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Negotiating Forest Rights Debates: A Game Theoretic Analysis of Stakeholder Behaviour in the Western Himalayas †

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Abstract

This study employs cooperative, behavioural, and experimental game theory to examine how forest rights are negotiated among tribal communities, government agencies, and civil society organisations in the western Himalayas. It explores how claims over access, governance, and benefit-sharing regarding forest resources are asserted, contested, and mediated in a complex socio-political environment. This research adopts a mixed-methods approach. Qualitative data from in-depth interviews and focus group discussions. Quantitative data from structured surveys and field-based experiments. The findings underscore the importance of integrating traditional knowledge systems with modern development policies. This study emphasises the need for sustainable and inclusive strategies that protect both the environment and local livelihoods.

Keywords: western Himalayas; forest rights debates; tribal rights; game theory; stakeholder behaviour

1. Introduction

In the western Himalayas, negotiations over the right to forests occur in everyday social and political debates. This includes the competing interests of tribal people, the government's forest department, and non-governmental organisations (NGOs) that seek to influence how people use forest resources and how to share and govern the benefits derived from them [1]. These negotiations are about developing an institutional framework—the rules, norms, and decision-making mechanisms—that will affect the pattern of resource use and the distribution of costs and benefits among various parties [2].

While the Forest Rights Act (FRA) of 2006 has created a legal framework for validating tribal claims to the use of natural forest-based resources [3], its actual implementation by regional authorities is highly uneven. Many tribes rely on forests for their economic survival, cultural identity, and overall stability [4]. Unfortunately, there are still numerous barriers within the political and administrative systems that prevent the tribes from effectively achieving recognition of their rights.

To understand why some negotiated agreements succeed while others fail, despite apparently similar environmental conditions, it is necessary to examine the behavioural and institutional factors that affect stakeholder collaboration [5]. The ability of organisations in a local community to negotiate and reach an agreement on an issue depends directly on the degree of trust between the parties and their reputations among one another [6]. Historical trust and the degree of mutual understanding developed by groups are identified

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as critical to cooperative behaviour [7]. Thus, this historical context would affect whether stakeholders would cooperate and/or collaborate to achieve mutually beneficial outcomes.

As trust and a positive relationship between groups grow, it becomes easier for groups to come together and form coalitions. Conversely, as distrust (or prior betrayal) develops within or between groups, the likelihood of a dialogue breakdown increases. Although the majority of policy regarding indigenous peoples in India has historically been developed and implemented by non-indigenous peoples without much consideration of the perspectives or needs of indigenous peoples, the passage of legislation such as the FRA 2006 represents a significant opportunity to address past injustices and provide opportunities for honest dialogue to occur between parties that have had fundamentally different interests and historical relationships.

Three complementary approaches have emerged from modern game theory to analyse forest governance challenges. While two-party negotiation models have historically viewed actor preferences as static and the negotiation process as predetermined, modern game theory provides a rational, science-based analytical tool for understanding and evaluating the negotiation process for both parties involved in forest governance challenges. Cooperative game theory addresses how coalitions form and share joint benefits when enforceable agreements are possible [8]. A collaborative approach is a step above the traditional two-party transactional model of the bilateral marketplace, because it provides a framework in which all parties (tribal communities, governmental agencies, non-governmental organisations) work together toward mutually beneficial results through the establishment of coalitions, thus providing an analytical tool to understand the multi-party aspect of forest rights negotiations that the bilateral market does not.

In addition to these advances, behavioural game theory recognises fairness, reciprocity, and trust, all of which empirically observe phenomena that do not fit within the rational choice model [9]. Empirical recognition of fairness, reciprocity, and trust explains why governance arrangements perceived as unfair by tribal communities will fail, regardless of the level of enforcement they receive through formal channels. This is an issue that needs to be addressed in traditional bilateral negotiation models that assume rational economic agents. Behavioural game theory shows that whether indigenous people choose to either cooperate with or resist government and development programmes depends on several factors, including the nature of the incentive provided by those programmes, but equally important is whether the process and outcome of negotiation respect the values, knowledge systems, and history of the indigenous peoples involved. Behavioural game theory explains the legitimacy problem in forest governance: why a policy can technically be effective. However, implementation is slow due to procedural and/or distributive injustices experienced by indigenous peoples in accessing resources.

Experimental game theory uses controlled field-based simulations to study how institutions work in the real world [10]. Experimental games, unlike purely predictive theories and aggregate surveys, provide observable behaviour across communities and institutions; therefore, they demonstrate which institutional designs, if any, facilitate cooperative agreement-making at the community and institutional levels. Experimental games involving tribal communities, government officials, and/or NGO representatives provide a way to determine which decision-making procedures, communication processes, and customary practices lead to cooperative behaviours among participating parties and to legitimate governance agreements. Experimental game theory, the use of field-based simulations to assess institutions, is a much more advanced methodology than many forms of policy analysis that typically fail to anticipate how communities actually make decisions regarding the implementation of forest management agreements.

