

Indigenous Governance for Sustainable Future: Insights from Indian Knowledge Systems

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ABSTRACT

The accelerating impacts of climate change, declining biodiversity and widespread environmental degradation have exposed the limitations of conventional approaches to environmental governance. To deal with these problems, we need a system of governance that focuses on protecting the environment, equality, culture and the participation of all people. For many generations, tribal communities have used and protected land, forests, water and natural resources through their traditional knowledge. They have a close relationship with nature. They work together and focus on saving natural resources for future generations. Despite this, tribal knowledge and traditional governance systems are still not given enough importance in sustainable development policies. The Indian Knowledge System (IKS) can play an important role in this area. This study examines how tribal knowledge and traditional governance systems linked to the Indian Knowledge System can be included in sustainable development policies. The study uses a qualitative research method. It examines available research papers, traditional practices and examples of tribal communities involved in managing natural resources. The paper argues that sustainable development requires recognizing Indigenous governance as a legitimate and complementary system of environmental management. Integrating Indigenous knowledge into sustainability policy supports the achievement of Sustainable Development Goal (SDG) 10 (Reduced Inequalities) by promoting inclusive governance; SDG 13 (Climate Action) through community-based adaptation; SDG 15 (Life on Land) by strengthening biodiversity conservation; SDG 16 (Peace, Justice and Strong Institutions) through participatory governance and SDG 17 (Partnerships for the Goals) by fostering equitable collaboration between governments, Indigenous communities and other stakeholders. Such an approach contributes to resilient ecosystems, socially just institutions and more sustainable futures.

Keywords: Biodiversity Conservation, Indigenous Governance, Indigenous Knowledge, Sustainability Policy, Sustainable Development Goals (SDGs)

INTRODUCTION

Indigenous Governance means a system where people collectively exercise their rights, make decisions and fulfil their responsibilities through their own institutions and social relationships. It explains how a community can “live best together” and organise its society while maintaining its relationship with the natural world. Indigenous governance is a broad system. It includes leadership, authority, institutions, different levels of governance, cultural values, land, natural resources and data. Therefore, it is not only about administration. It also has social, cultural, relational and ecological aspects (Ladner, 2003). Social relationships, trust, shared rules and collective action can play an important role in managing shared resources for a long time (Pretty, 2003). When people have common rules and strong social relationships, they are more willing to work together to manage shared resources. Indigenous knowledge is seen as old techniques as well as the long experience of local people, their views of nature, way of life and traditions of managing resources. It can play an important role in understanding and protecting the local environment. Local people have long observed changes in weather, water, forests, fire, plants and animals (McElwee *et al.*, 2020). This experience can help identify local environmental problems and possible solutions to deal with climate change. About 28% of the world’s land is managed by people for whom forests are not only natural resources but also an important part of food, livelihood, culture and life (Greenwood *et al.*, 2024). Their conservation practices can therefore help address climate change, protect biodiversity and forests and strengthen local livelihoods (Hoffman *et al.*, 2021).

Indian civilisation which is considered to be approximately 5000 years old has a wide range of knowledge traditions in the field of governance, architecture, medicine, agriculture and management of resources among others. These knowledges are now understood under the broader framework of Indian Knowledge Systems (IKS). Indian Knowledge Systems refers to the diverse systems of knowledge, practices, philosophies, technologies and cultural traditions that developed in the undivided Indian subcontinent over many centuries. It is interdisciplinary and brings together practical experience, ecological understanding and cultural traditions. According to Sharma *et al.* (2025), IKS includes traditional knowledge that connects environmental, social and economic aspects and can be useful in the context of sustainable development. As per the IKS Division, Ministry of Education, GoI (2023), IKS focuses on three main principles: *Parampara*, *Dr̥ṣṭi* and *Laukika-prayojana*. *Parampara* focuses on preserving and carrying forward the knowledge and traditions passed down through generations. *Dr̥ṣṭi* highlights the Indian way of understanding knowledge and encourages the use of traditional knowledge along with modern knowledge to address present-day challenges. *Laukika-prayojana* focuses on the practical use of Indian Knowledge Systems to solve current and emerging problems in areas such as health, technology, environment and social well-being. The importance of IKS can be seen at in sustainable development and local problem-solving,

traditional agriculture, water management, architecture and environmental practices are important. These practices developed through the long-term experience and adaptation of communities to local conditions. IKS is also linked with sustainable development, medicinal plants, biodiversity conservation and natural resource management (Borah *et al.* 2026). It focuses on the relationship and interdependence between humans and nature rather than seeing them as separate.

