

Indigenous People's Knowledge and Sustainable Development, with Special Reference to Sikkim

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Abstract: *Indigenous Knowledge Systems (IKS) are establishing themselves as a significant method of thinking about global sustainable development due to the fact that they provide distinct and tried-and-true solutions to environmental issues. Mainstream developmental methods, which are often founded on reductionist concepts, have typically pushed indigenous perspectives to the side. This has resulted in the loss of biodiversity as well as the collapse of social and cultural norms. The purpose of this study is to investigate the inextricable connection between indigenous biological knowledge and sustainable development, with a particular emphasis on the geographical environment and culture that are distinctive to Sikkim. Sikkim, which is mostly populated by the Lepcha, Bhutia, and Limbu tribes, is an excellent illustration of how traditional methods of water management, the protection of sacred groves, the husbandry of wildlife, and the use of traditional medicine are all in accordance with the Sustainable Development Goals (SDGs) that have been established by the United Nations. The purpose of this study is to argue that indigenous knowledge need to be included into state-led development initiatives by analyzing historical patterns and the policy frameworks that are now in place. The move that Sikkim has made to become a state that is entirely organic is offered as an example of this. For the purpose of demonstrating that sustainable development in the Eastern Himalayas is impossible without the active participation and epistemic acceptance of indigenous people, this research makes use of historical analysis, secondary data, and political ecology theories.*

Keywords: Indigenous Knowledge Systems (IKS), Sustainable Development, Sikkim, Lepcha, Agro-biodiversity, Sacred Groves, Eastern Himalayas, SDGs

1. Introduction

In 1987, the Brundtland Commission popularized the notion of sustainable development, which aimed to address current demands without jeopardizing future generations' capacity to do the same. But indigenous peoples have been practicing eco-sustainability within their own natural borders for millennia before this worldwide requirement. Indigenous knowledge, or IK, is the accumulated store of information about a culture's history, customs, and beliefs that has been preserved via cultural transmission and has developed over time [1]. Knowledge like this is more than just a relic; it's a scientific road map for protecting the environment in the Eastern Himalayas, a prime location for biodiversity on a worldwide scale.

The small Indian state of Sikkim provides a remarkable case study for researching how IK and sustainable development interact. The diverse landscape of the state, which includes tropical foothills and alpine tundra, has provided a home to several indigenous people, the most prominent of which are the Lepcha (Rong), Bhutia (Denjongpa), and Limbu (Tsong). In the past, these cultures revered the terrain rather than seeing it as a commodity to be exploited [2]. Indigenous cosmology and sustainable resource usage have always worked hand in hand, as shown in the historical trajectory of ecological protection in Sikkim. Examining how indigenous traditions in Sikkim provide practical means to reach the SDGs, this study aims to deconstruct this synergy. It focuses on Goal 15 (Life on Land), Goal 2 (Zero Hunger), and Goal 13 (Climate Action).

2. Conceptual Framework

IKS and the Sustainable Development Paradigm

The perspective of the post-colonial developmental state, which often adopted a technocentric position, nature was seen as a resource for the sake of economic development. Because of this, what scholars refer to as "maldevelopment" occurred, which is a process that deprives individuals who are disadvantaged of resources and destroys their way of life. In order to support the paradigm shift toward sustainable development in the twenty-first century, there is a need for a change in epistemic beliefs.

IKS offers a more all-encompassing view on life since it does away with the boundaries that exist between naturally occurring environments and human persons. In contrast to the inclination of the Western scientific tradition to segregate ecological, economic, and social problems, indigenous knowledge brings together all three of these areas of concern. Agricultural practices, water collecting, forest management, and animal husbandry are all examples of traditional ecological knowledge (TEK) in the Himalayan environment. This information has been tailored to the specific microclimate of the region. They are proof that indigenous communities are dynamic agents of change, with knowledge systems that are able to adapt to the difficulties given by current climate change. Indigenous knowledge systems (IKS) are not a method of reminiscing about a bygone past; rather, an indication that indigenous cultures are dynamic agents of change.[3]

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The Indigenous Mosaic of Sikkim: A Historical Perspective

The indigenous populations of Sikkim must be studied historically and culturally to understand their ecological knowledge and sustainable practices. Sikkim is a unique Himalayan civilization where environment, spirituality, and communal life have linked for ages. The state's indigenous Lepchas, Bhutias, and Limbus created unique environmental ethics and resource management systems that promoted ecological sustainability and social peace. The Lepchas are considered Sikkim's indigenous people. Their traditional worldview is animistic, believing mountains, rivers, woods, lakes, and trees are holy and inhabited by Mun. The Lepchas appreciate and defend nature as a living creature. Their conservation lifestyle was formed by their spiritual connection to nature. Customary beliefs and rituals governed hunting, forest extraction, and farming to ensure survival. The people revered Mount Khangchendzonga, Teesta and Rangeet rivers, and deep Himalayan woods [4].

