

Polycentricism and Frugality in Biodiversity Conservation Governance: Examples from North-east India

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Abstract

During the last few decades, the scholarship on governance has stressed upon the multi-level and multi-scale character of today's problems, especially, in fields of environmental sciences, owing to increasing concerns on sustainability issues in a rapidly globalizing world. Consequently, the question of decentralization has been central to policy debates in the context of governance for sustainable development. Many argue that decentralization (localization) of solutions, grounded in community-based practices and local resource management, local partnerships as well as technologies suited for local needs and constraints are critical in dealing with sustainability challenges. In this line of argument, there has been an increasing recognition of building capacities of local communities for self-governance, owing to their deep and diverse understanding of the meaning of 'good governance' and knowledge of available resources. For purposes of a more nuanced comprehension of decentralized (local) governance, this article explores two independent theories, namely, polycentricism and frugality, and aims to propose a framework synthesizing governance approach and technological innovation approach.

Decentralization in circumstances of managing common property resources is captured by the concept of polycentric governance, wherein, the multiplicity of scales and difference in actors and stakeholders and their autonomies, are key characteristics. Although the proposition of such localized, small scale solutions is largely ignored by many owing to the grandeur of sustainability challenge, the recent literature on polycentricity, however, has recognized the importance of bottom-up approaches in governance where non-nation states actors across countries exercise their authority and autonomy to come up with feasible solutions and partnerships in response to relevant problems.

Frugality, broadly understood as innovations, improvisations, and experiments by marginal actors (often associated to the Global South) emerging out of local contexts and constraints, framings of problems, and motivations influencing solutions, is in need of rigorous conceptualization. Such a conceptualization is necessary to elevate the discourse on frugality from an empirical category to theoretical argument, especially in relation to its implication in providing a bridge to connect the gaps between theories of governance and the practicality of natural resource management.

The geographical scope of this study is limited to a region of the 'Global South'- Northeast India- that is often associated with endowment of rich biodiversity and, yet, plagued with the notoriety of being in a state of economical resource deprivation. The biodiversity conservation governance of this region is observed to be highly complex and

shows an overarching presence of legal pluralism, and plurality of 'knowledge-generating centers' for common pool resource management. In this study, we attempt to illustrate, with examples of biodiversity conservation practices, how the synthesis of two theoretical approaches- polycentricism and frugality, can enhance our understanding of decentralized governance.

Keywords: Governance, decentralization, localization, polycentricism, frugality, biodiversity conservation governance

Introduction:

The evolving discourse on governance has given rise to a multitude of theories and concepts for implementation in effective governance mechanisms. Two such theories being- polycentricity and frugality. While the discourse on polycentric governance and its theorization has been prevalent since the early twentieth century, frugality in governance is a relatively novel concept that has come up in technological, political, and economic discourses only in recent times.

The term 'polycentricity' connotes a complex form of governance with multiple centers of decision-making each of which operates with some degree of autonomy (E. Ostrom, 2005; V. Ostrom, Tiebout and Warren, 1961). Polycentricity conveys more than just federalism; a federal system may consist only of a sequence of neatly nested jurisdictions at the local, state or provincial, and national levels, but a polycentric system also includes crosscutting jurisdictions specializing in particular policy matters (McGinnis and Ostrom, 2011).

Frugality can be broadly understood as innovations and experiments by marginal actors emerging out of local contexts and constraints (cultural, economic, resource, political, capabilities, etc.) and framing of solutions to address respective problems (Gupta 2016, Bhaduri, 2016).

Biodiversity conservation broadly refers to the protection, upliftment, and management of biodiversity in order to derive sustainable benefits for the present and future generations. Protected areas (national, parks, biosphere reserves, wildlife sanctuaries etc.) were developed with the purpose of affording protection to wild animals and their natural habitats, hence serving as a strategy to maintain and conserve biodiversity. Although such areas are considered the cornerstone of biodiversity conservation, these areas face multiple problems in delivering this core objective (Githiru and W. Njambuya, 2019), mainly due to a lack of proper understanding of how these areas should be governed and hence, leading to an absence of workable action plans and management programmes.

