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The Karbi Indigenous Community A Sustainable Relationship With Their Natural Environment

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Abstract- The Karbi people of Assam, India, are indigenous people with cultural practices that are deeply rooted in nature. Community knowledge of ecology, which is passed from generation to generation, enables community members to utilize biodiversity for subsistence activities and conservation practices while integrating traditional botanical knowledge. This relationship is also endorsed by traditional knowledge, community-based resource management, and spiritual and animistic beliefs. The Karbi are part of the ecosystem and this fosters a sense of responsibility amongst them for environmental protection. Indigenous land-use practices are a reflection of wider Indigenous worldviews about the interconnectedness of humans and nonhumans, which is a key element in ecological balance. The cultural practices like totemic beliefs, sacred groves and sustainable farming practices are closely associated with forest ecology. All of this, in combination, helps to conserve biodiversity and to ensure the long-term healthy environment and good health of the community. But with the advent of modernization, this precarious social-ecological relationship faces serious challenges and therefore it is important to look at the Karbi model of sustainability. The biocultural concept is a helpful lens through which to conceptualise customary governance systems as a means to enhance the resilience of ecosystems under human stressors. These frameworks also illustrate the linkages between cultural values and ecological health, and how local institutions can contribute to community response to chronic environmental changes. Indigenous lands are also designated as centers of biodiversity and cultural heritage, and incorporating traditional ecological management systems is in line with this global recognition.

Keywords- Karbi Tribe, Sustainability, Traditional Ecological Knowledge, Sacred Groves, Biodiversity Conservation, Indigenous Community, Assam.

I. Introduction

Etymological meaning:

The exact origin of the term Karbi is unknown. Arleng, the community's own name, literally means "man" in the Karbi language and represents how the Karbis have always defined themselves based on their humanity rather than an external title. During British occupation, the village was identified as Mikir in official and administrative documents. The word's meaning in the Karbi language is still debated, although the closest proposed derivation is from Mekar, which means "people." The legacy of this colonial designation has had significant administrative ramifications. The Indian Constitution still only recognizes the title Mikir, which means that Karbis living in states such as Meghalaya, Mizoram, and Nagaland cannot claim Scheduled Tribes classification despite being part of the same tribe.



II. The Karbi Identity and Cultural Heritage

The Karbi are an Indigenous community living mainly in Assam's Karbi Anglong district. They have a rich and long-standing cultural heritage. Their social structures and belief systems are closely connected to the surrounding landscape, reflecting a biocultural identity in which nature is essential to both physical and spiritual well-being. For the Karbi, local ecosystems are not simply commodities; they are expressions of ancestral care and stewardship. This understanding is consistent with biocultural perspectives that recognize the intrinsic and relational value of ecosystems and view them as central to community life rather than merely as sources of material resources. It also reflects evidence that conservation is often more equitable and effective when Indigenous peoples and local communities have meaningful authority over decision-making and resource governance, although outcomes vary according to local circumstances. It also reflects evidence that conservation is often more equitable and effective when Indigenous peoples and local communities have meaningful authority over decision-making and resource governance, although outcomes vary according to local circumstances.

Modern Challenges to Traditional Ways of Life:

Ecological knowledge is increasingly endangered by rapid social and economic change, and by the increasing presence of industrial activity. The transfer of ecological knowledge from one generation to the next and the authority of customary governance systems are being undermined by rapid social and economic change, and by the growing presence of industrial activities. These pressures are frequently generated by markets that are far away, and/or policies that are centralised which are not fully aware of the complex and inter-connected processes that affect landscapes that are managed locally. A weakening of local authorities in rule-making may also lead to a decline in potential connections between carbon storage, biodiversity conservation and livelihoods derived from forestry.

To tackle these challenges, the national development objectives need to be shaped by Indigenous people's needs and priorities and their culture. Local governance should be at the heart of their landscapes' management. Achieving sustainable ecosystem governance is not possible at a single spatial or institutional scale, so the policy-makers need to increase the level of cooperation between local, regional and national institutions to sustainably protect these connected social-ecological systems. Loss of biodiversity can also be linked to local food security and practices that are biodiversity friendly, like agroforestry systems, can be used. The need for community-based management is therefore critical. Integrating uses of forest products and encouraging more sustainable forests land-use practices can enhance ecological resilience and benefit the lives of local resource users.

