation, and weak legal recognition have endangered their customary rights and socio-economic well-being. Based on the secondary sources of information, this study critically examines the status of traditional fishers in Assam, emphasising their ecological knowledge systems, community-based management practices, and the growing threats they face. The study identifies a wide range of governance-related issues, including fragmented institutional regulation, exclusions through the lease system, the absence of legal frameworks, and socio-economic vulnerabilities arising from caste and gender issues, as well as policy gaps. The communities themselves have responded to these issues through adaptive practices such as cooperative formation, seasonal bans, and diagnostics. The study advocates for rights-based and participatory fisheries governance, involving legally recognised customs of tenure, the integration of fisheries into the work of all relevant agencies, and the strengthening of fisher cooperatives through training and inclusive development policies. The recommendations include reforming the lease system to give greater preference to traditional users, incorporating Indigenous Ecological Knowledge (IEK) into conservation policies, and improving data systems to enable informed governance. By prioritising the rights and roles of traditional fishers, Assam would be able to have its inland fisheries governance aligned with Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 14 (Life Below Water) and SDG 10 (Reduced Inequality), which would be consistent with themes of ecological sustainability and social equity.

Abdul Wakil Ali

Department of Economics, Pandit Deendayal Upadhyaya Govt. Model College, Assam, India

Email: abdulwakil222@gmail.com

Corresponding Author*: Abdul Wakil Ali

Email of Corresponding Author*: abdulwakil222@gmail.com

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1. Introduction

Assam, a northeastern state of India, is endowed with rich aquatic ecosystems comprising the Brahmaputra and Barak River basins, wetlands (bells), floodplains, and seasonal water bodies that serve as vital lifelines for thousands of traditional and Indigenous fishing communities. These communities, including the Kaibartas, Maimal, and other Scheduled Tribes and backwards castes, have relied on riverine and inland fisheries for generations, not only as a source of sustenance and income but also as a deeply embedded cultural and spiritual practice (Baruah, 2020).

In recent decades, the rapid expansion of developmental activities, construction of embankments and hydropower dams, overexploitation of fish stocks, and the privatisation of fisheries under leasehold systems have disrupted traditional rights and access. At the same time, the lack of formal recognition for indigenous fishing practices and customary tenure arrangements has exacerbated marginalisation and led to socio-economic vulnerability (Nayak, 2014; Das & Saha, 2021).

On 25th September 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, comprising 17 Sustainable Development Goals (SDGs), 169 targets, and 304 indicators. As a signatory, India committed to this global agenda, and the Government of Assam launched its state-level initiative, "Assam-2030 in light of SDGs," effective from 1st January 2016. Recognising the vital contribution of fisheries to socio-economic development, the Department of Fisheries, Govt. of Assam, seeks to align its initiatives with the SDGs. Given that over 95% of the state's population consumes fish, the sector holds significant promise for advancing SDG 1 (No Poverty), SDG 10 (Reduced Inequality) and SDG 14 (Life Below Water). The sector can play a transformative role by promoting community-based development and strengthening rural livelihoods. Protecting traditional fishers' rights and knowledge systems is essential for achieving social equity and ecological sustainability. The intersection of indigenous rights, environmental justice, and participatory governance forms a critical area of inquiry. Therefore, "Sustainable Fisheries Governance in Assam: Protecting Traditional Fishing Communities and Indigenous Rights" is adopted. To achieve the overall aim of the study, the research seeks to assess the socio-ecological significance and present status of traditional fishing communities in Assam, examine the major threats to customary

tenure systems and indigenous fishing rights, and evaluate the existing fisheries governance framework in the state in relation to the Sustainable Development Goals (SDGs).

2. Methodology

This study utilizes a qualitative, desk-based research design grounded in secondary data analysis to explore the socio-ecological significance, livelihood vulnerabilities, and governance issues that traditional fishing communities in Assam face. The interpretative research aims to synthesize existing knowledge to evaluate the policy implications of existing frameworks with respect to Sustainable Development Goals.