There are arguments that decentralization (localization) of solutions, grounded in community-based practices and local resource management, local partnerships as well as technologies suited for local needs and constraints are critical in dealing with sustainability challenges (Kothari, 2013). This line of reasoning is best articulated in the context of managing common property resources (Ostrom et al. 1999), recognizing the multiplicity of scales and difference in actors and stakeholders and their autonomies, the landscape of localization of innovations in a multi-level governance context is captured by the concept of polycentric governance (Jorden et al. 2018).

The concept of biodiversity has played a central role in conservation, however, how it should be understood is a matter of ongoing debate (Burch-Brown and Archer, 2017). Most biodiversity conservation activities seem to point to a highly orthodox and

traditional definition of biodiversity, wherein legislations tend to follow a path of conservation, which more often than not excludes the human dimension (Saikia, 2011). We, therefore, try to understand the various dimensions of frugality and polycentricism in governance and its implications in the policy-making and to understand the efficacy of these policies to the multiple notions of biodiversity conservation.

Conceptual Background:

Different experts in various theories of governance have intended different opinions when it comes to how a governance structure should look like. B. Guy Peters stated that the minimalist definition of ideal governance is to get things done and have services delivered.

For a society or structure to function effectively, collective choices to reach consensus on a range of issues that cannot be addressed by individual actions alone, are required. The need for such collective decisions become indispensable when societies, or for that matter, the world as a whole require addressing of challenges and issues such as climate change, natural resource management, biodiversity conservation etc. In such cases, even when there are effective formal institutions in a society, these may be augmented or perhaps contested, by informal institutions (Peters, 2010). Especially in the complex and multi-faceted issues of management of natural resources, governance also implies some accountability so that actors involved in setting goals and then attempting to reach them, whether through public and private actions, could be held accountable for their actions (Van Keersbergen and Van Warden, 2004). There are a variety of ways in which collective problems associated with governance of complex issues can be addressed. Scholars argue that an effective system of governance is, more often than not, better provided with the involvement of State actors, just as the case with traditional systems of governance, where non-State actors are often excluded. Given the difficulties in imposing collective governance through negotiations across networks or other collections of social actions, 'Governments' have been the principal source of law in most societies (Peter, 2010) and have a monopoly over making decisions in the face of conflicts. Some scholars argue that this structure have been widely prevalent mostly due to the difficulties encountered in reaching consensus and high-quality decisions in systems/mechanisms where a range of actors are involved. Even in systems where informal institutions are made responsible for policy-making and implementation function in a 'shadow of hierarchy' (Scharpf, 1997) with the formal institutions having the capacity of re-capturing control. The tendency to think that formal and informal institutions or State and non-State actors of governance are somehow strictly alternatives, can be denied or negated by the fact that these structures almost always assist one another in providing governance (Helmke and Levitsky, 2004), in a variety of different ways these structures interact while governing a particular system. For example, some informal instruments may supplement the formal actions of governing organizations, whilst others may contradict those actions (Peters, 2010). As the range of governance activities in the global governance scenario continue to increase, it has become clearer that in most policy areas, relatively unstructured frameworks which lack many formal enforcement instruments are rendered capable of steering negotiations and decision-making in the international system. Hence, the development of frameworks of multi-level governance and polycentric governance is a key to understanding the various interactions and activities among different governing bodies and governance systems.

Interactions and overlaps within the discourses of frugality and polycentricity:

Bhaduri (2016) suggests that the innovation and knowledge generating activities of the informal economy might not always overlap with the boundaries of the informal economy as some of these practices also refer to community level practices. Nevertheless, the arena of science and technology initiatives in the developing countries, which are government mandated, seems to have lost the essence of community well being and local context (Smith et al., 2014). A classic example of such a case is the State intervention in production of pashmina shawls by introducing computerized design-making processes, which has led to the isolation of local designers (Sheikh, 2014).

On the other hand, Smith (1776), in his seminal work 'The Wealth of The Nations' demonstrated an example where Columella, a practitioner of farming suggested enclosing a kitchen garden with a hedge of brambles and briars. In those times, the idea of enclosing a kitchen garden was dismissed by eminent philosophers (Democritus) because the cost of a stonewall and the required continual repairs would well exceed the expected profit from the garden itself. But Smith found Columella's solution to this common problem to be very frugal. This shows that the source of knowledge for frugal innovations generally stems up from experience and at times, are traditional.