The Karbi people have a strong connection with their environment, both in terms of their history and customs as well as the social organization of their community. Karbi people's livelihood, cultural life and social relations have been influenced by the varied ecosystems and natural resources of the region over generations. The Karbi are very spiritual, possess a strong attachment to their land and natural resources and see themselves as part of the wider environment. This view fosters a sense of responsibility for the protection and care of their ancestral lands and territories and the impact it has on



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their social, economic and religious lives. Their customs relate to forest ecology and reflect a comprehensive awareness of the human condition and the environment. There is an even closer connection of the Karbi community with its forest environment as forests are sources of food, medicine, and cultural identity. As environmental stewards, rooted in customary practices, this illustrates the possibility to conserve biodiversity in complex landscapes through Indigenous-led conservation. It is therefore necessary to have a community-based management.

Optimal use of multiple forest products and sustainable land-use can enhance ecological resilience and help sustain the health and welfare of local resource users. The effective community-led stewardship also requires good legal land tenure. The role of securing rights is to enable marginalised communities to defend their resources from big industry. Findings from Indigenous territories demonstrate positive impacts of formalised tenure, including better forest results, where communities have strong voice in land-use decision making and where customary institutions are recognised in broader governance frameworks. Access rights, meaningful participation in decision-making and institutional support for communities to monitor their processes should, therefore, be supported by legal recognition. These measures can complement each other and enhance the capacity of the Karbi people to safeguard their forests with sustainable and environmentally conscious resource utilization.

III. The following factors contribute to the “Karbi context”:

For the Karbi, sustainability is not a goal of the environment. Rather, a balance between traditional use and changing ecological needs on the land must be maintained. It takes an adaptive approach to traditional resource management and scientific monitoring to address environmental uncertainty to acquire such knowledge. It also entails a change from the traditional hierarchical model of decision-making to coordinated strategies for conservation at the community level that are flexible to the local context and will foster broader conservation of biodiversity. The rights and welfare of local communities must therefore be protected in land management policies, as well as the inter-connections between conservation, landscapes and the more-than-human world of Karbi society, in the context of conservation and restoration efforts.

The external actors' shift from extractive economy to agroecological economics by acknowledging and re-specting Indigenous knowledge can also help to move toward a post-growth economy. Traditionally, agricultural science has overlooked or marginalized the importance of IK, but it is essential for developing sustainable agriculture; IGR is an essential part of sustainability that can contribute to ending illegal resource harvesting and industrial encroachment. But the reform of tenure is not enough to guarantee long term conservation. It must be supported by good regulation, enforcement and extension with a focus on sustainable land use, including deforestation. These efforts should be done together, reflecting on the fact that some policy outcomes have failed and unequal power in forest governance and the socio-economic needs of various actors.



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From a Karbi perspective, the establishment of participatory institutions where community members, customary leaders, government officials, researchers and civil society can collaboratively priorities, monitor changes to the environment, and adapt the institutions' rules to suit changing environmental conditions. They have to have representation, conflict resolution, benefit sharing and accountability processes that are clear to these institutions, as collaboration does not always result in a fair outcome. They should also ensure that they are the agents of the Karbi decision-making process and prevent "elite capture". By engaging in continuous learning and adaptation, earlier policy shortcomings can be rectified to develop strategies that are locally driven and promote forest resilience and community well-being.

Environmental Conservation:

In the context of Karbi, environmental conservation is defined as the protection of forests, water and biodiversity through traditional ecological practices and community stewardship which ensures their availability for future generations. Agroforestry, which can be carried out sustainably, can contribute to biodiversity and enhance the resilience of local farming systems, along with soil- and water-conservation practices. The restoration activity and the nature of support for natural vegetation re-establishment should be tailored to local social and political situations, and should aim to restore long-term ecosystem health. Conserving organic matter, minimizing use of harmful chemicals and maintaining soil organisms that enhance nutrient cycling and soil quality.