The data required for this study have been collected from a large number of credible secondary sources, including government publications from the Directorate of Fisheries, Assam (2023), the Statistical Handbook of Assam (2019), Handbook on Fisheries Statistics (2020) and reports of national and international agencies like the FAO and CIFRI. For contextualizing the indigenous fishing practices, tenure systems and socio-environmental transformations, peer-reviewed journal articles, policy documents and academic monographs were consulted.

Aspects of quantitative information, like fish production at the level of district, availability, and per capita consumption of fish were analysed by means of descriptive statistics for the identification of inter-district inequalities to assess resource accessibility, while qualitative aspects were analysed by means of thematic analysis to trace related discourses on aspects of customary rights, ecological degradation and institutional exclusion.

The research design does not include a field component of empirical investigation, but rather lays emphasis on methodological triangulation to be expressed in the use of various credible secondary sources of information in order to raise validity and reliability of the study. While this entails, as a detriment, a shortage of the presentation of lived experience and other micro-level considerations of community dynamics, the virtue of this research has been the provision of a macro-level analysis, as thorough as possible then, of the structural issues to be confronted by traditional fishers.

3. Overview of Fishing Sector in Assam

Fish is an important food source, accounting for nearly one-fifth of global animal protein intake. Fishing provides a livelihood for millions of people, as well as providing valuable foreign exchange earnings to the country. It is a highly perishable food that requires proper

handling, processing and distribution. Fisheries are considered next to the agriculture sector for employment opportunities and food supply. Fish is a vital source of quality protein and is cheaper than other animal protein sources. Around 35% of the people in India are fish eaters, and the per capita consumption is 9.8 kg, while the recommended intake is 13 kg (Manual on Fishery Statistics, CSO-MFS-2011). There are two Prime sectors in fisheries: marine fisheries and inland fisheries. Both sectors play an important role in the Indian economy. Inland fisheries are prime in the Indian economy, specifically in Assam. The Inland fishery resources of Assam can be classified under three broad categories: Capture fishery: Refers to riverine fishery; Culture fishery (aquaculture): It includes ponds and tanks, and integrated culture systems; and Culture-based fishery: It includes beel fisheries, reservoir fisheries, and swamps and low-lying areas. It provides employment and livelihood for fisher communities who solely depend on it. Fisheries are a renewable natural resource, subject to their dynamics, acted upon by various anthropogenic forces. Fishery sector contribution to the Gross Value Added (GVA) for 2016-17 at current price in India is 0.96% and its contribution to the agriculture sector is 5.37% (Handbook on Fisheries Statistics, 2018).

Table 1: State water resources

Resources	Numbers	Water Spread Area (in hectares)
Beels /Ox-bow lakes	Registered: 430	60215
	Unregistered: 767	40600
Forest Fisheries	71	5017
Derelict water bodies/ swamps/low-lying	3882	116444
Reservoir fisheries	2	2553
Individual Ponds	369304	56566
Community Tank	6328	5152
Total Hectares		286547

Source: Directorate of fisheries, Govt. of Assam

Table 1 presents a detailed categorization of these water bodies along with their respective numbers and water spread areas in hectares. A significant portion of Assam's inland water resources comprises beels and ox-bow lakes, with 430 registered and 767 unregistered beels

covering water spread areas of 60,215 and 40,600 hectares, respectively. Beels are floodplain wetlands that are seasonally connected to river systems, playing a crucial ecological and economic role in rural livelihoods (Baruah et al., 2020). Their productivity and biodiversity make them essential to artisanal and small-scale fisheries in the state.

Forest fisheries, generally located within forested wetland ecosystems, are fewer in number (71) and account for 5,017 hectares. In contrast, derelict water bodies, including swamps and low-lying areas, represent the largest category by area, totaling 116,444 hectares across 3,882 units. These underutilized or neglected water bodies hold significant potential for aquaculture development through scientific intervention (Dey et al., 2016).