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The three theoretical approaches to games mentioned above address different, but related, gaps in the study of forest governance. Theories of institutional design suggest that cooperation involves the rules governing interaction among actors [11]. However, the characteristics of such regulations that confer legitimacy in a tribal context should be well identified. Thus, the three game models mentioned above model the formation of coalitions among multiple actors and the perception of fairness among community members. The theory of commons governance emphasises that trust is vital to the successful management of common property and that long-term relationships are also important. However, it fails to indicate which institutional mechanism builds trust or how fairness is perceived by the community and translated into compliance behaviour. Thus, behavioural and experimental game theories systematically investigate which factors influence a community's willingness to accept and enforce governance arrangements.

The integration of these three approaches into game theory (coalition analysis using cooperative game theory; legitimacy analysis using behavioural insights; and institutional testing using experimental methods) will enable this research to identify the exact nature of the institutional mechanisms that support both cooperation and sustainable governance within the complex and multi-actor forest rights negotiation process of the Western Himalayan region. It becomes particularly relevant because the Western Himalayan region is a unique environment where competing interests coexist alongside a wide variety of land and natural resource claims. Therefore, it is an appropriate area to assess how negotiations regarding forest management are influenced not only by rules and policies, but also by the history, sense of belonging, and daily life experiences of the many people who depend on the continued viability of their forest environments.

2. Research Materials and Methods

The study utilises a mixed-methods approach; therefore, it uses both qualitative explorations and quantitative measurements to examine how tribal communities, NGOs, and government organisations collaborate to establish rights to forests in the Western Himalayan region. This methodology answers three primary research questions: (1) What game theory-based approaches may be used to show how community groups, NGOs, and government agencies negotiate forest rights using current institutions in the Western Himalayan region? (2) How are institutional structures and rule-making processes (in terms of influencing stakeholder cooperation) and alliances formed and agreements made through forest rights negotiation, as defined by a combination of serious games and game theory based on current research? (3) Under what combinations of customary and state-based institutional frameworks (as supported by the commons governance literature and game theory) will the most significant level of sustainability, equity, and legitimacy be achieved for forest rights agreements? The game-theoretic approach analyses both stakeholders' experiential knowledge and strategic reasoning to provide an understanding of patterns across stakeholder groups.

Research data was collected through multi-season fieldwork in forest-based tribal village communities in Kinnaur (Spillow, Naptha, Poo, Kalpa) and Lahaul–Spiti (Keylong, Kolang, Koksar, Sissu, Kibber, and nearby communities). Interviews were semi-structured with tribal elders, forest officials, and NGO staff. Hence, allowed participants to express their perspectives on forest rights in their own words and at their own pace. Additionally, the focus group discussions at the panchayat level allowed the community to collectively reflect on their experiences as they negotiated forest rights and the past conflicts they faced. The study used participant observation to document the everyday activities related to collecting forest resources (time taken, types of resources collected, and how decision-making occurs within a community).

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3. Discussion on Findings

Coalition building for forest rights in the western Himalayas is a negotiation process among tribal communities, NGOs, and government agencies in an environment of multiple stakeholders and institutions. Game theory helps explain why some negotiated agreements are successful and others are unsuccessful, even though both are in the same context [8]. The key variable is open, honest communication about the impacts on resources and shared interests. Communication allows parties to develop a shared sense of their interdependencies. Forest game experiments illustrate this very clearly [9]. In these experiments, participants who had no means of communicating with each other failed to understand how the sum of their harvests would result in the accumulation of their combined harvests into a single depletion of the forest. However, during the FDG in Koksar Lahaul, tribal people narrated their vulnerability: "If we continue to harvest at this level of frequency and volume, eventually we will run out of trees to harvest. We should harvest at the rate of our needs so that we can sustainably use the excess trees" (Focus group discussion, Lahaul, Koksar, 23 August 2024). These changes in rational self-interest allow them to become collectively conscious, leading to cooperative behaviour. The lack of knowledge of FRA Rights and entitlements for benefit-sharing among many tribal groups in India is a significant obstacle to the realisation of those rights [3]. There is also an additional communication barrier between government departments, and both the time frames for implementing the FRA. Game theory reveals that institutional structures influence stakeholders' willingness to collaborate using mechanisms of cooperation. Research found a somewhat paradoxical aspect of monitoring and sanctioning in the governance of commons [10]. Once external monitoring is introduced into forest governance systems, community members at first reject it. A respondent in Spillow Kinnaur stated, "We do not need a watchman for our forest; we have always managed it ourselves" (Interviewed during field visit to Kinnaur, Spillow, 20 July 2024). Such resistance from the local community members was entirely rational based on prior experiences with external monitoring.

A cultural connection to forests is demonstrated through community debriefings following forest games [9]. As an example of this connection, an elderly member of the village, Sissu, Lahaul community said, "We need to cut trees for subsistence reasons like firewood", and "the trees in the forest give us rain" (Interviewed during field visit to Lahaul, Sissu, 21 August 2024). A female participant in the community debriefing in Poo, Kinnaur, also noted that "from birth until death, we depend on the forest; we need wood for both our cradle and funeral pyre" (Interviewed during field visit to Kinnaur, Poo, 25 July 2024). Community members view the forest through ecological, economic, cultural, and spiritual lenses. Therefore, governance frameworks that ignore these lenses will not engender either commitment or alliances.