These steps enhance ecological processes that underlie Karbi agroforestry systems. Preserving native vegetation, riparian buffers and habitat corridors also is significant as they support wildlife movement and genetic exchange between fragmented landscapes. All these can contribute to a more integrated and varied land use system that can ensure ecological strength and local livelihoods. Cultural preservation relies on preservation of Karbi traditional knowledge, tradition, oral traditions and spiritual beliefs. These elements contribute to the construction of a collective memory, social cohesion, and cultural identity from one generation to the next. Protecting and restoring ancestral territories is inextricably linked to this work as the physical terrain holds a lot of the ecological knowledge in the form of Karbi cultural practices. Incorporating these cultural factors into land-use planning can help ensure sustainment of biodiversity and social and economic health of the community.

Participatory mapping can help to map and document sacred sites, customary-use areas and culturally important species to inform zoning and restoration as well as scientific evidence. Such planning should acknowledge Karbi institutions as legitimate knowledge holders and decision-making authorities not simply as 'cultures' that are holding sources of information. Integrating ICLR can therefore help to enhance ecological sustainability and livelihood security. Cultural preservation is an integral component of conservation governance, which will help to preserve Karbi identity and the care of ancestors' landscapes.

Economic Viability: In the presence of diversity in livelihood and land-use options of the Karbi household, these systems are more economically viable. These should include consideration of community well-being, cultural values, development that re-time (Kremen & Merenlender, 2018). This balance can be achieved by payments for



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ecosystem services and CLT incentives. These mechanisms must be able to capture the potential of landscape scale management and enable the participation of people for them to be effective. Financial assistance should be accompanied by technical assistance, market access and development benefits that are community based. Programmes should be initiated around the Karbi institutions and livelihood priorities, as income generated from short-term payments may not be sufficient to support agroforestry and/or to compensate their members for income they could also generate from other livelihood options (Cole, 2010; Torres, MacMillan, Skutsch, & Lovett, 2013).

Clarifying eligibility criteria, community monitoring and benefit sharing can ensure that everyone understands how programme decisions are being taken. These safeguards can limit the benefits to a small number of beneficiaries, and help to finance conservation through customary stewardship while ensuring access to valued resources (Calvet-Mir, Corbera, Martin, Fisher, & Gross-Camp, 2015; Blundo-Canto, et al., 2018, p. 150). Programmes should also be carefully assessed to identify whether they offer any extra benefits for the ecology, provide better household well-being and offer benefits fairly. It is especially relevant given the potential for non-equal livelihood outcomes due to limited institutional capacity and accountability (Samii, et al., 2014; Blundo-Canto, et al., 2018).

IV. TEK and Resource Management

Forest Dependence and Non-Timber Forest Product Utilization:

Forests are a vital source of food, medicine, handicrafts and other household products for the Karbi people. TEK is one of the ways to help people identify, harvest, and promote the renewal of non-timber forest products. The forest resource management also helps in biodiversity and cultural identity (Mipun, Bhat, Borah, & Kumar, 2019; Nasrin & Barman, 2025, p. 1). These practices are supported by careful management of fallow areas which are part of an agroforestry cycle, used for supplying food and fodder and allowing soils to recover. This also points to the importance of investigating other streams of income other than the traditional NTFP sources, especially in the light of the increasing exposure of communities to fluctuating and unpredictable markets.

Future studies should explore the possibility of measuring and valuing ecosystem services to enable payment schemes to be put in place that fairly compensate small-holders for their contribution to environmental protection and climate change mitigation. Evaluations may take into account culturally relevant community benefits, water control, soil restoration, biodiversity, and carbon sequestration. They should also consider the other income potential a household may miss out on when choosing one land use over another, as well as the costs of monitoring and operating programmes (Calvet-Mir, Corbera, Martin, Fisher, & Gross-Camp, 2015, p. 158). Engaging with community institutions and Karbi households to determine these benefits can support the development of indicators and payment amounts that are trusted by communities. A careful assessment also needs to be made to assess if these incentives create further environmental advantages without jeopardizing livelihoods or customary access to resources (Samii, et al., 2014; Blundo-Canto, et al., 2018).