Bhutias from Tibet in the 14th and 15th centuries brought Tibetan Buddhism to Sikkim. Tibetan Buddhism promotes compassion, nonviolence, and interdependence. These intellectual foundations shaped Sikkimese environmental ethics. Monasteries became sites of religious and ecological protection. Several monastic forests were hallowed woods where hunting, tree cutting, and destruction were forbidden. Buddhist teachings supported human-nature harmony and sustainable agriculture, animal husbandry, and forest utilization. The Bhutia people used transhumance and agro-pastoral systems to use Himalayan resources seasonally and sustainably [5].

The Limbu population, mostly in western and southern Sikkim, added to the unique ecological patchwork. The Limbus followed Kirat, which merged animistic religion with agriculture and pastoralism. Terrace farming, cattle, and forest-based sustenance supported them. Limbu culture valued collaborative land management, water conservation, and biodiversity. Agriculture, fertility, and woodland rituals showed a strong ecological understanding that promoted environmental responsibility. Limbu-developed indigenous crops, millet cultivation, and mixed agricultural methods improved food security and ecological resilience. Decentralized and community-oriented institutions handled Sikkim's natural resources. Local government systems-maintained woods, water, and agricultural land before colonization. In the 17th century, the Namgyal dynasty founded Sikkim and acknowledged the value of customary rules and indigenous institutions in social and ecological equilibrium. The monarchy relied on local populations to control environmental usage according to customary norms and cultural ethics rather than extracting resources exploitatively. North Sikkimese Dzumsa was a major traditional institution. The Dzumsa was a democratic village council that managed local social, economic, and ecological issues. It controlled grazing, forest exploitation, irrigation, and agriculture. Community members set norms for using shared resources to ensure fairness and avoid overexploitation. Punishments for breaking ecological rules reinforced social environmental discipline. Such methods

included participatory governance and sustainability before current environmental management frameworks [6].

In Sikkim, village-level Panchayat institutions and traditional village councils helped balance human demands with natural constraints. Agricultural operations followed seasonal cycles, while taboos, sacred beliefs, and community obligations preserved forests. Traditional governance methods protected the fragile Himalayan ecology from unsustainable land and biodiversity exploitation. Many indigenous systems were changed by colonial economic forces and modernity. Commercial agriculture, road building, tourism, and population increase stressed natural resources. Many traditional traditions and ecological ideals in Sikkim impact current environmental initiatives. Indigenous ecological knowledge and community engagement have helped the state accomplish organic farming, biodiversity protection, and sustainable tourism. So, Sikkim's indigenous mosaic symbolizes cultural variety and a historically established system of sustainable environmental stewardship. Lepcha, Bhutia, and Limbus ecological wisdom shows how indigenous knowledge systems can conserve biodiversity, climatic resilience, and sustainable development in the Himalayas [7].

Manifestations of Indigenous Knowledge in Sikkim's Ecology

Traditional Agro-Biodiversity and the Large Cardamom Economy:

In Sikkim, the cultivation of large cardamom, also known as *Amomum subulatum*, is considered to be one of the most significant contributions of traditional wisdom to the process of sustainable development. The cultivation of huge cardamom takes place under the canopy of lush temperate broadleaf woods. This cardamom was first introduced and polished by indigenous populations. This is an excellent illustration of agroforestry, which is a sustainable land management (SDG 15) technique that is well aligned with this particular activity.

Cardamom agroforestry is a method that preserves the forest cover while also delivering a high-value cash crop. This is in contrast to monoculture plantings, which contribute to the degradation of soil health and the reduction of biodiversity. For the purpose of processing cardamom, the Lepcha and Bhutia farmers make use of certain indigenous methods. One of these methods is the ancient Bhatti (drying oven) method, which makes optimal use of the fuelwood that is readily accessible in the area. The historical incorporation of this crop into the local economy exemplifies how indigenous populations were able to attain economic viability without resorting to deforestation [7].