The alarming effects of climate change, biodiversity loss, land degradation and water crisis have raised serious questions about the effectiveness of conventional approaches to environmental governance. Although modern technology and state regulation remain essential, they somehow are still far away from addressing the detailed ecological knowledge preserved by communities that have lived in particular landscapes for generations. Conventional environmental governance has always relied on centralised regulation, scientific methods, large and heavy infrastructure. The decisions at the central level many times fail to understand the local level interventions that is required. It is generally based on “one size fit all” approach. Thus, sustainability always got challenged in such approach. However, traditionally environmental and natural resources were managed at the local level and not at the centralised level. The advantage of this was that the people living close to these resources have knowledge passed down through generations. Local communities had observed rainfall, soil conditions, plants, animals, rivers and seasonal changes over long periods. With their observations, they use this knowledge in agricultural practices, social norms, cultural traditions and community rules. As such, they were always in a better position to manage these resources. Indigenous and local knowledge systems represent extensive bodies of knowledge about biodiversity and ecosystems and that they can complement scientific knowledge in understanding and managing environmental change (UNESCO, 2026). Similarly, IPBES (2022) views Indigenous and local knowledge as dynamic systems of knowledge, practices and beliefs that are closely connected with territories and ecosystems.

The focus is not just the revival of ancient practices but to understand as if how the community interacted with nature and maintain sustainability that led to the survival of civilisations for so long. Further, how and whether such knowledge can be integrated to solve the current challenges that the world is facing over. Thus, the purpose of this paper is therefore not to suggest the replacement of modern institutions with traditional systems. Rather, it tries to focus that certain principles and practices associated with Indian Knowledge Systems can add on to contemporary sustainable governance.

REVIEW OF LITERATURE

Garnett *et al.* (2018) reviewed 648 empirical studies. The study found that conservation efforts are more effective when Indigenous peoples and local communities have equal

participation or greater control. Such involvement is also linked with fairer and more just governance. The authors explain that the role of Indigenous peoples and local communities (IPs and LCs) is not limited to participation. It also includes greater control and decision-making, where their rights, values and traditional institutions are recognised. The study suggests that Indigenous peoples and local communities should have a stronger role in conservation. Their rights and traditional institutions should also be respected.

Popova (2014) studied examples of conservation policies introduced after the adoption of the Convention on Biological Diversity (CBD) in 1992. The study showed that the traditional knowledge and practices of Indigenous and local communities were important for conservation. The author found that projects using different elements of traditional knowledge provided direct benefits to Indigenous communities, especially in countries with better legal and social systems for protecting their rights and social security.

Dawson *et al.* (2021) reviewed 169 research publications to understand how different types of governance affect conservation outcomes. The study found that locally controlled conservation was more effective because local institutions involved in managing land and resources were recognised in the governance system.

Mukherjee and Kaur (2025) connected IKS with current discussions on sustainable development. They explained that ideas such as *Rta* and *Dharma*, the connection between nature and life in Vedanta, interdependence in Buddhist philosophy and *Seva* in the Sikh tradition can support environmental ethics, responsible consumption and sustainable development.

Shroff (2025) studied the link between IKS, environmental sustainability and the Sustainable Development Goals (SDGs). The study showed that the knowledge and experience found in IKS can provide an important base for sustainable development. It can also help address environmental challenges and improve ecological resilience.

Similarly, Sharma *et al.* (2025) studied the link between IKS and the SDGs through environmental, social and economic aspects. The authors explained that focusing on the environmental pillar can support long-term productivity, climate resilience and human well-being. The social pillar covers governance, gender equality, health, education and poverty reduction. The economic pillar supports industrial capacity, innovation, employment and income generation.

Shawoo (2019) studied how Traditional Ecological Knowledge (TEK) can be included in climate policy through the Local Communities and Indigenous Peoples Platform. The study showed that institutions such as the UNFCCC support the inclusion of Indigenous peoples' views. The author suggested a rights-based approach, greater decision-making power for Indigenous peoples and proper arrangements to protect the overall nature and cultural integrity of TEK.