In scenarios where the plethora and spectrum of problems are diverse, in societies where economical gaps are huge, layered and multi-faceted, to fulfill the preferences of various consumers in different settings, a single individual or even small communities with their frugal solutions falls short, hence calling for a comprehensive system of diverse agents- which is a definitional precursor to polycentricity.

Marx (1978) found that innovations at a local or community level could generate substantial 'social use' value, which cannot be captured through the lens of 'exchange value'. Duty and relatedness to social commons remain an important motivation among grass-root innovators (Bhaduri, 2016).

The scholarship on frugal innovation finds that in spite of various attempts of inclusion of the frugal informal sector of the economy into the mainstream development discourse, this segment remains under-appreciated for their knowledge-generating and problem-solving roles. Rather the participation of this group has remained limited to 'identifying their needs' or 'articulating their problems' to scientists and technologists. This can be arguably attributed to the favored top-down approach in problem-solving activities by states and development corporations around the world.

The plurality of knowledge among the small and the marginal brought into the discourse of development (Bhaduri, 2016) could have several implications on policy-making and governance owing to the multiplicity of 'centers of knowledge-generation'. Mokyr (2005) affirms that the success behind the first industrial revolution was due to the successful, non-hierarchical feedback between different forms of 'useful knowledge'.

The very concepts of reuse and repair owe its intellectual debt to the behavioral features of the small and the marginal (Bhaduri, 2016). Research on grassroots innovations and community innovations are exposing the wide prevalence of such actions. These forms of innovative actions contribute to sustainability in a major way by reducing waste and delaying technological obsolescence (Kumar and Bhaduri, 2014; Sheikh, 2014).

The differentiation in design and product qualities across markets containing characteristics of frugality (Bhaduri, 2016) shows the specificity of solutions to respective

problems, hence bringing in the approach of high “contextuality”. This is an important behavioral feature of the small and the marginal— the disuse of the one-size-fits-all approach and more importance towards differentiation across systems.

Bhaduri (2016) concludes that accessing different forms of knowledge, spread across countries and communities can lead to a base for frugality which could address specific problems with specific but systematic solutions, building a capacity to absorb, assimilate and apply the knowledge acquired from multiple sources in practical solutions. To restore the legitimacy of experimentation with diverse forms of knowledge, which can be applied in policymaking, the relationship among the various knowledge-generating sources needs to be shaped within the narrative of ‘exchange’ rather than ‘transfer’ or ‘catch-up’ of knowledge.

We now look into the empirical evidence of the previously discussed concepts and theories by taking into account the context of biodiversity conservation governance.

Biodiversity Conservation in North-east India: Governance and Community-based Practices:

The entire region of north-east is endowed with rich biodiversity and that the rapid degradation of natural resources due to various factors like urbanization, land use pattern change, industrialization and general development of the region, including climate change has given rise to a myriad of problems in the context of biodiversity conservation and natural resource management.

Over the past century, Northeastern India has gained worldwide attention for its diverse and extensive forest cover and biodiversity. Forests of this region are unique, both in terms of their structure and species composition. According to the Community Forestry International (CFI), the region is a meeting ground of temperate east Himalayan flora, palaeo-arctic flora of the Tibetan highlands, and wet evergreen flora of Southeast Asia and Yunnan, forming a bowl of biodiversity. Arunachal Pradesh and the Brahmaputra valley, sandwiched between eastern Himalayan in the north, and the Garo/Khasi/Jaintia and Mikir/Cachar/Barail hills ranges in the south, occupies a significant place and is a hot spot for the evolution and speciation of flora in Northeast India. The altitudinal variation and rainfall patterns of southwest and northeast monsoon play a significant role in the development of ecological niches in this region of India.

Largely closed to the outside world, in recent decades deforestation has progressed rapidly due to land clearing by migrants and local people and heavy timber demand from Bangladesh and urban centers in India. While indigenous communities are recognized as the rightful stewards of much of the forestland in the North-east, they have little external support to carry out this critical task. Illegal logging and forest clearing is made easier where tenurial rights to forests are weak or unclear. This lack of clarity is a result of an ambiguous legal and policy framework that is constantly challenged by private sector interests, and even by government agencies (Mark Poffenberger, 2006). Hence, it is of great importance to save the land’s forest resources, and hence its biodiversity.