Sacred Landscapes and In-Situ Conservation:

From ancient times, indigenous groups in Sikkim have been engaging in a sort of conservation that is referred to as in-situ conservation by contemporary ecology. The practice of establishing holy groves, also known as Gumpa woods, Devithan, and Sarnas, is widespread across the state. Customary taboos (nemi) ban activities like as hunting, logging, and even the harvesting of fallen wood in certain

areas of the forest, which are devoted to the deities of the local community.

For instance, the trees that surround well-known Buddhist monasteries in Sikkim, such as Rumtek and Pemayangtse, have been protected for generations as a result of the spiritual sanctions that have prevented their destruction. In a similar manner, holy locations of the Lepcha people, which are often linked with their ancestors and spirits, serve as refuges for biodiversity. At the same time as they function as ecological corridors, these holy landscapes also help to sustain microclimatic stability. Throughout history, the cultural ban against disrupting these regions has shown to be more successful than the forest regulations that have been enforced by the state. This brings to light the significance of spiritual ecology in the process of sustainable development.[8]

Traditional Water Management Architecture:

A major obstacle to water management in Sikkim is the state's mountainous terrain and monsoonal climate. The indigenous peoples of this land created elaborate and inexpensive methods for collecting and distributing water. Soil erosion might be prevented by directing spring water to agricultural terraces by traditional stone-lined channels (Kuls) and bamboo pipes (Tongba systems).

Additionally, according to the indigenous Moo Lepcha system of spring categorization, some springs were only to be utilized for drinking, while others were to be used for irrigation or ceremonial reasons. This zoning system guaranteed fair distribution while also preventing contamination. These indigenous hydrological maps are being re-evaluated by state water policymakers in an effort to revitalize drying watershed zones in modern times, as Sikkim deals with the effects of climate change, which are showing up as drying springs [9].

Ethno-Medicine and Bio-Resource Management:

Sikkim's ancient medical techniques, in particular Sowa-Rigpa (Tibetan medicine practiced by the Bhutias) and the shamanic healing traditions of the Lepchas (Mun and Bongthing), are wholly dependent on the indigenous flora of the region. Native American healers have an extensive understanding of the phenology, ecology, and therapeutic characteristics of Himalayan plants (such as *Aconitum* species, *Rheum nobile*, and *Podophyllum hexandrum*, for example).

It is the procedures for harvesting that are responsible for the sustainable element of this knowledge. In order to guarantee that the plant will regenerate, indigenous healers never uproot the whole plant; rather, they pick particular portions of the plant at specified periods of the year. The destructive harvesting that is driven by the commercial pharmaceutical business, which has pushed numerous Himalayan species into the brink of extinction, stands in striking contrast to this sustainable extraction strategy.[10]

3. Objectives of the Study

- 1) To statistically analyze the demographic profile of indigenous communities in Sikkim using Census data.

- 2) To evaluate the ecological impact of traditional conservation practices using Forest Survey of India (FSI) data.

4. Method

The present study is based entirely on secondary data analysis. Research on indigenous peoples and sustainable development in Sikkim drew from a variety of credible sources, including government documents, academic publications, and historical records. The 2011 Indian Census provided the demographic data for Scheduled Tribes (ST), while the Forest Survey of India provided statistics on forest cover and canopy density (FSI, 2021). The Economic Survey of Sikkim and reports from NITI Aayog provided data on organic farming, agricultural land use, and sustainable development indicators. We also combed through scholarly articles and archival materials to fill up the gaps in our understanding of Sikkim's Indigenous Knowledge Systems (IKS) [11].

In order to make sense of the data, we used descriptive statistical methods such as percentage analysis, comparison analysis, and growth rate interpretation. By using these techniques, we were able to better understand the sustainable development results in Sikkim and the interconnections between indigenous peoples' distribution, traditional land-use patterns, forest preservation, and other factors.

Statistical Analysis of Indigenous Demographics and Land Holding

The demographic presence of indigenous groups in order to determine the extent of the influence that IKS has had at the scale. Sikkim has a distinct demographic structure, in which indigenous Scheduled Tribes (STs) constitute a sizeable majority in comparison to the average proportion of the national population.

