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Research Paper

Indigenous Practices for Protecting Environment

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Abstract: The environment is defined as the sum total of all surroundings, including natural forces and living things that provide conditions for growth, development, and potential harm. Early humans lived closely with nature, developing measures to safeguard their environment. The climate change, biodiversity loss, and their impact on socio-ecological positions has created a critical scenario all over the world. Indigenous knowledge (IK) has been integral to human societies and represents complex ways of understanding and co-existing with natural ecosystems, developed and adapted over long periods. Indigenous groups always live sustainably through their customs and should always be a part of the conservation programs. IK system has passed down from one generation to other to make sustainable use of the resources available, keeping in mind the future generations. The concept of sacred groove, sacred sites, sacred forests or trees not only shows the religious faith and practices of indigenous people but also promotes sustainable development by way of conserving the 'sacred' resources. Indigenous knowledge is also visible in agricultural activities, food security, land use, water management, forest products, crop cultivation, waste management, food preservation, etc. Application of Indigenous Knowledge in Indian Context can be observed in areas like agriculture, fishing, wild life conservation, forest conservation etc. Increasing population pressures, immigrants, food demand, etc adversely affect he land area and soil quality. Non-traditional approaches lead to unsustainable practices. The biodiversity is declining rapidly and the environment is under crisis throughout the world. However, these changes are generally lower in the indigenous lands. Traditional ecological knowledge and practices have been successful in promoting sustainable land management and sustainable development. This knowledge can help formatting the climate adaption strategies.

Keywords: environment, indigenous knowledge, indigenous tribes, biodiversity, forests

The environment is defined as the sum total of all surroundings, including natural

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forces and living things that provide conditions for growth, development, and potential harm. It consists of physical, chemical, and biotic factors like climate, soil, and living organisms, influencing the form and survival of organisms and ecological communities. There is historical evidence of humanity's efforts to protect nature. Conservation of environment refers to sustainable use and management of natural resources, ensuring they are preserved for future generations.

Early humans lived closely with nature, developing measures to safeguard their environment. Some examples are-:

-Bhimbetka cave paintings: 10,000-year-old depictions of birds, animals, and humans, living in harmony.

-Indus Valley Civilization: Demonstrated high environmental awareness, management of resources with well-planned cities, advanced sanitation, and conservation practices.

-Vedic Age / Ancient Indian Texts: Conservation of nature has roots in the Vedic Period, with the Vedas containing hymns dedicated to natural entities like the sun, moon, rivers, and trees. Vedas, Arthashastra, Ramayana, Mahabharata, etc., emphasized environmental protection, sustainable use of resources and respect for nature.

-Ayurveda: Ancient medical texts like Sushruta-Samhita and Charak-Samhita integrated ecological perspectives.

-Mauryan Emperor Ashoka: Issued edicts to protect wildlife and forests, marking the first recorded conservation efforts.

The climate change, biodiversity loss, and their impact on socio-ecological positions has created a critical scenario all over the world. About one million of species on earth face extinction risk, and over 80% of the ecological processes that are part of ecosystem functioning are already affected by climate change.

Tribal communities in India have historically developed a deep connection with nature, integrating environmental conservation into their cultural and religious practices. They believe in the sanctity of natural elements and protect forests and wildlife through traditional knowledge and wisdom. This includes practices like worshiping natural objects, observing taboos, and maintaining sacred groves, which play a crucial role in biodiversity conservation.

Indigenous knowledge has been integral to human societies and deeply embedded in cultures and communities worldwide. This knowledge represents complex ways of understanding and co-existing with natural ecosystems, developed and adapted over long periods. While rooted in ancient wisdom, Indigenous knowledge remains highly relevant today. It supports sustainable living and manifests in various forms, including oral histories, spiritual culture, art, and songs. This knowledge and wisdom continue to provide the foundation for the well-being and livelihoods of millions of people deeply connected to their cultures and languages. Despite modernization and development pressures, these indigenous practices highlight the importance of preserving the environment for future generations.

Indigenous Knowledge (IK) is ‘the large body of knowledge, skills and experiences that has been developed outside the formal educational system which people apply to maintain, improve and sustain their livelihood’ (The World Bank, 2003). IK is ‘the traditional knowledge of the local community existing within and developed around the specific conditions, indigenous to a particular geographical area’ (Grenier). ‘IK is found in peoples’ memories and activities and are expressed in the form of stories, songs, belief system, rituals, folklores, community laws, local language, cultural values, agricultural practices, material objects, plant species, and animal breeds’ (Basu). ‘IK also referred to as

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traditional or local knowledge, embedded in culture and unique to a given location or society with special reference to the rural poor whose life is built upon it (for food security, human health, animal life, education, and natural resource management)' (Sharma, 2014).

Indigenous knowledge is the knowledge, innovations and practices of indigenous and local communities around the world. Often referred to as Traditional Ecological Knowledge (TEK), is an invaluable resource in modern times. It encompasses a vast array of wisdom and practices developed over centuries, deeply integrated into local cultures and environments. TEK is important to safe guard environment. Indigenous people understand the topography and topology of the area more than anyone else including the relationships between all the living organisms, natural phenomena, and the landscape. This gives indigenous people a more holistic view of the ecosystems they live in.