There is substantial literature on indigenous knowledge, traditional practices and sustainable development. National and international organisations do recognise the important role that traditional communities play in biodiversity conservation, However, significant gap remains.

- i. Literature focusses much on the traditional sustainable practices but don't examine the governance institutions in role
- ii. Discussion on IKS focusses more on philosophical foundations and texts and less on its contemporary relevance.
- iii. There is a dearth of work related to indigenous knowledge and practices that can be attributed to specific sustainable development goals

This paper addresses these gaps by examining IKS through the lens of governance. It asks what institutional principles and insights can be taken from Indian knowledge Systems that can be adapted for contemporary sustainability.

Based on these research gaps, the objectives of this paper are:

- i. To analyse selected insights from Indian knowledge systems for community-based natural resource management.
- ii. To examine the contribution of Indigenous governance towards sustainability and its contemporary relevance.
- iii. To identify certain indigenous knowledge and practices that can be attributed to specific SDG.

As such, this paper seeks to answer the following research questions:

- i. What lessons can contemporary governance learn from Indian Knowledge Systems?
- ii. How can Indigenous knowledge complement modern scientific systems?
- iii. Whether integrating Indigenous knowledge into sustainability policy supports the achievement of Sustainable Development Goal (SDG)?

METHODOLOGY

The paper adopts a conceptual and qualitative methodology based on secondary literature, classical Indian texts, policy documents and selected examples or case study of community-based resource governance. The studies focused on dimensions like knowledge, institutions, participation, resource management and sustainability outcomes have been considered. Further, the study is conceptual rather than econometrics. The selected insights from Indian Knowledge Systems that have been considered for this paper are:

- i. Sacred Groves
- ii. Traditional Water Management Systems
- iii. *Muhurat* and *Panchang* based Agricultural Practices
- iv. Indigenous Knowledge and Benefit Sharing

Each of the insights gained were analyzed on the basis of relevant SDGs:

- SDG 10 - Reduced Inequalities by promoting inclusive governance
- SDG 13 - Climate Action through community-based adaptation - UNESCO reports that Indigenous and traditional knowledge can contribute to climate adaptation by supporting observation, preparedness and locally appropriate responses (UNESCO, 2025).
- SDG 15 - Life on Land by strengthening biodiversity conservation
- SDG 16 - Peace, Justice and Strong Institutions through participatory governance and
- SDG 17 - Partnerships for the Goals

Figure 1 presents the flowchart of this study. It shows how Indian Knowledge Systems, Indigenous Governance and Sustainable Development are connected.

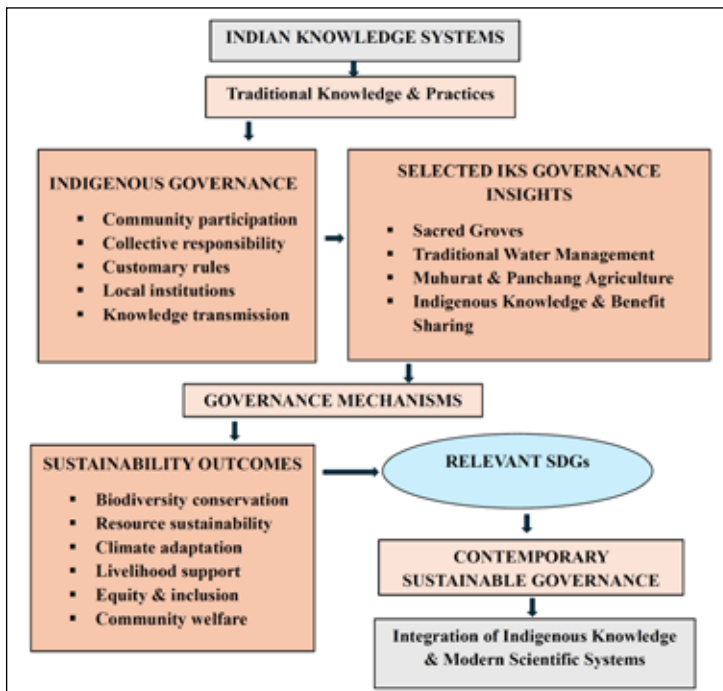


Fig. 1: Conceptual Framework of the Study

Source: Author

DISCUSSION AND FINDINGS

Table 1 presents the compilation of insights from Indian knowledge systems along with the indigenous knowledge gained from it, governance mechanism followed at that time, its main contribution to sustainability, relevant SDGs and Indian examples pertaining to each insight. Each of these insights are discussed further in detail:

