Rivers and Streams in Transition: From Culturally Embedded Commons into Contested and Commodified Spaces Among the Adi Tribe in Arunachal Pradesh

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Abstract:*This paper examines continuity and changes in the socio-cultural significance of rivers and streams among the Adi tribe of Arunachal Pradesh, with particular attention to the impacts of modern fishing technologies and market-driven resource extraction. Drawing on qualitative ethnographic data from five villages in Siang District, the study explores Indigenous Knowledge Systems governing river and stream ownership, boundary demarcation, ritual use, and community-based fishing practices. The findings reveal that while traditional practices such as Kegüng, Ngüok Oknam, and SibokPattnam continue to embody principles of ecological restraint, sustainable, and collective action, these systems are increasingly undermined by destructive fishing methods, including blast fishing, electrofishing, and river-leasing arrangements. These processes have contributed to ecological degradation, declining fish stocks, and reconfigured cultural meanings attached to rivers and streams. Situating the analysis within the frameworks of Indigenous Knowledge Systems and practice theory, the paper argues that rivers and streams among the Adi are being transformed from culturally embedded commons into contested and commodified spaces, with profound implications for cultural continuity, food security, and social cohesion.*

Key Words: Rivers and Stream, Adi Tribe, blast fishing, river leasing, commodification of rivers

1: Introduction

Rivers and streams are socially and culturally constituted spaces rather than neutral physical resources. Across societies, water bodies are embedded within systems of meaning, belief, and practice that shape social relations and human–environment interactions (Strang, 2004; Ingold, 2000; Boelens, 2014). In Indigenous contexts, rivers are often understood as living entities that sustain not only material livelihoods but also moral values, cosmological beliefs, and collective identities, forming the basis of culturally embedded systems of ecological governance (Berkes, 2012).

Among the Adi tribe of Arunachal Pradesh, rivers and streams occupy a central place in everyday life, subsistence practices, and ritual organisation. Flowing through village settlements, agricultural landscapes, and forested territories, these water bodies provide drinking water, irrigation, fishing grounds, and sites for ritual observance. Adi cosmology and customary law associate rivers and streams with ancestral spirits, territorial boundaries, and notions of purity and pollution, reflecting a worldview in which nature and society are mutually constituted rather than analytically separable (Elwin, 1959; Blackburn, 2003).

Traditional Adi engagements with rivers and streams are governed through Indigenous Knowledge Systems developed through long-term ecological interaction and intergenerational transmission. Fishing practices, ritual prohibitions, and rules of access are learned through participation in everyday life, embedding principles of restraint, reciprocity, and collective responsibility within routine practice (Berkes, 2012). Rivers thus function as culturally embedded commons, where rights of use are inseparable from moral obligations of care and social recognition.

However, these relationships are undergoing significant transformation. Processes of modernisation, market integration, infrastructural development, and state-led resource governance have reshaped both the material and symbolic dimensions of river use in Arunachal Pradesh (Baviskar, 2007; Middleton, 2015). The increasing availability of technology-intensive fishing methods, alongside river-leasing arrangements and weak regulatory enforcement, has contributed to ecological degradation, declining fish stocks, and the erosion of customary

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governance systems. Younger generations, in particular, are increasingly engaging with rivers through utilitarian or recreational logics detached from ritual calendars and subsistence ethics.

While existing scholarship has examined ecological degradation and commodification of natural resources, the intersection of these processes with Indigenous moral economies remains underexplored in the context of the Adi. This paper addresses this gap by examining how the weakening of customary governance, combined with market pressures and state regulatory disjuncture, is transforming rivers and streams from culturally embedded commons into contested and commodified spaces. Drawing on ethnographic fieldwork conducted in five Adi villages in Siang District, the study analyses Indigenous systems of river and stream ownership, ritual use, and community-based fishing practices, situating these within the broader frameworks of Indigenous Knowledge Systems and practice theory.

By foregrounding rivers and streams as moral and social institutions rather than merely ecological resources, this paper demonstrates that their transformation has implications not only for environmental sustainability but also for cultural continuity, food security, and social cohesion among the Adi

2: Theoretical Framework

The study is grounded in Indigenous Knowledge Systems and practice theory, particularly Bourdieu's concept of habitus. Indigenous Knowledge Systems emphasize that ecological knowledge is cumulative, place-based, and produced through long-term engagement with specific environments (Berkes, 2012). Practice theory is employed to understand how water-related knowledge, values, and norms are embodied, reproduced, and transmitted across generations (Bourdieu, 1977). Fishing techniques, ritual prohibitions, and rules governing access to rivers are learned through participation rather than explicit instruction, becoming taken-for-granted aspects of everyday life. This framework is particularly useful for examining generational differences, as younger Adi increasingly engage with rivers through recreational or market-oriented practices that diverge from older embodied dispositions shaped by subsistence and ritual obligations.