Owing to the overwhelming diversity in tribal populations in the region, the Fifth and Sixth schedules of the Constitution of India deal with the administration of tribal areas and provide those areas considerable autonomy for their respective governance. As a result, the North-eastern states exhibit a diversity of governance structures and

institutions related to natural resource management (and hence, biodiversity governance) (S. Chatterjee, 2008), reflecting strong polycentricism.

However, the formalized Acts and Laws that govern the majority of the protected area networks in terms of their biodiversity, come under the aegis of the national and state formulated policies like the Indian Forest Act of 1927, The Wildlife Protection Act (1972), National Forest Policy (1988), The Schedules Tribes and Other Traditional Forest Dwellers Act (2006), and the respective Acts of individual states. Arupjyoti Saikia, in his historical book 'Forests and Ecological History of Assam, 1826-2000', delineates how the imperial forestry practices under the 1878 Forest Act led to changes in traditional resource utilization patterns and gave rise to a somewhat commercialization of forests in terms of its produce. He locates present day ecological conflicts in the colonial era when contest over forests, land, and resource began to take a new shape.

S. Chatterjee (2008) states that there has been a gradual decrease of traditional structures of governance like village councils, autonomous district councils, etc. in spite of the constitutional mandate of autonomous governance of the Schedule 5 and Schedule 6 regions. As a result, the traditional wisdom and knowledge associated with governance has found a decline of its application into conserving the biodiversity of the region. An institutional analysis of the structures of governance (except for the state of Meghalaya and some parts of Arunachal Pradesh) is practically non-existent (S. Chatterjee, 2008). In his study, it was revealed that many of the protected areas in the state and community forests suffers from an acute absence of proper management plans and working schemes. The state and national biodiversity strategy action plans (SBSAPS and NBSAP, developed through a participatory basis in each of the states, have not yet been operationalized. Then there is the existence of the state biodiversity boards (SSBs), although an adequate linkage between the boards and the biodiversity action plans remain deficit (Chatterjee, 2008). Hence the role and functions of the biodiversity boards in conservation of biodiversity remain unclear to conservation agencies.

The presence of community forests is characteristic to Northeast India where local communities can exercise rights over their forests (S. Chatterjee, 2008). Such factors give rise to an existence of dual sets of rules- customary and statutory- in such areas where community forests are present. Local communities in states like Arunachal Pradesh and Nagaland have declared community-conserved areas (CCAs) for management of their biological resources (S. Chatterjee, 2008). In addition to these structures, there are also various international, national and regional NGOs and other unions (like the KMSS in Assam) which work towards the conservation of biodiversity in these areas, with their own individual sets of goals and management techniques and processes for the management of natural resources.

Overall, the governance of this region, especially in the context of governance of common pool resources, is highly complex and shows the overarching presence of legal pluralism. The evolution of the ideological paradigm in relation to the region's forestry and conservation programmes is worth noting, although there is a lack of empirical studies based on the same. The region provides an interesting interface of the nuanced interaction of elements (actors, institutions, stakeholders) involved in the governance of natural resources and are integrally connected to the individual concepts of polycentricity and/or frugality, including the interactions and overlaps of the concepts themselves.

The legal plurality of natural resource governance, along with traditional forms of governance, yet the lack of institutional analysis of governance, make the region an

important site for studying the interaction between polycentricism and frugality in the biodiversity conservation governance context. The observation by Chatterjee (2008) that the traditional forms of governance are on a decline, along with the increasing trend of biodiversity loss threats make it an even more useful site for understanding the impact of interaction between the polycentricism and frugality on the quality and effectiveness of governance, in a historical context.

Biodiversity conservation in Assam:

Among all the North-eastern states of India, Assam is perhaps a unique case for this study. The state has a number of conservation sites where both the fauna and flora dimensions of human-nature conflict are present, especially man-animal conflicts. A large number of incidents of man-animal conflict has been well-documented in the state of Assam in comparison to the other northeastern states where such occurrences, albeit might be present, have not yet been extensively documented and solutions for the problem has not yet been officially addressed (except the reporting of such instances in the South Garo and South Khasi hills of Meghalaya).