Sacred Groves

Khasi sacred groves are forest areas protected by local communities based on their traditions, religious beliefs and rules. They are known as *Khlaw Kyntang*, *Law Kyntang* or *Law Lyngdoh*. Their protection is based not only on government rules but also on local social and religious beliefs. These forests are considered the dwelling places of deities. Therefore, cutting trees or taking flowers, fruits or branches is not allowed. People also believe that breaking these rules can bring bad consequences (Meghalaya Biodiversity Board, 2018). A study of 79 sacred groves recorded 514 plant species (Tiwari *et al.*, 1998). Similar sacred groves are also found among the Garo and Jaintia/Pnar communities with their own names and traditions. A study of three sacred groves in the Jaintia Hills recorded 395 plant species across about 28 hectares and involved 108 families (Jamir & Pandey, 2002).

Maharashtra's *Devrai* are sacred forests believed to belong to local deities. This tradition is mainly found in parts of the Western Ghats, such as Pune, Ratnagiri, Raigad, Kolhapur and Sindhudurg. Local people believe that harming these forests can bring divine punishment. This belief helped limit tree cutting, the use of forest resources and construction activities. The forests were also protected by fencing around them (Chandran, 1997). Over time, religious beliefs and local rules helped protect these forests and increased their environmental importance. In some *Devrai*, the use of forest resources is almost completely prohibited. In others, limited traditional use is allowed, such as collecting fruits, medicinal plants, flowers and fallen branches and allowing animals to graze during certain seasons (Vipat & Bharucha, 2014).

Traditional Water Management Systems

Within the framework of the Indian Knowledge System (IKS), water was understood not merely as a consumable resource but as an essential component of ecological, social, cultural and spiritual life. Historical evidence from sites such as Dholavira demonstrates the early development of interconnected reservoirs, channels and runoff-harvesting structures adapted to arid conditions, while later traditions produced region-specific systems such as baolis or stepwells, kunds, tankas, johads, ahar-pyne networks, temple tanks and cascading irrigation tanks Danino (2020). Stepwells like Rani Ki Vaav, for instance, enabled access to groundwater despite seasonal fluctuations and were integrated into broader systems of storage, recharge and social activity, while johads in Rajasthan functioned as small earthen barriers that captured monsoon runoff and facilitated groundwater recharge (Anon, 2022). Research on johads in Rajasthan

identifies community ownership, locally designed management rules, collective resource mobilisation and equity in water distribution as important factors in the sustainability of the system (Torri and Herrmann, 2011). Equally significant was the institutional dimension of these systems. Traditional water resources were often maintained through collective labour, locally evolved rules, shared responsibilities and principles of equitable distribution. Thus, traditional Indian water management systems can be viewed as living knowledge systems whose technological and institutional principles offer valuable pathways for developing more sustainable, locally appropriate and socially inclusive approaches to contemporary water governance. Traditional architectural knowledge was used in its construction by considering water, soil, temperature and structural stability. It was built below the ground, which kept the inside cooler than the outside. This was useful in the hot and dry climate of Gujarat (Priya, 2010; Jain-Neubauer, 1999).