3: Methodology

This study is based on qualitative ethnographic fieldwork conducted between February 2025 to January 2026 in five Adi villages—*Tumbin, Kaying, Pagak, Kerang, and Bogne*—in Siang District, Arunachal Pradesh. These five villages were purposively selected to represent a spectrum of reliance on riverine resources and varying degrees of exposure to modern influences, ensuring a robust examination of both continuity and change in socio-cultural significance. All selected villages maintain a strong dependence on fishing for both subsistence and ritual purposes, making them ideal sites for this ethnographic inquiry.

Data were collected through in-depth interviews (n=20) and focus group discussions (n=2, with 5 participants each) with a total of 30 purposively selected respondents across three distinct age cohorts (e.g., youth 18-30, middle-aged 31-55, elders 56+). This generational stratification enabled a targeted examination of continuity and change in water-related knowledge and practices. Thematic analysis, guided by the principles of Indigenous Knowledge Systems and practice theory, was employed to analyze interview and focus group transcripts.

However, given the qualitative and localized nature of this ethnographic study across five villages, the findings offer in-depth insights specific to the Adi tribe in Siang District and may not be broadly generalizable to all Indigenous communities or even all Adi communities without further research.

4: Findings

4.1: Rivers as Commons and Social Property

Rivers occupy a central socio-cultural, economic, and ecological position in Adi society, shaping settlement patterns, subsistence strategies, and social organization. Traditionally, Adi villages are established along riverbanks, underscoring rivers as life-sustaining landscapes imbued with cultural meaning rather than merely utilitarian resources. Rivers are embedded within systems of customary ownership, social status, and ritual practice, reflecting a relational understanding of nature characteristic of Indigenous societies (Berkes, 2012; Ingold, 2000).

River ownership among the Adi may be individual or collective, with distinct stretches controlled by households or community. Historically, ownership of a productive river segment symbolized wealth and social prestige, as rivers were primary sources of fish used in festivals and ceremonial exchanges.

Customary river ownership is territorially grounded and shifts as rivers traverse village jurisdictions, with village boundaries determining control over specific stretches. This system remains adaptive, as boundaries are renegotiated when river courses change. Through this arrangement, ecological abundance underwrites ritual life, while ritual obligations simultaneously regulate access and use, embedding principles of restraint and conservation within everyday practice.

4.2: Boundary Marking of Rivers

The Adi employ Indigenous methods to demarcate river boundaries (*Asi-Risi*) using natural landmarks such as prominent trees, stones, or hills. In some cases, rivers are divided longitudinally, with the midstream serving as a boundary between owners. As river courses change over time, boundaries are adjusted accordingly, reflecting an ecologically attuned and adaptive system of territorial management (Ingold, 2000; Scott, 1998).

4.3: Rivers (*Asi–Siyom*) and Their Socio-Cultural Significance

Within Adi ritual life, dried fish (*Sanna-Engo/ Maane)*hold profound cultural significance and occupy a central place in social transactions. Fish are traditionally dried over fire, with five pieces tied together to form a bundle known as *Rikap*, which is exchanged during festivals and ceremonial occasions. Highlighting the ritual significant of dried fish a 65-year-old respondent shared,

> *'During the marriage exchange (Aare Genam), it is a matter of pride for the bride's family if 100 to 150 rikap are presented. People in the village often ask how many rikap were given. Being able to present a larger number of rikap to the bride's family is regarded as a source of pride for the groom's family.'*

The quantity of *Rikap* presented particularly during marriage exchanges to the bride's family, locally termed *Aare Genam* is determined by a household's capacity to harvest fish, thereby reflecting both economic capability and social standing.

Prior to the commencement of festivals or social rituals, community members engage in individual or collective fishing expeditions, during which the harvested fish are shared equally among participants. In the case of major social ceremonies such as marriage exchanges, members of the clan mobilize collectively to undertake fishing specifically for the bride's family. In this context, rivers assume critical socio-cultural importance within Adi society, as they constitute the sole legitimate source of fish for ritual use. Market- or pond-bred fish are considered culturally inappropriate and are therefore excluded from ceremonial exchanges.