In Assam, the reservoir fisheries make very little contribution, as only two reservoirs have been recognised which contribute 2,553 hectares of area. However, the reservoirs provide ample scope for the extension of cage and pen culture technology (Katiha et al., 2005). The only number of ponds dominates as number of units, which are to the tune of 369,304 number covering 56,566 hectares of area, indicate that very much of the consumption-cum-production takes place at household level fish culture in rural areas. The community tanks also number 6,328 units and add to geographical extent of 5,152 hectares with village institutions or cooperative societies managing them. The total area of inland water resources in Assam is to the tune of 286,547 hectares. Thus, the inland water resources possess immense potential for enhancement of fish production and sustainable means of livelihood. Many of these resources have been, however, underutilised due to various factors such as siltation, encroachment, institutional support not being accorded (Department of Fisheries, Assam, 2023).

Fishery plays an important role in the economic development of the Assam. It also plays a significant role in income and employment generation throughout the state. Assam abounds in aquatic resources necessary for development of fisheries. The two main rivers Brahmaputra and the Barak along with their 53 tributaries and numerous floodplain lakes (beels) and ponds constitute traditional sources of fishing in the State. The undulating topography and high rainfall has given rise to vast and varied fisheries resources. Rice and fish are the two basic items in the diet of the Assamese people. About 88.5% of household in Assam eat fish (Statistical Handbook Assam, 2019).

Table2: District-Wise Per Capita Requirement of Fish in Assam.

(In Kg)

District	Requirement District wise per annum	Fish Production	Availability of Fish	Per Capita Consumption
Kokrajhar	14929830	8553890	8779720	8.82
Dhubri	23462220	13599490	12662920	8.1
Goalpara	16966845	9830110	9682050	8.56
Barpeta	23037090	18708120	18728320	12.19
Morigaon	16112580	24044070	24046450	22.39
Nagaon	31849950	56524560	52066560	24.52
Sonitpur	22073385	14903620	15352870	10.43
Lakhimpur	17538210	19424100	19363960	16.56
Dhemaji	11547015	9107010	10697250	13.95
Tinsukia	22347870	18730000	18833600	12.64
Dibrugarh	22321035	15639120	17868720	12.01
Sivasagar	11653095	23655690	24070390	30.98
Jorhat	15566115	10390360	11141610	10.74
Golaghat	17954790	7101000	8526750	7.12
Karbi Anglong	11123280	6145140	6569480	8.86
Dima Hasao	3603150	370730	427840	1.78
Cachar	29225700	40001040	40731040	20.91
Sribhumi	20677695	19060120	20398040	14.8
Hailakandi	11095380	20649790	20651960	27.92
Bongaigaon	12433425	15729850	15910800	19.2
Chirang	8114355	1348190	1372360	2.54
Kamrup	25538895	19602600	20411990	11.99
Kamrup Metro	21102645	6508870	7680080	5.46
Nalbari	12985995	12995620	13096650	15.13
Baksa	15988935	10082490	10149640	9.52
Darrang	15625845	16874810	17052810	16.37
Udalguri	13996275	7315910	7408910	7.94
Biswanath	10307685	5968610	7145090	10.4
Charaideo	7718100	9070140	9748390	18.95
Hojai	15671580	15327600	13802350	13.21
Majuli	2815605	4863940	4889770	26.05
South Salmara	9342075	7510510	6409000	10.29
W. K. Anglong	4970595	927650	1682040	5.08
Bajali	5465100	3060310	3095220	8.5

Assam	525162345	473625060	480454630	13.26
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N.B.: Required calculated on the basis of nutritional requirement @15 Kg per capita per annum. Projected population 2023 is use for per capita consumption in Assam

Source: (Table 8.01 to 8.09) Directorate of Fisheries, Assam.