The unsustainable extraction of forest products and rapid fragmentation of habitats due to encroachment of forestlands for agriculture in the state of Assam has resulted in conflicts between wild animals and humans, which has become almost an annual occurrence (Kushwaha and Hazarika, 2004). The immediate effects of such occurrences can be seen in the forms of crop loss, destruction of property and human lives, and in turn, retaliation against the animals, including their subsequent killings. Biodiversity conservation in Assam, therefore, has to deal with twin concerns of protecting the fauna and flora as well as ensuring livelihood protection to the communities.

At the many conservation sites focusing on human-wildlife conflict management, the major focus of governance has been on monitoring. For example, the Kaziranga National Park being surrounded by tea estates have harbored local communities and tea-garden workers alike, whose households extends to the fringe of the forests. There is evidence that show that the elephants, in their movements to and from the Kaziranga National Park and the Karbi Anglong hills, using the narrow and elongated gardens along the southern banks of the Brahmaputra river, have raided crop and grain stores of communities that surround tea plantations (noted by Kushal Konwar Sarma, veterinarian and conservationist). Understanding the spatial and temporal patterns of crop raiding and the movements of elephants in the area is considered to hold the key for designing long-term conservation strategies. While spatial monitoring can be achieved from expensive satellite telemetry studies producing high quality and ample data, it becomes highly donor dependent (Zimmermann *et al.*, 2009). On the other side of the spectrum, in the Assam Haathi project, community members have been trained and engaged as 'field monitors' to record the movements and details about conflict incidents. The data collected by the field monitors are then transferred into a GIS database for spatial analysis, which is then analyzed for elephant migration routes, conflict hotspots, spatial correlates and seasonal variations. Despite the scientific limitations, this method proves to be appropriate for a community-based approach because (a) it is easy to expand or replicate in other areas, (b) it is sustainable, cheap and can be easily adopted by other communities without external NGO input, (c) it provides ample opportunity for awareness-raising, (d) it encourages leadership and responsibility for dealing with the issue at a community level, and (e) it provides indirect education about elephants and conservation (Zimmermann *et al.*, 2009). Such an approach also helps creating a

'corridor of tolerance' - a multi-use passage along the elephants' traditional routes that allows co-existence, through a system of good depredation management and socio-economic support to communities along this path. Most importantly, the presence of both top-down as well as bottom-up community based approaches for managing human-animal conflict make these sites a laboratory for understanding the interaction between polycentricism and frugality in governance.

Illustrative Examples: Manas National Park (MNP) and Kaziranga National Park (KNP), Assam

The MNP and KNP, both have attracted equal amount of international attention and have been regarded key biodiversity areas of international stature, hence bringing in a huge influx of funds to maintain/conservate its biodiversity, all the while remaining under constant critical scrutiny. Also, both of these areas have a rich and interesting historical background, albeit diverse in origins. They are two of the oldest protected areas in the region. The MNP is situated in a completely different cultural, geographical, ethnic, environmental-ecological and political setting than the KNP.

Kaziranga National Park (KNP):

The Kaziranga National Park is situated in the Golaghat, Karbi Anglong and Nagaon districts in the state of Assam. The forests of Kaziranga host 2/3rds of the world's great one horned rhinoceroses and it was declared a world heritage site by the UNESCO in 1985 owing to its astounding richness in biodiversity. Originally, the area was demarcated to provide protection to the dwindling rhino population. The administrative management of the park majorly lies with the state forest department, however, due to its highly revered international stature, quite a number of international, national and local organizations are linked to its conservation. The area reported high levels of insurgency threats and civil unrest during the separatist movements carried out by the United Liberation Front of Assam (ULFA) during the 1980s. During this time, poaching of the rhinos gained new heights with reports suggesting links between such poaching activities and funding of terrorist organizations during the period of 1980 to around 2005. This particular period of unrest proved to be detrimental to the biodiversity of the area as well. Incidents of conflicts between poachers and protectors have been a problem in the past and reports of such killings of both rhinos and poachers have found its way to as recently as 2015. The fringe villages of KNP houses communities from different economic, social, ethnic and religious backgrounds owing to the fact that some villages are tribal and indigenous (Mishing and Karbi villages along the southern boundary) and others have been settled over time with increase in developmental activities of the area (workers in tea plantations, immigrants from neighboring areas etc.). The rhino being developed into a symbolism of Assamese identity and pride, the uncritical and exclusive approach to its conservation has given rise to a growing militarization of the region, problematizing an already difficult relationship between subsistence farming communities in the fringes and a tendency of putting the onus of poaching on these communities. Such an intersection of a political rhetoric and conservation of biodiversity in the area renders the political ecology of KNP quite unique from other protected areas of the northeast.