Muhrat and Panchang based Agricultural Practices

Traditional Indian agricultural practices emphasize harmony with natural cycles to optimize productivity and resource efficiency. Ancient Indian practise of “*Panchanga Shastra*” or “*Muhurta*” i.e. Panchanga comprising tithi, vara, nakshatra, yoga and karana historically provided a temporal framework for agricultural decision-making, while classical agricultural literature such as Krishi-Parashara and Vrikshayurveda incorporated observations of rainfall, soil, plant growth and climatic conditions into farming practices (Sadhale, 1999; Nene & Choudhary, 2002). Farmers in Tamil Nadu use the Panchangam (lunar calendar) to plan agricultural activities like plowing, sowing and harvesting, aligning with seasonal cycles and natural resources. Farming works based on lunar cycles ensuring optimal soil moisture and crop growth. Chronobiology based farming also improves soil fertility. Indian Knowledge Systems conceptualize agriculture as an integrated activity governed by the interrelationship between human beings, nature, seasonal cycles and ecological resources. Traditional knowledge reflected in practices such as the Panchangam incorporates observations of lunar cycles, seasons, rainfall, soil conditions and ecological indicators to guide agricultural activities, reflecting the principle of harmony with Prakriti. Emphasis on seasonal crops, local seeds, water conservation, mixed farming and the use of natural resources shows the importance of maintaining balance with nature and protecting resources for future generations. Today, this traditional knowledge can be combined with weather information, soil testing and modern irrigation methods. This can help farmers deal with climate change and get good yields with fewer resources. Thus, the Indian Knowledge System (IKS) provides a holistic approach where economic prosperity (Artha), balance with nature (Prakriti) and social welfare (Lok Kalyan) are closely connected.

Indigenous Knowledge and Benefit Sharing

The Kani tribe in Kerala, India, had traditional healers called Plathis. They had traditional knowledge about the fatigue-reducing properties of the Arogyapacha plant (*Trichopus*

zeylanicus). They shared this knowledge with scientists at the Tropical Botanic Garden and Research Institute (TBGRI). Together, they developed a medicine called 'Jeevani' and patented the technology. In 1995, the technology was licensed to Arya Vaidya Pharmacy. The benefits from the license fee and royalty were shared equally, with 50% going to the Kani community. The Kani Samudaya Kshema Trust was established to ensure fair distribution of the royalty. The Kani community's share was given to this trust. It was used for community welfare, basic infrastructure, insurance and documenting traditional knowledge. This arrangement was an early example of Access and Benefit Sharing (ABS) in India. It showed that community institutions can play an important role in using traditional knowledge for community development (Posey & Dutfield, 1996; Ten Kate & Laird, 1999).

Table 1: Analysis of the Insights Gained from IKS with Respect to Sustainability

Insights from IKS	Indigenous Knowledge	Governance Mechanism	Main Sustainability Contribution	Relevant SDGs	Indian Examples
Sacred Groves	Traditional forest protection based on cultural and spiritual beliefs	Community rules, customary institutions and collective protection	Biodiversity conservation, ecosystem protection and cultural preservation	SDG 13, 15, 16	Khasi Sacred Groves – Meghalaya; Devrai – Maharashtra
Traditional Water Management	Johads, tanks, ahar-pyne, bamboo drip irrigation and village ponds	Collective water management, maintenance and equitable sharing	Water conservation, groundwater recharge, irrigation and climate adaptation	SDG 6, 13, 16, 17	Rani ki Vav; Gujarat: Johads – Rajasthan; Ahar-Pyne – Bihar; Bamboo Drip Irrigation – Meghalaya;
Muhurat & Panchang-Based Agriculture	<i>Panchang</i> , seasonal calendars, local ecological observations and traditional timing of agricultural activities	Farmer community-based decision-making and intergenerational transmission of knowledge	Climate adaptation, preservation of local agricultural knowledge and sustainable farming	SDG 2, 12, 13	Traditional agricultural calendars – Karnataka, Maharashtra and other regions;
Community Forest Governance	Local knowledge of forests, plants, wildlife and sustainable harvesting	Village institutions, customary rules and collective forest management	Forest conservation, biodiversity protection and livelihood support	SDG 10, 13, 15, 16, 17	Van Panchayats – Uttarakhand; Community Forest Management – Odisha
Indigenous Knowledge and Benefit Sharing	Medicinal Knowledge possesses by tribal communities	Kani Samudaya Kshema Trust	Royalty for community development, Acknowledgement of Tribal Knowledge, Community Development	SDGs 10	Kani Tribe, Kerala

Source: *Author*

Table 2 shows how traditional Indian ideas of governance can be useful today. These ideas can support good, responsible and inclusive governance.