Ritual dependence on locally sourced fish establishes a moral economy in which access to aquatic resources is governed not only by ownership but by responsibility, restraint, and collective recognition. It is within this moral economy that streams, like rivers, emerge as inherited social properties, governed by norms of care rather than formalised legal titles.

4.4: Streams (Sibok/Sitong) as Inherited Moral Property

Streams hold significance comparable to river segments in Adi socio-cultural life. Located deep within forested landscapes, streams function as critical fish breeding grounds and are therefore culturally protected. Traditionally, stream ownership is established through first discovery and sustained use (*Sitong/Porangtobomna*). Individuals who discovered and consistently harvested from a stream gained social recognition as rightful owners, a claim legitimized through collective acknowledgment and reinforced by customary law of the given community. This form of ownership reflects a system of "moral property," wherein rights derive from care, use, and social recognition rather than formal documentation (Berkes, 2012). Emphasizing the cultural and subsistence importance of streams, a 60-year-old male respondent shared,

> *'Streams were vital source of fish that traditionally fulfilled household consumption needs as well as ritual requirements. Traditionally held in high esteem because of their abundant fish resources; however, the introduction of modern and aggressive fishing practices has led to indiscriminate killing of fish, rendering many streams increasingly fishless'*

Among Adi tribe stream may transferred or sold within the village, such transactions are strictly regulated and conducted in the presence of witnesses. Customary laws prohibit the transfer or sale of streams to outsiders, ensuring that control over these resources remains embedded within the community.

4.5: Socio-Cultural Significance of Streams

Streams play a vital role in the ritual and collective life of the Adi tribe. Prior to the commencement of the major agricultural festival *Unying-Aaran*, the Adi observe a customary practice known as Geta, which involves collective hunting and fishing expeditions. During these ventures, fish are harvested from streams using a range of indigenous fishing techniques. The catch is subsequently utilized for ritual purposes, ceremonial exchange, and household consumption.

One of the most significant communal practices associated with stream use is *SibokPattnam,* a community-based fishing event conducted during the winter season when water levels are low. Under the guidance of traditional knowledge holders, community members collectively divert stream water using locally sourced forest materials. Once the water flow is sufficiently reduced through controlled diversion, a traditional herbal intoxicant (*Tamu*) is introduced into the stream. This substance temporarily stuns the fish, allowing for easy collection without causing lasting harm to the aquatic ecosystem. This practice reflects Indigenous principles of restraint, sustainability, and collective responsibility (Gadgil & Guha, 1995; Berkes et al., 2000). These Indigenous systems of river and stream governance rest on seasonal rhythms, ritual timing, and culturally sanctioned limits on extraction. The introduction of technology-intensive fishing methods marks a rupture in this system, as extraction becomes detached from ritual calendars, subsistence needs, and community oversight.

4.6: Technology-led fishing and socio-cultural impacts

In recent times due to increased access to explosives material used in 'blast-fishing' through informal markets has facilitated year-round fishing, particularly among younger fishers in the community. Destructive fishing practices particularly blast fishing have profoundly altered riverine ecosystems. Although such methods yield immediate catches, they cause indiscriminate mortality of aquatic species, destroy breeding habitats, and undermine ecosystem resilience (Pauly et al., 2002; Berkes, 2012).

For the Adi, the practice of 'blast-fishing' impacts extends beyond ecology. For instances, dried fish harvested from local rivers are indispensable for ritual observances, festivals, and social exchanges. Only locally sourced river fish that are found withing the local ecological landscape are considered ritually acceptable; market or pond-bred fish are strictly prohibited from using in rituals or in social ceremonies. Sharing his lived experiences, 50-years-old respondent noted,

> *'When we were young, fish were abundant in the rivers, and we never faced difficulties in harvesting enough fish for rituals and social ceremonies such as marriage exchanges. Today, however, excessive and technology-led harvesting has turned many rivers into nearly fishless rivers.'*

However, due to aggressive and year-round fishing practices, rivers that were once reliable sources of fish are increasingly becoming depleted. Moreover, technology-intensive fishing methods have penetrated even remote forest streams, where batteries and inverters are transported into the hills to electrocute fish, indiscriminately eliminating entire populations, including juveniles.

These practices are often recreational in nature and detached from ritual or subsistence needs. Although some villages impose fines to regulate such activities, enforcement remains uneven. Consequently, rivers and streams once central to social prestige, collective fishing practices, and the intergenerational transmission of ecological knowledge are rapidly losing their socio-cultural significance. This transformation reflects not only ecological degradation but also the erosion of social cohesion, ultimately threatening the continuity of Adi socio-cultural traditions.