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The need to preserve sacred groves and conserve biodiversity.

Sacred groves provide valuable haven for flora and fauna. These sites enjoy limited resource extraction and disturbance through traditional beliefs, which help conserve biodiversity/genetic resources and knowledge of ecosystem management (Pandey, 2007). Their location across the landscape may also link forest areas and facilitate gene flow, as well as offering safe habitat for species sensitive to land-use change. As sanctuaries and links in the landscape of agriculture, sacred groves can mitigate the impacts of fragmentation (Ray & Ramachandra, 2010; Bhagwat & Rutte, Sacred groves: potential for biodiversity management, 2006).

The conservation of their groves is not the only thing that requires protection, but the maintenance of other habitats, such as riparian vegetation and maintenance of tree cover, in the vicinity of the groves also needs protection. These features can help improve landscape connectivity and the biodiversity in the groves (Bhagwat et al., 2005, A Landscape Approach to Biodiversity Conservation of Sacred Groves of Western Ghats of India). Sacred groves can therefore be considered as integral components of a broader cultural landscape of the Karbi and include them in the protection of species and ensure continuity of customary practices of conservation.

Traditional Agricultural Practices:

The Karbi communities practice rotational shifting cultivation by taking part in different agroforestry cycles of alternating cultivated fields with fallow fields. Practices that assist in preserving soil and a diverse landscape. Mixed cropping, crop rotation and the use of a suitable leguminous tree species that will grow locally bestows a wide variety of crops, boosts soil fertility and nutrient retention without synthetic fertilizers, and offers a foundation for the integration of appropriate modern technologies to enhance climate-smart food production (Myllemngap, 2021; Aich, Dey, & Roy, 2022, p. 10).

Traditional knowledge and scientific approaches have the potential to be complementary and contribute to flexible natural-resource management. Communities can gather locally from both experiences and formal monitoring data, and incorporate local values and institutions into the decisions they make (Rist, Shaanker, Milner-Gulland & Ghazoul, 2010; Berkes, Colding & Folke, 2000 p.13). For example, in the Karbi landscape, communities could map sacred groves and agroforestry areas, keep track of indicator species and soil conditions, and adapt rules of management based on changing conditions. The knowledge holders of the Karbis must be the partners of this work and not just sources of information.

Involving the community in identifying observations and making decisions about conservation can contribute to meaningful participation and effective conservation action (Thompson, Lantz & Ban, 2020, p. 1). Conserving sacred habitats can also maintain cultural links and continuity and help to sustain the diversity of the landscape. Community protected sacred sites may be used in conjunction with formal conservation networks to maintain habitats, and to promote local stewardship (Bhagwat & Rutte, 2006, Sacred groves: potential for biodiversity management).



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Shifting Cultivation and Its Sustainability:

Shifting cultivation or jhum as it is called locally is the practice of cutting down a piece of forest, cultivating it for a couple of years and then allowing it to lie fallow for a few years. This can support livelihoods and various crops and other species under long fallow periods. Population growth and the reduced crop rotation periods, however, can lead to deforestation, soil erosion and reduced soil fertility. These problems can be solved by using agroforestry, good management of fallow and terracing. For instance, afforestation with nitrogen-fixing trees or greater diversity of crops can enhance the soil fertility and health of ecosystems, boost productivity and livelihoods, and strengthen environmental security (Leakey, 2014).

Policies which value fallow lands and promote a diversity of landscapes are helpful in achieving these changes. This involves securing customary land rights, demarcating fallow land, offering technical and financial assistance for soil conservation, better fallows and community-based agro-forestry. Instead of assuming that jhum is necessarily an "agricultural practice to be avoided", policies should aim to encourage its sustainable management (Dressler, et al., 2016, p. 306). There should also be more engagement with the decisions being made by cultivators and programmes should be evaluated with locally agreed indicators of livelihood security, biodiversity and soil recovery. This can help to ensure that the customary access to food, fuel, fodder and other fallow land resources is not limited by conservation incentives. This way of sharing the landscape can sustain ecological functions and support communities' gradual adaptation to the changes of their demography and markets.