The data on requirements, production, availability and per capita consumption of fish obtained from table 2 related to the districts of Assam for the year 2023, is based on projected populations and the nutritional criterion of 15 kg of fish per capita per year. These statistics collected from Directorate of Fisheries, Assam (Table 8.01 to 8.09) show that there are very marked regional differences in respect to both the production of fish and the consumption of this commodity, both in respect of the self-sufficiency and deficiency of the various districts. The fish requirement figures are calculated on the basis of per capita nutritional requirement of fish of 15 kg. (i.e. 33.072 lb.) a year. For instance, Nagaon requires nearly approximately 31.85 million kg. of fish and produces (from Table. 8.02) about 56.52 million kg. of fish, while the per capita availability of fish is 24.52 kg. (approx. 54,0492 lb.) for the province, (i.e. fish availability per caput in Nagaon is exceedingly more than the nutritional standard) suggesting surplus condition. The districts of Morigaon and Sivasagar shows exceedingly high per Capita availability of fish, viz. 22.39 kg. (app. 49.227 lb.) and 30.98 kg. respectively, testifying to the fact that these districts are important fish producing areas. The districts on the other hand like Dima Hasao (1.78 kg.) Chirang (2.54 kg.) and Kamrup Metro (5.46 kg.) show comparatively poor per capita availability of fish. This would suggest that either such districts must be dependent on imports or else that aquaculture has not developed in these areas to any appreciable extent. The district of Kamrup Metro which in spite of being a metropolitan and therefore a highly economically important district has, however a per capita fish consumption which is considerably low from the point of view of the nutritional requirement (FAO, 2020) it is noteworthy to add, may be on account of inability of supplying fish through urban food systems. The aggregate state figure shows moreover that, about 525.16 million kg. of fish is available for total annual requirement in the state of Assam while total production is only to the extent of 473.63 million kg. The availability (480.45 million kg.) is apparently even a little more than production, which may be on account of imports of fish or of the stock carried over, but the average per capita consumption figure, i.e. 13.267 kg. is lower than the given nutritional standard fish requirement of 15 kg. The gap between production and consumption in the state is thus apparent from the above statistics and calls for remedial measures in the direction of production of fish and development of inland

fisheries infrastructure in backward districts (Baruah & Goswami, 2019) in Assam the qualitative deficiency of fish in those areas, where their percapita fish availability shows a very low figure is also an indication that corrective measures have to be taken in that direction too. The spatial variation which is visible in these district wise fish statistics will call for a rethinking on policy and evaluation of this policy where by its success or failure can be measured. A district wise approach is a must here. The development of hatcheries in deficit districts, appropriate (proper) cold-storage and cold-chain infrastructure and good marketing structures to ameliorate or reduce the costs to consumers in such deficit areas are necessary. This can also be undertaken by adopting a new policy for surplus areas, such type of intra-district co-operative marketing and development in regard to linkages in the value chain for surplus areas can also be adequately provided. (Planning Commission, 2012; NFDB, 2021).

4. Traditional Fishing Communities in Assam

Assam, with its extensive network of rivers, wetlands, floodplains, and ox-bow lakes, supports a significant population engaged in inland fisheries. According to the Department of Fisheries, Assam (2023), the state possesses approximately 286,547 hectares of inland water resources, including over 369,000 individual ponds, 1,197 registered and unregistered beels, 3,882 derelict water bodies, and 6,328 community tanks. These aquatic systems have historically formed the lifeline of traditional fishing communities, predominantly comprising Scheduled Castes such as the Kaibarta, Jhalo Malo, and Namasudras, alongside various Indigenous and Other Backward Classes (Baruah, 2020; Deka, 2016).

The livelihood dependency on these resources is immense. As per the Handbook of Fisheries Statistics (2020) published by the Ministry of Fisheries, Government of India, over 3.5 lakh (350,000) individuals in Assam are directly engaged in capture and culture fisheries. A large proportion of these are traditional fishers, with nearly 65% of fisher households belonging to marginalized caste and tribal groups (Sarma & Goswami, 2017). These communities have relied on fishing as a hereditary occupation, supported by indigenous ecological knowledge, seasonal migratory practices, and communal access to water bodies.

Traditional fishing communities possess a rich corpus of indigenous technical knowledge (ITK), including selective gear usage (e.g., *jakoi*, *chepa*, *barjal*), understanding of fish breeding seasons, water level cycles, and species behaviour. These practices are eco-friendly, low-cost, and closely aligned with the natural hydrology of Assam's rivers and wetlands

(Dutta, 2021). Studies show that in wetland areas like the Deepor Beel or Haram Beel, nearly 80% of the fish catch still comes from traditional methods (Nayak & Berkes, 2010), reflecting the resilience of these systems despite technological changes.