- **Dharma – Doing the right and ethical thing:** Dharma teaches us to do the right thing and fulfil our responsibilities. It is linked to **responsible governance** today.
- **Lokasangraha – Welfare of all:** It means focusing on the well-being of the whole society. It supports the idea of **including everyone in development**.
- **Passing on knowledge – Shruti tradition and learning from experience:** It focuses on learning through oral traditions and experience and passing knowledge to the next generation. Today, this can help **protect and use traditional knowledge**.
- **Sarve Bhavantu Sukhinah – May everyone be happy:** It means that the benefits of development should **reach everyone**. It supports the idea of equal welfare for all.

Thus, traditional Indian ideas can provide a foundation for good and sustainable governance. They focus on doing the right thing, the welfare of all, protecting knowledge and sharing the benefits of development.

Table 2: Indigenous Governance and Sustainability

Dimension	Indigenous Principle	Contemporary Governance Relevance
Ethics	<i>Dharma</i>	Responsible Governance
Collective welfare	<i>Lokasangraha</i>	Inclusive Development
Knowledge transmission	<i>Shruti Paramapara (oral tradition)</i> , Experiential learning	Knowledge preservation and documentation for sustainable practices
Happiness	<i>Sarve Bhavanti Sukhinah</i>	Welfare for all

Source: *Author*

Traditional practices also have some limitations. They should not always be seen as sustainable or suitable for present conditions. Population growth, changing livelihoods, urbanisation, climate change and commercialisation have created new challenges for these practices. The value of indigenous knowledge in governance should not be judged only by the presence of traditional practices. It should also be assessed on the basis of participation, equality, accountability, sustainable use of resources, knowledge transfer, community benefits, conflict resolution and links with formal institutions. Table 3 presents these dimensions and suggests possible indicators for assessing the governance value of Indigenous knowledge.

Table 3: Possible Indicators for Evaluating Indigenous Governance

Dimension	Key Question	Indicator
Participation	Who participates in decisions?	Community participation
Equity	Are benefits fairly distributed?	Benefit distribution
Accountability	Who is responsible for decisions?	Transparency and responsibility
Resource Sustainability	Are resources maintained for future generations?	Forest/water/biodiversity condition
Knowledge Transmission	Is knowledge transferred to younger generations?	Youth participation and knowledge transfer
Community Benefit	Does the system improve community welfare?	Livelihood and social benefits
Conflict Resolution	How are disputes addressed?	Local conflict-resolution mechanisms
Institutional Linkage	Does it work with formal institutions?	Community -government cooperation

Source: *Author*

There may also be conflict between traditional institutions and formal government institutions.

Indigenous governance is closely linked to the local environment and community relations. Formal government systems provide legal rights, administrative support and scientific and technical help. Therefore, one system should not replace the other. Both should work together. The inclusion of IKS in present governance requires careful assessment, community participation, scientific validation where needed, legal recognition and protection from misuse or commercialisation. Thus, the study does not suggest replacing formal government institutions. It aims to improve local relevance, participation, equality and sustainability in resource governance.

CONCLUSION

The selected cases demonstrate institutional mechanisms through which Indigenous and community knowledge can contribute to sustainable resource governance. However, it needs to be understood that merely having traditional knowledge that were at places centuries ago will directly be implemented in the present context. This is because of the increasing population pressure, rapid urbanisation, fast changing land-use pattern and remarkable shift from need to greed. The ethical foundations on which Indian knowledge system is based that promoted Dharma, ethical governance, community participation, respect for nature, collective responsibility and the sustainable use of natural resources.

Sustainability cannot be achieved only through laws and modern technologies. It also requires state institutions and values that encourage people to see natural resources as shared responsibilities rather than unlimited commodities. Indian Knowledge Systems can contribute to this transformation by providing a body of ideas, practices and institutional experiences that connect human well-being with ecological responsibility. The future of governance lies in creating a collective cooperation between knowledge systems. Such a cooperation can help build governance that is more participatory, inclusive, ecologically responsible and sustainable.

Limitation and Future Scope

This study is based on ideas and available information. It does not use data to measure the direct effect of traditional governance on sustainable development. The study is limited to selected books, research papers, government documents, Indian knowledge traditions and a few examples.

Future researchers can take this study further. They can add new areas based on different communities, environments and governance systems. These areas have not yet been tested in the field or through data. Future research can use surveys, interviews and field studies to study this topic in more detail. Data and economic methods can also be used to understand the actual effect of traditional governance on sustainable development.

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