V. Climate change and environmental degradation

Vulnerability to Climate Change:

Climate change-induced species' shifts in their distribution are affecting the Karbi region more and more. Such alterations may affect the customary farming schedules and leave the livelihood activities difficult to sustain. Smallholder farmers are already dealing with demographic and socioeconomic pressures, and are additionally impacted by irregular rainfall and rising temperatures. Because of this, it is particularly critical to adopt climate-smart practices – methods that allow for the efficient use of resources and help ensure stable harvests.

The local adapted, drought-tolerant varieties, mixed cropping, agroforestry, soil conservation, water harvesting and better management of fallow land are the priorities. These practices can help reduce the probability of crop losses and promote soil health and agrobiodiversity (Aich, Dey and Roy, 2022; Altieri, Nicholls, Henao and Lana, 2015, p. 2). Community-based weather forecasts and meteorological data could also be used for adjusting planting schedules, supporting farmers to adapt to changes in the seasons while maintaining traditional ecological knowledge (Yang, et al., 2019). These measures should be designed in the participation of communities, for scientific innovations to reinforce rather than replace the Karbi farming institutions and locally tested adaptation measures (Singh & Singh, 2017 p. 307)

The loss or degradation of forests due to removal is known as deforestation and habitat loss. Deforestation, loss of habitats and biodiversity are strongly driven by illegal



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logging, infrastructure development and unsustainable jhum practices, especially reduction of fallow periods. Ecological pressures destroy the ecological processes, thus reducing the access of the forest resources to the livelihood of the Karbi communities. Restoration is therefore urgently needed, and should be planned and implemented in consultation with local communities with the goal of restoring ecosystems whilst allowing for continued customary resource use (Haq, Pieroni, Bussmann, Abd-El Gawad, & Elansary, 2023; Erbaugh, et al., 2020, p. 47).

Focus on degraded corridors and need to implement measures like erosion-control trees and native multipurpose species to address soil erosion while simultaneously offering households NTFPs (Leakey, 2014). The ecological knowledge of the Karbi can support the decision on what species to plant based on the soil properties, seasonal availability, cultural values and cultural harvesting patterns etc. Avoid monoculture plantations as they can decrease habitat quality and limit future options for forest use. Community stewardship would be further enhanced by community nurseries, locally agreed harvesting rules, as well as long-term observation of seedling survival, vegetation recovery, soil stability, and household benefits. These measures can be integrated to create a socially fair and ecologically effective restoration process (Haq, Pieroni, Bussmann, Abd-El Gawad, & Elansary, 2023; Erbaugh, et al., 2020, p. 47).

VI. Conservation Efforts and Community-Based Initiatives

A Sacred Grove helps conserve the environment by:

Sacred groves are significant areas of biodiversity. They serve as buffers for the remaining natural vegetation and as a link to habitats in fragmented landscapes. Protecting them can thus be good for nature and cultural heritage (Hansepi & Laisram, 2022). Connecting sacred groves to broader conservation networks, and if appropriate, to formal protected area systems, may enable more habitats to be protected. Such actions should consider the rights of local people to use land and resources instead of arbitrary controls on land use (Bhagwat & Rutte, Sacred groves: potential for biodiversity management, 2006; Bhagwat et al., The Role of Informal Protected Areas in Maintaining Biodiversity in the Western Ghats of India, 2005).

Communities in surrounding buffer areas might have the capacity to establish sustainable guidelines for harvesting timber, fuelwood, medicinal plants, and other forest products such as how much and when to harvest. Policies should be updated as needed by regularly monitoring species diversity, forest regeneration, resource availability, and household needs, to both communities and conservation agencies. This flexible option may offer a solution to avoid depletion of resources, promote local stewardship, and sustain cultural traditions, which contribute to the conservation of sacred groves.

Decisions in community forestry and Joint Forest Management will be best made open and shared. The role of local people in the management of forests and the benefits they reap should be important and just. Residents can sustainably care and utilise forest resources through community forestry. Joint Forest Management is a process that involves working together by government agencies and community groups to do this.