However, the traditional rights and practices of these communities face increasing threats. One major institutional constraint is the lease-based fishery management system, where state-owned water bodies are leased out for fixed terms. Although intended to regulate resource use, this system often excludes traditional fishers. Research indicates that in districts like Barpeta and Nalbari, over 70% of leased beels are controlled by politically connected elites or non-local contractors (Deka, 2016). As a result, only 30–35% of traditional fisher families report secure and continuous access to fishing sites (Dutta, 2021).

Hydrological disruptions caused by embankments, dams (such as the Subansiri Lower Hydroelectric Project), and flood control interventions have further degraded fish habitats and disrupted migratory routes. The Central Inland Fisheries Research Institute (CIFRI) reports a 25% decline in wetland fish productivity in the Brahmaputra floodplains over the past two decades. In addition, climate change has contributed to increased unpredictability in flood timing and intensity, further reducing fish catch and affecting livelihoods (Sharma et al., 2022).

The socio-economic status of traditional fishers remains precarious. Data from the National Sample Survey Office (NSSO) suggests that nearly 65% of traditional fisher households in Assam earn below the monthly poverty line income. Literacy rates in these communities remain lower than the state average, and women fishers—who are heavily involved in post-harvest activities like drying, processing, and marketing—often lack formal recognition and access to markets or credit facilities (Baruah, 2020).

5. Challenges to Indigenous Rights and Loss of Customary Tenure in Assam

Indigenous communities in Assam—including groups such as the Bodos, Misings, Karbis, Dimasas, Rabhas, and others—have historically maintained strong customary relationships with land, forests, water bodies, and communal resources. These relationships are embedded in traditional governance systems, cultural practices, and subsistence economies that emphasize collective ownership and ecological balance (Baruah, 2003; Das, 2017). However, in recent decades, these communities have encountered significant threats to their rights, particularly concerning the erosion of customary tenure systems and the weakening of institutional recognition of Indigenous governance.

One major challenge is the displacement of Indigenous peoples due to large-scale infrastructure projects, including hydroelectric dams, highways, and industrial zones. The construction of the Lower Subansiri Hydroelectric Project near the Assam-Arunachal Pradesh border displaced several Mishing villages and disrupted traditional fishing and river-dependent practices, with inadequate compensation or rehabilitation (Ahmed, 2020). Such displacement often results in the severing of spiritual, economic, and ecological ties to ancestral lands—constituting not only physical relocation but also cultural and ontological dislocation (Fernandes, 2008).

Another key issue is the loss of customary tenure systems, which traditionally governed land ownership, forest access, and water use through community-level institutions and unwritten norms. These systems are increasingly undermined by the formalization of land tenure and state-centric legal frameworks that prioritize individual ownership, leaseholds, and commercial usage over collective rights (Nayak & Berkes, 2010). For instance, in areas outside the Sixth Schedule (which offers constitutional protection for tribal autonomy), such as parts of the Brahmaputra valley and Barak Valley, Indigenous communities have faced dispossession due to the absence of legal recognition for customary rights (Nath, 2014).

The privatization of commons and lease-based allocation of wetlands and forests further intensifies this trend. Under Assam's leasing policies, community-managed beels (ox-bow lakes) and fisheries are auctioned to the highest bidders, often non-local or politically connected entities. This process marginalizes traditional Indigenous fishers, such as the Mishing and Kaibarta communities, and deprives them of access to their traditional resources (Deka, 2016; Dutta, 2021). In many such cases, community members become wage laborers on lands or water bodies they once managed autonomously.

Moreover, the expansion of protected areas and wildlife sanctuaries—though important for biodiversity—has sometimes excluded Indigenous residents from forest-based livelihoods without adequate consultation or rights recognition. The implementation of the *Wildlife Protection Act, 1972* and Forest (Conservation) Act has led to restrictions on traditional shifting cultivation (*jhum*), fuelwood collection, and fishing in buffer zones, undermining customary practices (Choudhury, 2005).