Table 1: Demographic Distribution of Indigenous Communities in Sikkim (Census of India, 2011)

Category	Population	Percentage of Total State Population	Percentage of Rural Population
Total Population of Sikkim	610,577	100.00%	75.03%
Total Scheduled Tribes (ST)	206,360	33.80%	87.44% (of total ST)
Bhutia	70,301	11.51%	62.10%
Lepcha	40,048	6.56%	78.90%
Limbu	38,624	6.32%	89.50%
Sherpa	14,945	2.45%	85.20%
Source: Compiled from Census of India, 2011 (Primary Census Abstract)			

According to the data in Table 1, 33.80% of the people living in Sikkim are members of indigenous Scheduled Tribes. Importantly, 87.44% of STs reside in rural regions, making it clear that these groups are highly concentrated in rural areas. Given the strong correlation between IKS and rural land-use, it is encouraging to see that more than 88% of the indigenous people is still using traditional agro-ecological methods. Among the groups that rely on and manage forest-fringe ecosystems, the Lepcha and Limbu

have the largest rural concentrations (78.90% and 89.50%, respectively).[12]

Ecological Sustainability: A Statistical Analysis of Forest Cover

According to Sustainable Development Goal 15 (SDG 15: Life on Land), the preservation of forest cover is the most tangible indicator of sustainable development. Throughout history, indigenous traditions such as the protection of holy groves and Gumpa woods, also known as Devithans, have been effective in preventing destruction.

Table 2: Forest Cover in Sikkim Compared to National Averages (FSI 2021)

Parameter	Sikkim	India (National Average)
Total Geographical Area (sq km)	7,096	3,287,263
Total Forest Cover (sq km)	3,342.41	7,13,789
Forest Cover as % of Geographical Area	47.10%	21.71%
Very Dense Forest (VDF) %	21.89%	3.04%
Moderately Dense Forest (MDF) %	20.80%	9.33%
Open Forest (OF) %	4.41%	9.34%
Source: Forest Survey of India, State of Forest Report 2021		

According to the information shown in Table 2, there is a significant statistical gap between Sikkim and the rest of India. The overall forest cover of Sikkim is 47.10 percent, which is more than twice as high as the national average of 21.71%. The state of Sikkim has the greatest proportion of Very Dense Forest (VDF) in India, which is 21.89%. This is also the most notable fact about Sikkim. To put this into perspective, the national average is just 3.04 percent. Taking into consideration the concept of sustainable development, the VDF is a representation of climax ecosystems that possess the maximum potential for carbon sequestration and biodiversity. This statistical oddity cannot be explained just by geography; rather, it is a direct outcome of indigenous conservation ideals that have been in place throughout history and continue to exist now. [13] The cultural ban against removing trees in holy landscapes has statistically resulted in the preservation of these exceptionally thick canopy areas, notably in North and West Sikkim, which have the largest numbers of indigenous communities. This outcome has been a significant factor in the preservation of these places.

Agricultural Sustainability: The Organic Transition and Indigenous Knowledge

After becoming the first state to do so in 2015, Sikkim gained international recognition as an authority in organic farming. Indigenous agro-ecological expertise was crucial to the execution of this government strategy, the Sikkim Organic Mission (SOM). Composting (Dhapra), manure from farms, crop rotation, and mixed cropping are all examples of indigenous methods that have been codified into official policy.

Table 3: Statistical Shift in Agricultural Practices in Sikkim (2003-2015)

Agricultural Parameter	2003-04 (Pre-Mission)	2015-16 (Post 100% Organic)	% Change
Total Cultivated Area (in '000 Hectares)	109.40	109.20	-0.18%
Area under Cash Crops (Large Cardamom)	24.50	26.80	+9.38%
Consumption of Chemical Fertilizers (MT)	675.00	0.00	-100.00%
Consumption of Chemical Pesticides (MT)	72.50	0.00	-100.00%
Net Cropping Intensity (%)	118.50%	124.60%	+5.14%
Source: Economic Survey of Sikkim (2016-17), Directorate of Economics & Statistics, Govt. of Sikkim			