There is a disconnect for tribal communities in the Western Himalayas between the language of the FRA 2006and its implementation on the ground [3], in part due to the lack of meaningful participation by tribal people in interpreting and implementing rights frameworks. In cases where government agencies unilaterally decide on issues of forest tenure, benefit-sharing, and forest-use management rules without the involvement of tribal people, the communities see these arrangements as further examples of historical marginalisation, despite their technical merits.

Communities compare the extent to which a governance arrangement is fair as an outcome, and how it is fair in terms of processes [6]. More centralised arrangements for sharing forest benefits generate less compliance than those designed by communities, regardless of whether the distribution of benefits appears more or less advantageous [9]. Seasonal cycles in elite cooperation disappear once elites have the majority of forest advantages available [12].

Dialogue and ongoing monitoring by traditional forms of governance enable continued adaptation to changing environmental conditions. Hybridising customary governance systems with game-theoretic systems yields higher levels of both stakeholder satisfaction and environmental sustainability [13]. In this regard, FRA implementations should create space for hybrid governance mechanisms that formally recognise a customary decision-making process [14], thereby enabling local stakeholders to control it. The Lahaul Women's Association has demonstrated this type of hybridisation through its forest-monitoring programmes.

There are several expectations, based on the game-theoretic literature, regarding what will occur in the negotiation of forest rights within the village communities of Kinnaur and Lahaul-Spiti. Community members should strongly prefer collaborative decision-making and the open distribution of benefits from resource extraction. Community members residing in areas with active customary institutions should be more trusting of governance structures and be willing to restrict resource extraction than those living in areas without such customary institutions. Communities in the regions that have received government investment in implementing the FRA 2006 at the local level will receive recognition and awareness of their rights more rapidly than communities in areas where the FRA 2006 was implemented as an incidental function of the forest department. Communities in areas with ongoing monitoring and enforcement of resource use and management will perceive higher levels of forest regeneration and have more substantial commitments to sustainability than communities in areas without such monitoring and enforcement.

These expectations provide insight into how game theory translates to forest rights governance in the Western Himalayas and guidance on how different governance mechanisms may lead to both community acceptance and sustainable outcomes. This understanding can also guide policymakers, government officials, NGOs, and tribal communities in achieving their goals for implementing forest rights under the FRA 2006.

4. Conclusions

The use of game theory provides valuable insight into which institutional mechanisms will be most effective in facilitating sustainable forest rights negotiations among tribal communities, governmental agencies, and non-governmental organisations in the western Himalayas. This paper illustrates that cooperation depends on the procedural legitimacy of these negotiations, the transparency of communication among all parties, and the respect for customary institutions by governmental agencies and other external actors.

FRA 2006 provided an overall framework for recognising tribal forest rights, but there is no uniformity in how this has occurred across the country [15]. Game theory shows that technical policy success may be possible, even with technically correct policies that are viewed as procedurally unfair or fail to account for local customary knowledge systems. The combination of indigenous knowledge and modern development policies is important for establishing sustainable forest governance [16]. The customary institutions of the Kinnaur and Lahaul-Spiti districts have demonstrated an adaptive capacity to manage forests that rigid state regulations have not. Studies involving experimental games have shown that people are willing to collaborate if they perceive they have some control over the rules governing their actions. Theories related to mixed-strategy game theory support the idea that communities develop flexible ways of governing by adjusting their institutions [17].

Therefore, there exists a tremendous opportunity in the Western Himalayan region to experiment with hybrid governance systems which combine customary decision-making processes with formalised implementation mechanisms of the FRA 2006.

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From the perspective of the three key recommendations for policymakers based on game-theoretic principles, the first recommendation is to establish a separate, local unit to implement the FRA 2006 at both the district and village levels. Hence, it helps build trust between the government and the local people before the state enforces its legal mechanisms. Secondly, a governance structure should be developed that includes the community as a stakeholder through the development of Community Rules, the monitoring of community-based outcomes, and the revision of the Agreement based on lessons learned and experience. Thirdly, Customary Institutions should be formally included within the existing governance structure to allow the community to exercise their own management of their Forest Rights in accordance with their cultural values and historical decision-making processes. A flexible or dynamic framework for assessing forest regimes in developing countries is an essential institutional factor that enables a country's institutions to be adaptable to changing environmental and social factors [18]. A dynamic institutional design for forest governance is also needed in the Western Himalayas. This region has a unique combination of ecological, cultural, and social characteristics, including rugged geography, numerous and diverse tribal communities, and many competing claims to natural resources, which necessitate adaptive governance systems and, therefore, are not appropriate for static regulatory systems. The Western Himalayas offer an opportunity to conduct experimental research on hybrid governance systems that combine customary decision-making processes with the formal mechanisms of the FRA 2006. Experimental research on hybrid governance systems in this region will likely provide valuable lessons and insights for other mountainous regions with similar institutional issues and for tribal populations, both within India and worldwide.

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