Compounding these challenges is the lack of comprehensive land records in tribal areas, which leaves communities vulnerable to land grabs and encroachment. The absence of legal titles for customary lands limits Indigenous peoples' ability to assert claims or receive

compensation during land acquisition. Furthermore, climate change-induced impacts—such as flooding, erosion, and declining productivity of commons—exacerbate dispossession by making traditional livelihoods less viable (Sharma et al., 2022).

The cumulative effect of these dynamics is the institutional invisibility of Indigenous tenure systems and the weakening of Indigenous autonomy over land and natural resources. Addressing this requires a shift towards a pluralistic legal approach that recognizes and protects customary tenure, ensures free, prior, and informed consent (FPIC) in development projects, and enables co-governance of resources in collaboration with Indigenous institutions.

6. Results and Discussion

The findings of the present study are consistent with earlier research on inland fisheries governance and small-scale fishing communities in Assam and comparable socio-ecological contexts. The institutional exclusion of traditional fishers under lease-based management systems observed in this study supports the findings of Deka (2016), who documented patterns of elite capture and reduced access of local fishing households to beel fisheries. Similarly, the erosion of customary tenure and increasing commercialization of inland fisheries correspond with the analysis of Nayak (2014), who argued that such processes contribute to marginalization and livelihood insecurity among traditional fishers in Assam.

The livelihood vulnerability and socio-economic challenges identified in this study also align with Sarma and Goswami (2017), who reported persistent poverty, limited institutional support, and restricted market access among fisher communities in the region. Furthermore, the significance of Indigenous Ecological Knowledge and community-based resource management highlighted here is supported by Dutta (2021) and Nayak and Berkes (2010), both of whom demonstrated that traditional ecological practices play an important role in sustaining fisheries and conserving wetland ecosystems.

In addition, the spatial disparities in fish production and availability across districts observed in this study are consistent with the district-level assessment by Baruah and Goswami (2019), which identified uneven fisheries development and infrastructural gaps across Assam. Collectively, these converging findings strengthen the argument that participatory governance frameworks, recognition of customary tenure rights, and locally grounded policy

interventions are essential for promoting ecological sustainability and improving livelihood security in Assam's fisheries sector.

7. Conclusion

The study demonstrates the socio-ecological importance and precarious condition of indigenous fishing communities in Assam, which depend for their livelihood, food security and cultural continuity on the state's vast inland water resources. More than 286000 hectares of complex aquatic ecosystems, including beels, swamps, reservoirs and ponds, are found in Assam, but these resources are not fully utilised or are inadequately utilized, due to the problems of hydrological changes, siltation and inequitable forms of governance. The greatly exploited lease-based management system of fisheries has caused the marginalisation of indigenous and traditional fishers, and in many instances, their which has robbed them of access to the commons, which they have, through a system of customary tenure, the various communistic, and also other systems of tenure which facilitated a state of complete development.

The disparities in fish production and per capita consumption across districts also highlight the uneven access to resources and uneven aquaculture development. Some districts have surplus production, while others are very much below the benchmark of 15 kg per capita annually required for nutrition and thus show spatial inequalities and systemic neglect of infrastructure and support mechanisms in those districts with deficits.

Traditional fishermen, especially from Scheduled Castes and indigenous communities, have deep ecological knowledge as well as experience in sustainable modes of fishing. However, their rights and contributions remain largely unrecognised in formal structures of governance. The erosion of customary tenure in conjunction with displacement, privatization and climate variability have exacerbated their socio-economic vulnerabilities.

At this juncture, fisheries governance in Assam needs to move towards more inclusive community-based models in order to conform to Sustainable Development Goals (SDG 1 and SDG 14). This involves legal recognition of customary rights, equitable distribution of

resources, participative decision-making and the incorporation of indigenous systems of knowledge into the policy framework. This is essential for ecological sustainability, social justice and resilient livelihood of rural populations.

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