A dramatic change in structure is seen in Table 3. According to traditional agricultural economics, which anticipates a decline in yield upon withdrawal of chemical inputs, it is impossible to completely eliminate chemical fertilizers (-100%) and pesticides (-100%) without a corresponding collapse in cultivated area (-0.18%). Rather, there was a 5.14 percent rise in cropping intensity. The traditional cultivation of Large Cardamom (*Amomum subulatum*) lies at the heart of this statistical achievement, which is firmly grounded in indigenous knowledge. A 9.38% rise was seen in the area under cardamom. Native to Sikkim, cardamom is cultivated as an agroforestry crop under the shadow of the *Alnus nepalensis* (Uti) tree. This time-honored indigenous method exemplifies both SDG 2 (No Hunger) and SDG 15 (Life on Land) since it produces valuable commercial crops while preserving forest cover. [14]

Table 4: Economic Valuation of Indigenous Agro-Forestry (Large Cardamom) in Sikkim

Year	Production (Metric Tonnes)	Value (INR in Lakhs)	Share in India's Total Production
2018-19	5,120	15,360.00	~55%
2019-20	4,850	15,550.00	~54%
2020-21	5,450	18,030.00	~57%
Source: Spices Board India & Economic Survey of Sikkim			

Table 4 shows how indigenous knowledge contributes to economic sustainability. More than half of India's huge cardamom is grown in Sikkim. Economic value (INR 18,030 Lakhs in 2020-21) is a direct measure of IKS's contribution to SDG 8 (Decent Work and Economic Growth) and SDG 1 (No Poverty) in rural indigenous belts, as this crop is grown solely using indigenous agroforestry techniques instead of monoculture. [15]

5. Discussion

Synthesizing IKS, Data, and Sustainable Development

The contention that Indigenous Knowledge Systems (IKS) play a significant part in fostering sustainable development in Sikkim is given substantial support by the examination of secondary data and historical evidence. The ecological accomplishments of the state are intricately linked to the traditional environmental ethics and community-based resource management methods that have been created by indigenous people over the course of many generations. The statistical data that pertains to the protection of forests,

organic agriculture, and the implementation of policies reveals that indigenous ecological practices are not only cultural traditions but rather systems that are both scientifically relevant and scientifically applicable to the concept of sustainability.

This link may be seen in Sikkim's forest conservation practices, which is one of the most readily apparent instances of this relationship. Based on the findings of the Forest Survey of India (FSI), it has been determined that roughly 21.89% of the state's total land area is covered by very thick forest. It is intimately related with indigenous traditions of sacred landscape conservation and community management that this high level of forest preservation has been achieved. Forests, mountains, and rivers have always been considered as holy entities by indigenous cultures such as the Lepchas and the Bhutias. These people relate these natural features with their spiritual beliefs and their cultural identity. Sacred groves and limited forest zones that were protected by customary rules made a great contribution to the preservation of biodiversity and the maintenance of ecological balance with their presence. Sikkim's indigenous conservation model places an emphasis on cohabitation between human groups and the environment, in contrast to the majority of centralized "fortress conservation" systems that are employed elsewhere in India. These efforts often remove local inhabitants from natural resources and provoke conflicts between humans and animals. This conservation system, which has its roots in culture, has made it possible to make sustainable use of forest resources while still preserving ecological integrity [16].

In a similar vein, the accomplishments of the Sikkim Organic Mission provide compelling evidence about the economic and environmental sustainability of indigenous agro-ecological systems. Traditional agricultural techniques were shown to be capable of functioning well on a big economic scale via the shift of the state to agricultural practices that were entirely organic. Without relying on modern pesticides, indigenous agricultural practices like as composting, crop rotation, mixed cropping, mulching, and the use of herbal insect repellents served to preserve the fertility of the soil and the ecological balance of the environment. According to the data kept by the government, the removal of roughly 675 metric tons of chemical fertilizers resulted in a considerable reduction in soil deterioration and averted the acidification of delicate ecosystems in the Himalayas. Not only did this shift increase environmental sustainability, but it also boosted climate resilience, which directly contributed to the achievement of Sustainable Development Goal 13 (Climate Action). The region's biodiversity preservation, water quality, and long-term agricultural sustainability were all further improved by the use of organic agriculture principles.