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Both are inclusive and account for one another, they can contribute to forest restoration, livelihoods and sustainable resource use.

They are successful when conditions in society and the economy that influence forest management are favorable. Local leadership, clear and stringent rules, land tenure and resource rights security, mutually agreed boundaries, and recognition of households' dependence on forests are important (Pagdee, Kim, & Daugherty, 2005). Publicly developing rules, documenting them on a regular basis, ensuring appropriate penalties are enforced fairly and proportionately, and apportioning benefits fairly can improve accountability, reduce elite capture and promote forest protection (Pagdee, Kim, & Daugherty, 2005; Persha, Agrawal, & Chhatre, 2011).

Formal community-management groups should be inclusive and include women, poorer households and others relying on forest resources. They should also be capable of modifying their rules when the ecological conditions and the local requirements change (Fischer et al., 2023; Gatiso, 2017, p. 1340). Community practices linked to national environmental objectives (e.g., land degradation reduction and biodiversity protection) can also contribute to the long-term management of community-managed forests (Grantham, et al., 2020, p. 5983).

VII. Conclusion

Effective partnerships between the Karbi community and the science community, which are based on mutual respect and equitable terms while being led by community, are crucial for the long-term sustainability of the community. This collaborative effort could contribute to culturally suitable solutions for climate resilient agriculture, forest and biodiversity conservation, and healthcare, respecting the Karbi values, customary institutions and resource utilization practices (Hansepi & Laisram, 2022; Ijatuyi et al., 2025). Local knowledge holders should be involved in prioritizing, designing, interpreting and monitoring outcomes. In this way, scientific methods can complement and reinforce the authority of the communities, instead of replacing it (Thompson, Lantz, & Ban, 2020; Ballard, Fernández-Giménez, & Sturtevant, 2008; Dawson, et al., 2021, p. 1).

Enabling local ecological knowledge to inform environmental decision-making helps create resilient landscapes and respect Indigenous sovereignty. This involves acknowledging the legitimacy of Karbi institutions and customary land rights as sources of authority for decisions rather than simply data collection sites or as project participants imposed from the outside (Brondízio, et al., 2021; Thompson, Lantz, & Ban, 2020). Monitoring can be designed jointly by communities and researchers and can integrate scientific measurements and local observations of environmental changes.

The outcomes can enable communities to grasp what's happening, update management rules, and better prepare to flex and respond to emerging pressures in a way that is accountable (Thompson, Lantz, & Ban, 2020; Dawson, et al., 2021, p. 1). This can also help to protect cultural knowledge, pass it down through generations and allow Karbi households to have a voice in the decision-making process, and to reap benefits of the conservation. Local knowledge can also play a role in governance to address the mar-



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ginalisation of local knowledge in dominant, technocratic management systems (Mistry & Berardi, 2016; Filho, et al., 2021).

These initiatives should not only be used to record Indigenous knowledge; rather, they need to be based on principles of transdisciplinary peer communities where "knowledge holders become equal partners in the production of knowledge and development of conservation strategies" (Reyes-García & Benyei, 2019, p. 659).

The main issues are deforestation, climate change, loss of traditional knowledge and socioeconomic inequality. However, there are also positive prospects in the field of sustainable agriculture, ecotourism, community-based conservation and cultural heritage. Through action that is well-planned and can build on strengths, a more sustainable future can be achieved and these challenges overcome.

Implementation of these strategies will require stakeholders to have adaptive management frameworks that enable conservation actions to adapt to the changing climatic indicators and locally observed environmental conditions (Pecl, et al., 2017, p. 23).

VIII. Concluding Remarks

The Karbi community has a significant chance to create a sustainable future. Combining TEK with appropriate scientific and technological solutions can help ensure ecologically resilient culturally-based approaches for the benefit of future generations. To make this vision a reality, community leadership will have to be sustained, policies adopted will have to be supportive and respect will be given to the Karbi cultural identity, customary institutions and ancestral knowledge. In general, the combination of scientific evidence with local practices, knowledge systems and community priorities increase the likelihood of the sustainable management of tropical ecosystems (Barlow et al., 2018, p. 527).

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