The forests of KNP lie in the floodplains of four major rivers of Assam, including the Brahmaputra. Because of this reason, it suffers from perennial flooding during the monsoons, which in turn causes death of animals and destruction of conservation infrastructure. There is no buffer zone in the park and animals have historically used the

adjoining forests and hills as refuge during the onslaught of seasonal floods. The busy NH-37 bisects the once contiguous landscape into two discrete regions, and it aligns with the natural animal corridors. Hence, quite a number of animals are annually hit by moving traffic and are seriously injured, sometimes even leading to death. Studies have examined and found nine such corridor tracts and five complexes used by animals and locals of fringe villages alike. A large area of this corridor complex is under human activity (17% by agriculture, 4% by settlements), rendering some patches as non-functional. These patches have been historically connected and their non-functionality might lead to concentration of individuals of a species in a particular patch, which according to most wildlife scientists might be detrimental towards their health and survival in the long run. Many conservation scientists like Varun R. Goswami, are of the opinion that the hills of Karbi Anglong and its inhabitants have traditionally played a critical role in this regard and application of traditional knowledge and practices in allowing animal movements holds the key to long-term conservation of biodiversity in KNP. WWF maintains that the successful conservation of Kaziranga's biodiversity and wildlife can be credited largely to the Karbi community that inhabit the fringes, who continue to contribute to the cause of conservation despite the minimal resources at their disposal. Additionally, run-off of pesticides from nearby tea-estates and from the petroleum refinery at Numaligarh poses a serious hazard to the ecology of the place, hence posing a threat to its biodiversity. While looking into this regard, it becomes evident that aspects of urban planning and development, industrial development etc. also comes into play while planning/managing conservation strategies for the area.

The establishment of the Centre for Wildlife Rehabilitation and Conservation near KNP, formed in 2002, by the Assam Forest Department and Wildlife Trust of India with support from the International Fund for Animal Welfare deals with animals in distress where immediate human intervention is required for their survival. The rehabilitation of wildlife is a multi-faceted effort that requires the skills and talents of individuals from a wide variety of backgrounds and areas of expertise, including the active involvement and support of the local people. While such initiatives contribute to a great extent in the conservation of charismatic species like the Asian elephant and the one-horned Rhino, poaching and killing of these animals during human-wildlife conflicts still remain a burning issue that needs to be addressed especially in and around the forests of KNP.

The Krishak Mukti Sangram Samitee (KMSS), a people's movement committed for upholding the rights of farmers and to protect the local heritage and resources in Assam has come up with a repository of more than 200 indigenous varieties of rice in the Kaziranga National Orchid and Biodiversity Park. Protection of indigenous plants, fishes and crops is one of the key agendas of KMSS and the organization has started its initiative to preserve the resources and natural heritage of this land. The KMSS has come up with a sprawling three hectare Kaziranga National Orchid and Biodiversity Park, the one of its kind in the region. The basic purpose of KMSS to open this Park is to conserve the local varieties of orchids, flowers, fruits, fish as well as our colorful ethnic culture and to spread knowledge about their conservation. The park, preserves more than 600 varieties of wild orchids, maintains a medicinal plant garden, a fishery for indigenous fishes, an extensive forest of native trees, a garden for native flowers and fruits and a rice museum. Most of the staff employed in the park belongs to the local and nearby communities, possessing great deal of knowledge about traditional conservation practices and in turn applying the same for the working of the park.