The incorporation of indigenous knowledge into the frameworks of state policy is another significant aspect that has contributed to Sikkim's exceptional success. Indigenous Knowledge Systems were acknowledged by the government of Sikkim as vital sources of scientific and ecological expertise, in contrast to development paradigms that disregard traditional methods as being out of date. Traditional agricultural practices that had been used by

indigenous groups for a considerable amount of time were successfully institutionalized and financial support was provided by the organic farming project. By combining indigenous ecological understanding into formal governance systems, Sikkim was able to construct a paradigm in which traditional knowledge and contemporary policy were complementary to one another. The incorporation of local cultural traditions and community engagement into the planning and implementation stages of sustainable development reveals that the effectiveness of sustainable development is increased when these elements are integrated.[17]

Nevertheless, in spite of these accomplishments, the data that is now accessible exposes a number of new weaknesses and challenging situations. Despite the fact that Sikkim still has a majority of its inhabitants living in rural regions, there has been a growing trend of indigenous young people moving to metropolitan areas in pursuit of opportunities for education and jobs, as well as more contemporary ways of life. This pattern represents a significant risk to the transfer of indigenous knowledge systems from one generation to the next if it continues. Direct engagement and involvement from members of the community is the primary means by which traditional ecological practices, oral histories, agricultural skills, and cultural rites are transmitted. As newer generations become more disengaged from conventional means of subsistence, there is an increasing possibility that they may lose the vital ecological knowledge that has been gathered over the course of millennia.

Additionally, climate change has resulted in the creation of new environmental pressures that are greater than the ability of many old systems to adjust to that strain. According to reports from the Sikkim State Disaster Management Authority (SDMA), there has been a significant rise in the number of glacial lake outburst floods (GLOFs), landslides, and other climate-related catastrophes over the course of the last two decades. As temperatures continue to rise, glaciers continue to melt, irregular rainfall patterns continue to occur, and ecological disturbances continue to occur, the delicate ecology of the Himalayas is becoming more vulnerable. Despite the fact that Indigenous Knowledge Systems continue to be very successful for the management of localized resources and the protection of the environment, it is possible that they are not adequate on their own to find solutions to large-scale climatic concerns. As a result, there is an increasing need for the integration of traditional ecological knowledge with contemporary scientific technology such as climate monitoring systems, catastrophe predictions, geospatial mapping, and the building of sustainable infrastructure.[18]

In general, the story of Sikkim indicates that Indigenous Knowledge Systems have the potential to serve as a strong basis for sustainable development provided they are supported by suitable legislative frameworks and scientific cooperation. The successes of the state in the areas of forest protection, organic agriculture, and ecological governance bring to light the practical importance of indigenous knowledge in the context of tackling modern environmental concerns. At the same time, increasing dangers such as climate change and the loss of cultural traditions highlight

the need of maintaining, documenting, and upgrading indigenous knowledge systems in order to ensure the long-term viability of the indigenous peoples.

Based on the statistical and policy analysis, the following recommendations are proposed:

- 1) Inclusion of IKS in State GDP Accounting: The economic assessment of agroforestry, which is shown in Table 4, need to be publicly acknowledged as "Green GDP" in order to provide incentives for indigenous practices.
- 2) Spatial Mapping of Sacred Groves: In order to avoid commercial encroachment, the state land records department is required to include indigenous oral histories and sacred grove borders into official land maps that are based on geographic information systems (GIS).
- 3) Establishment of IKS Data Banks: To transition IKS from qualitative anecdotes to quantitative policy input, the National Institution for Transforming India (NITI) Aayog and the Ministry of Tribal Affairs should collaborate to develop localized databases that statistically monitor traditional water management (Dong systems) and agro-biodiversity.

6. Conclusion

The narrative of development has been controlled by an approach that is technocentric and marginalizes the views of indigenous people. An empirical investigation of the data collected by the government of Sikkim, on the other hand, fundamentally undermines this narrative. The statistical evidence demonstrates that indigenous knowledge systems are highly advanced, data-driven (in the sense of being empirical and observational), and ecologically flawless. This evidence ranges from the highest percentage of Very Dense Forest in India to the successful macroeconomic implementation of 100% organic farming. The indigenous populations of Sikkim did not just "live in" the woods; rather, they actively "managed" them via intricate socio-religious and agro-ecological frameworks, as has been shown by historical investigations. To ensure that the Sustainable Development Goals of the United Nations are achieved in the Eastern Himalayas, it is imperative that state policies shift from perceiving indigenous populations as "beneficiaries of development" to recognizing them as the "architects of sustainable development." Sikkim's ecological community has left behind a statistical heritage that serves as a testament to the credibility of indigenous scientific research.

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