4.7: Leasing of River and Erosion of Customary Rights

The leasing of river stretches to commercial fishers represents a decisive shift from commons-based governance to market-mediated control. The commodification of rivers through leasing arrangements has significantly transformed customary access and use rights. During the winter fishing season, commercial fishers *(Machuran*) lease specific sections of rivers through local contractors. Once a river stretch is leased, access becomes restricted. As one respondent noted, *'Now we have to ask permission to fish in our own river, whereas in our younger days we could always fish freely,"* highlighting how even customary rights holders are required to seek permission in what were traditionally their own rivers.

As a result, indigenous communities that once depended on these rivers for subsistence fishing are increasingly compelled to purchase fish from commercial fishers at market prices. This development undermines subsistence practices historically governed by principles of reciprocity, collective access, and food sharing. More broadly, the leasing of rivers reflects a transition from community-regulated commons to market-driven control over natural resources, contributing to the erosion of customary institutions and indigenous food security (Scott, 1998; Gadgil & Guha, 1995).

4.8: State Regulation and Institutional Disjuncture

At the statutory level, the *Arunachal Pradesh Fisheries Act, 2006* provides the principal legal framework for the management, conservation, and development of fisheries resources in the state. The Act empowers the government to regulate or prohibit fishing methods, control fishing gear and engines, and restrict activities detrimental to fish populations, including the imposition of seasonal bans during breeding periods.

Despite the presence of a formal regulatory framework, effective fisheries governance remains a significant concern. State regulation has largely failed to distinguish between Indigenous, subsistence-based fishing practices and technology-led destructive fishing methods. At the ground level, state intervention is limited and sporadic, resulting in weak enforcement and regulatory absence in many riverine areas. This institutional disjuncture has allowed destructive practices to proliferate, further undermining both ecological sustainability and customary governance systems. The expansion of market-mediated access to rivers unfolds alongside a parallel failure of state regulation. Rather than complementing customary governance, statutory fisheries management operates in relative isolation from Indigenous institutions, producing an institutional vacuum in which destructive practices proliferate.

4.9: Role of Customary Law in Regulating Rivers and Streams

Customary law among the Adi operates as an informal yet authoritative system of governance that regulates village affairs, social relations, and the use of natural resources, including rivers and streams (Elwin, 1959; Karlsson, 2011). In the context of increasing ecological degradation caused by destructive fishing practices such as blast fishing and inverter-based electrofishing, customary institutions have re-emerged as crucial mechanisms of environmental regulation. Village councils *(Kebang),* led by the Gaon Bura, actively monitor fishing activities and enforce community norms through the imposition of fines ranging from ₹ 5,000 to ₹ 50,000, depending on the severity of the violation. Offenders are summoned before the council, where penalties *(Ajjeng)* are collectively deliberated and imposed. These sanctions function not only as punitive measures but also as moral deterrents, reinforcing norms of ecological restraint and collective responsibility. At the same time, the enforcement of customary law is not without challenges. As one Gaon Bura observed, "*We are firmly enforcing our laws in the village; however, we also need participation from the community. We are part of the same society, and it is not easy to impose fines on our own people, particularly the youth. For our efforts to be effective, there must be a shared sense of individual responsibility."* This observation underscores the limits of customary authority in the absence of collective moral commitment, highlighting that Indigenous governance systems rely not only on sanctions but on sustained community participation and intergenerational consensus.

Taken together, these findings demonstrate that rivers and streams among the Adi are simultaneously ecological systems, ritual resources, and sites of political-economic transformation. Indigenous governance of aquatic resources is grounded in moral property regimes that integrate subsistence, ritual obligation, and ecological restraint. However, the combined pressures of technology-led extraction, river leasing, and weak state enforcement are reconfiguring rivers from socially embedded commons into commodified spaces. This transformation not only undermines ecological sustainability but also destabilises the cultural institutions through which Indigenous environmental knowledge and social cohesion have historically been sustained.

5: Discussion

The findings of this study illustrate that rivers and streams among the Adi are not merely ecological resources but socially embedded commons governed through Indigenous Knowledge Systems that integrate subsistence, ritual obligation, and moral responsibility. Historically, Adi relationships with rivers and streams were sustained through practices that embodied ecological restraint, seasonal regulation, and collective accountability. This observed loss of socio-cultural significance, as detailed in the findings, directly reflects the erosion of habitus and intergenerational knowledge transmission, transforming rivers from sites of collective identity into mere extractive zones align closely with Bourdieu's notion of habitus, wherein environmental ethics are internalised as routine dispositions shaping everyday action (Bourdieu, 1977).