Manas Biosphere Reserve (MNP):

The Manas National Park is situated on the banks of the Manas River, and is contiguous with the Royal Manas National Park of Bhutan, the river providing as an international boundary within the forest. In Assam, it falls within the districts of Chirang and Baksa (Bodoland Territorial Region). Being situated at the heart of the homeland of the ethnic Bodo tribe of Assam, MNP saw a dark period of heavy armed conflict and poaching of the one-horned rhinoceros during the period of 1980 to around 2003. Going back to the British colonial regime, permission of logging of large tracts of forests to meet economic and commercial demands were granted, alongwith this a large influx of other communities like the Adivasis, Nepali cultivator-grazers, Bengali Muslims etc. was seen in order to support farming and tea-plantations in the traditionally Bodo tribal areas near Manas. In 1915, the ban on felling of trees for shifting cultivation restricted the traditional agricultural practices of the Bodo communities and the subsequent Forest Protection Act(s) rendered a hindrance to the subsistence of the local communities, thereby resulting in ethnic unrest, hence the park getting caught up in the quagmire of civil strife since the 1980s. As a result, in 1992, UNESCO declared it as 'a world heritage site in danger'. Conservation efforts are often intertwined with identities and social networks. MNP being situated in a culturally diverse, ethnically sensitive and politically volatile area of the northeast, required special and multidimensional conservation efforts to save itself from eroding off its rich biodiversity. Gradually, with support from the local communities, their commendable efforts in preservation and incentives from the government, most importantly with the formation of the Bodoland Territorial Autonomous Districts (BTAD) in 2003, the biodiversity of MNP could be aligned to the path of restoration, ultimately removing it from the list of 'heritage sites in danger' in 2011. An agreement signed in 2020 for granting of enhanced legislative and executive autonomy to the region, paved way to manage and control possible volatile situations in the erstwhile ethnically disturbed region.

Furthermore, Manas has been home to some of the endangered endemic wildlife such as the golden langur, pygmy hog, one-horned rhino etc. Over the years due to various reasons, the most notable one being the ethnic and civic unrest, the populations of these species drastically dropped, even wiping out the forest's entire rhino population. There have been reports that the local communities residing in the areas between the Sankosh and Manas rivers (where the natural distribution of golden langurs is found) greatly contributed to the conservation of the species by co-operating with the state forest department. Within the aegis of the India Rhino Vision 2020 (a multi-partner programme involving the BTC, government of Assam, WWF-India, the International Rhino Foundation etc.), the park now boasts of successful translocation of 32 rhinos from the source habitats. This would not have been possible without:

- The co-operation and acceptance of the local communities residing in some odd 56 villages in the fringes of the park. The role of community engagement in this particular aspect has been deemed inevitable.
- Partnership with local NGOs and state agricultural departments, livelihood options of the communiites dependent on forest resources are being developed by undertaking agricultural, renewable energy support programmes.
- The conversion of armed poachers into forest guards have not only incentivized their livelihood towards conservation specific goals but also has helped the use of their traditional knowledge in other conservation-related issues.

Currently, the Assam government, the BTC, WWF, and other NGOs have been helping community-based conservation organizations such as Manas Maozigendri Ecotourism

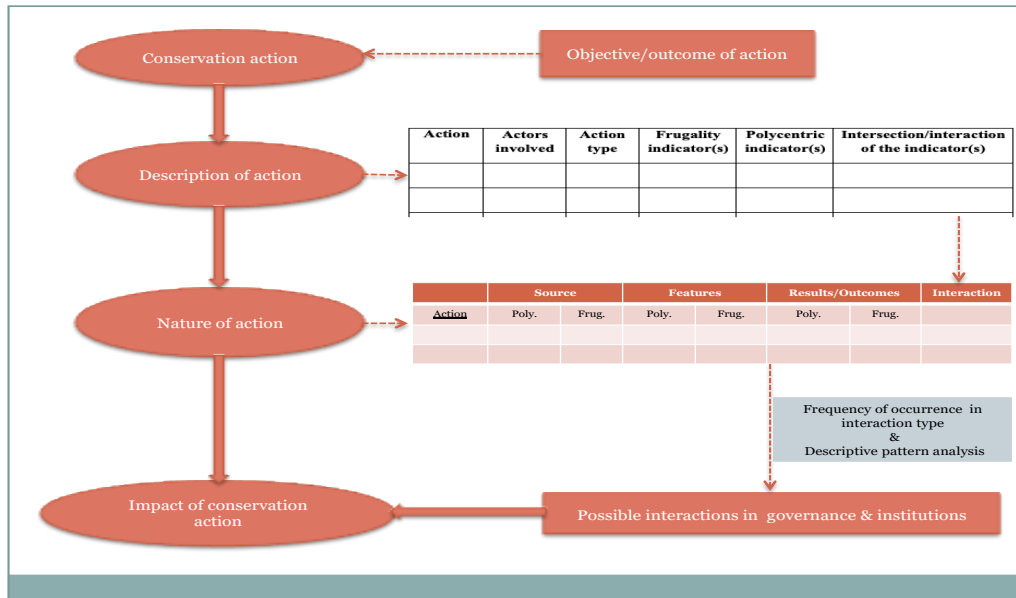
Society, Manas Ever Welfare Society etc. to raise awareness about the importance of conservation in the area. Collectively, 18 community organizations under the banner of United Front for Conservation of Nature are helping drive wildlife conservation in MNP. Despite undergoing a grim war over identities, ethnic clashes, political unrest, MNP and its wildlife, is reportedly once again thriving. Hence, it would be interesting to explore the dimensions of governance mechanisms at play in the area. The interplay of the geographical, political, ecological, socio-cultural, environmental aspects in Manas National Park provides uniqueness to itself, seldom seen elsewhere.