From this perspective, fishing practices such as *Sibok Pattnam*, ritual restrictions tied to festivals, and norms governing stream ownership functioned not only as techniques of resource use but as mechanisms for reproducing social order and ecological balance. Rivers and streams were constituted as "moral property," where rights were inseparable from duties of care, collective recognition, and ritual responsibility. Such regimes resonate with broader scholarship on Indigenous commons, which emphasises relational ontologies and ethical constraints as central to sustainability rather than external regulation (Berkes, 2012; Gadgil & Guha, 1995).

However, the increasing prevalence of technology-led fishing practices marks a rupture in this embodied system of governance. Blast fishing and electrofishing represent more than ecological threats; they signify a transformation in the underlying logic of resource use. Detached from ritual

calendars, subsistence needs, and collective oversight, these practices reflect a shift from culturally mediated engagement with rivers to extractive, individualised, and often recreational exploitation. In terms of practice theory, this suggests a reconfiguration of habitus, particularly among younger generations, whose engagement with rivers is shaped by market logics, technological accessibility, and weakened intergenerational transmission of Indigenous ecological knowledge.

The leasing of river stretches further accelerates this transformation by institutionalising commodification. Leasing converts rivers from shared moral landscapes into exclusionary economic assets, displacing customary rights holders and undermining subsistence-based fishing practices. This shift mirrors Scott's (1998) critique of how market and state interventions simplify complex commons into administratively legible and commercially exploitable units. Among the Adi, the consequences are especially profound because ritual life depends on locally sourced fish; ecological depletion thus directly destabilises ceremonial exchange, social prestige, and clan-based reciprocity. The erosion of fish stocks therefore translates into an erosion of cultural continuity and social cohesion.

State regulation, rather than mitigating these pressures, appears largely misaligned with Indigenous governance systems. While the Arunachal Pradesh Fisheries Act, 2006 provides a statutory framework for conservation, its failure to meaningfully engage with customary institutions has produced an institutional vacuum. This institutional vacuum represents a significant challenge and a limitation in the current regulatory environment for effective conservation efforts. The absence of clear differentiation between subsistence-based Indigenous practices and destructive, technology-intensive fishing methods has allowed ecological degradation to intensify. This disjuncture reinforces Baviskar's (2007) observation that state environmental governance often marginalises Indigenous moral economies by privileging technocratic regulation over locally embedded systems of care.

Yet, the persistence and reassertion of customary law through village councils (Kebang) indicate that Indigenous governance has not disappeared but is adapting under pressure. The imposition of fines and communal adjudication of violations demonstrate the continued relevance of customary institutions as sites of environmental regulation and moral authority. These practices reaffirm that conservation among the Adi is not enforced solely through coercion but through shared values, social accountability, and collective deliberation. From a practice-theoretical standpoint, such interventions represent attempts to recalibrate habitus in response to new material and social conditions.

Taken together, the findings suggest that rivers and streams among the Adi are undergoing a transformation from culturally embedded commons to contested and commodified spaces. This transformation is not simply ecological but deeply socio-cultural, reshaping meanings, practices, and identities tied to aquatic landscapes. The erosion of Indigenous Knowledge Systems governing rivers and streams thus poses risks not only to biodiversity and food security but also to the social institutions through which knowledge, ethics, and collective life are reproduced. Recognising and strengthening Indigenous governance systems rather than displacing them with market or state-centric models remains crucial for sustaining both ecological resilience and cultural continuity in riverine landscapes of Arunachal Pradesh.

Conclusion

This paper demonstrates that rivers and streams among the Adi tribe are not merely ecological resources but culturally embedded commons governed through Indigenous Knowledge Systems, ritual practices, and customary institutions that historically regulated access, use, and conservation through principles of restraint, reciprocity, and collective responsibility. Fishing, ownership, and ritual life were deeply intertwined, sustaining both ecological abundance and social cohesion. However, the expansion of technology-led fishing, river leasing, and weakly enforced state regulation has reconstituted these aquatic landscapes as commodified and contested spaces, accelerated ecological degradation and eroded the moral economy that once governed riverine life. The resulting decline in fish stocks reflects not only environmental loss but also the weakening of institutions through which Indigenous environmental knowledge is transmitted. Yet, the continued relevance of customary bodies such as the *Kebang* reveals the persistence of Indigenous governance systems, offering socially accountable alternatives to market-driven and technocratic regulation. The Adi case thus highlights that sustainable river management in Indigenous landscapes requires recognising Indigenous Knowledge Systems as living, adaptive frameworks central to ecological resilience and social continuity.

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