Furthermore, the Manas Biosphere Reserve is one of the sites recognized as running a successful community conservation programme, the Golden Langur Conservation Project. To achieve this, community based protection forces had been created in 2005, and they have been successfully protecting forests since then. They have been effectively stopping illegal poachers and confiscating illegally taken timber and wildlife. Members of the community living in the vicinity of the forest have taken up jobs as forest guards and are highly motivated to participate by multiple factors, viz., conservation, social benefits and economic opportunities (Allendorf *et al.*, 2013). Their traditional knowledge of the area and people around it has also played an important role in the effectiveness of this model.

Another example is The Pygmy Hog Conservation Programme. A part of this programme concentrates on grassland restoration in Manas National Park. The study proposes an experimental framework to understand the factors of change in species composition and habitat structure of the area. The study also focused on livelihood dependency on forest produce of communities from the fringe villages of the national park and aimed at decreasing such dependencies. Different stakeholders made various livelihood interventions in the past, which due to unsustainability, lack of market and support services, could not produce positive results. Further studies are being conducted to understand the socio-cultural and economic drivers of resource extraction from the forest. Such perspectives could prove beneficial in getting an insight into the reasons of forest dependency by the communities, which can help understand reasons for degradation of the forest area. In turn, such studies could help understand the shortcomings of conservation policies and hence help in the development of better and more inclusive strategies. In assessing the livelihood intervention method, it could be seen that the ultimate aim was the conservation of pygmy hogs in MNP. (Source: Report on the Pygmy Hog Conservation Programme- a collaborative project of the Durrell Wildlife Conservation Trust, IUCN/SSC, Forest Dept. govt. of Assam and Ministry of Environment and Forests govt. of India.)

Discussion:

The study proposes an analytical framework in order to qualitatively understand the interactions of the elements of frugality and polycentricity and the various degrees of manifestations of such theoretical concepts on the governance of biodiversity conservation. The framework could potentially provide a critical appraisal of policies relating to the same and an insight into the effectiveness of conservation programmes based upon existing governance structures. Based upon this, we reflect on whether the existing programmes and policies on biodiversity conservation could be directed towards a more inclusive policy, where there can be peaceful co-existence of human and nature.



The entry point for the analytical framework is the conservation action. For an action to qualify as such, we look at the objective or intended outcome of action (as per the Biological Diversity Act 2002). The nature of conservation action is to be specified as: Policy, Legislation, Guideline, Partnership, Mission, Scheme, and Project etc. A detailed description of the action is to be noted by the upper table, which captures: the nature of action (direct, indirect), sector or sectors (cross-sectoral) of action, actors involved, role of each actor, indicator of polycentricity, indicator of frugality, and type of interaction among the indicators. Once the action is recorded (as descriptive analysis), the governance of each case, based on a questionnaire, is identified as being: polycentric, frugal or a mix of both. The possible interactions among the governance types will be analyzed using the lower table. The type of interaction will be recorded with the help of this table to see whether it is: source-outcome, source-source, feature-outcome etc. Descriptive Analysis of the interactions can be done, and the impact of the interaction (if any) will be analyzed by looking at the conservation action outcome in each case.

This framework is an attempt to an in-depth understanding of the theoretical relationship between frugality and polycentric governance and consequently, and exploration of the impact of integrating frugality and polycentricism in biodiversity conservation governance. However, it needs to be considered as a work in progress.

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