Indigenous groups always live sustainably through their customs and should always be a part of the conservation programs that aim to protect climate change and loss of biodiversity. Here are a few examples of traditional knowledge applied to prevent climate change, biodiversity loss:

Agriculture

-Crop Rotation and Intercropping techniques, rooted in traditional farming, help maintain soil fertility and reduce pest infestations.

-Natural Pest Control utilizing natural predators and plant-based repellents to manage pests, minimizing the need for chemical pesticides.

Fisheries

-Sustainable Fishing Practices: Indigenous communities often employ techniques like fish weirs and traps, ensuring fish populations are not over-exploited.

Health and Medicine

-Knowledge of local medicinal plants has been passed down through generations and is used to treat various ailments. This has also inspired modern pharmaceuticals.

Horticulture

-Traditional methods of saving seeds and selectively breeding plants have helped develop resilient and diverse crop varieties.

Forestry

-Agroforestry, integrating trees and shrubs into agricultural systems, improves biodiversity and soil health.

Environmental Management

-Controlled Burning used to manage land and prevent larger, uncontrollable wildfires. This practice has also been adopted by modern conservationists.

-Water Conservation Techniques like terrace farming and constructing check dams to conserve water and prevent soil erosion.

Cultural Heritage

-Stories, Songs, and Folklore convey important ecological and cultural information.

-Rituals and Community Laws govern the sustainable use of resources and maintain social cohesion. Incorporating traditional knowledge into modern practices not only helps preserve cultural heritage but also offers sustainable solutions to contemporary environmental and social challenges.

Indigenous knowledge and restoration of ecosystem

Northeast region of India is a region of rich biodiversity and high bio-cultural diversity. The religion and culture of the native people of this area are closely linked to the forests. Local community here take part in overall preservation of natural resources. Prime examples of community-based conservation are local forests and sacred groves delimited by religion concepts.

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In Dering-Dibru Saikhowa Elephant Corridors' degraded habitat patches, pioneer species were identified with the help of the traditional knowledge. Saplings were planted to serve as a future reference site for landscape rehabilitation. More than 50% of planted species were linked to native communities through ethnobotanical uses and habitat for elephant movement.

The Bugun Liocichla's (critically endangered) conservation in Arunachal Pradesh highlights the importance of traditional knowledge and community conservation. The forest patch located just outside the Eaglenest Sanctuary is managed by the Bugun tribe of Singchung village. The tribe uses its TEK (sustainable land-use practices and deep respect for the natural environment) to manage and protect the forest. This approach protects the Bugun Liocichla and also benefits the community by preserving their cultural heritage and ensuring sustainable use of natural resources.

Indigenous knowledge and wild life conservation

Wildlife Conservation programmes are now more inclusive and local community-centric to increase effectiveness of conservation outcomes and to ensure social justice for the marginalised communities.

Wildlife conservation in India was initiated through the Wildlife (Protection) Act, 1972 and Indian Forest Act, 1927. Now local communities are being included in conservation governance. Community-centric conservation in India is being practiced through Joint Forest Management committees (JFMC) and Eco-Development committees (EDC). In these co-management models, the state and the community collaborate to set policies and manage the natural resources. Gram Sabhas, is granted power for governing natural resource management. Community-Conserved Areas (CCA) through autonomous community efforts in Scheduled areas have been raised where governance is through customary laws. In such areas local communities enjoy rights and privileges of using natural resources.

In Northeast, JFMCs and EDCs have been formed around reserve forests and wildlife sanctuaries in Assam. Arunachal Pradesh, Meghalaya and Nagaland have Community reserves. Communities themselves manage the land and other resources through village-based institutional networks as Community-conserved areas (CCAs) and sacred groves of different sizes.

Indigenous knowledge and sustainability

Expansion of growth and developmental programmes even to the remote corner of the country is causing ecological crisis, biodiversity loss and depletion & degradation of resources. Despite significant improvement in different sectors, the world is threatened with environmental damage due to increased pressure on natural resources.

People belonging to different ethnic groups, races, cultural backgrounds, religious intuition, and social structures have their own unique indigenous knowledge system in India. IK system has passed down from one generation to other to make sustainable use of the resources available, keeping in mind the future generations. The sections of population namely tribal societies, indigenous communities, marginalized group, rural poor and women, etc live in close proximity with forest and natural resources. IK is rich and diverse and covers areas such as water management, agricultural productivity, land use pattern, ethno-medicine, animal husbandry, food preservation, seed storage, environmental conservation, weather prediction, human health, crop health, food security, and so on. Integration of IK systems into

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mainstream policy and programme is a must to enhance Sustainable Development.

Many researches have shown that the IK provides useful framework, ideas, guiding principles, practices, and measures that can serve as foundation for effective development process for restoring social, economic, and environmental resilience of the world at large.

Indigenous communities of India viewed the given environment and the natural resources not only as a means of sustenance/livelihood but they construct their worldview and cosmology around it. For example, the concept of sacred groove, sacred sites, sacred forests or trees not only shows their religious faith and practices but also promotes sustainable development by way of conserving the 'sacred' resources. Indigenous knowledge is also visible in agricultural activities, food security, land use, water management, forest products, crop cultivation, waste management, food preservation, etc.

Application of Indigenous Knowledge in Indian Context

Wildlife Protection

For protection of wildlife, tribal communities often employ totems and religious beliefs. Adi tribes in Arunachal Pradesh do not hunt tigers, sparrows, and pangolins as they believe them to be well-wishers of humankind. Banyan trees are never cut down due to fear of famine and death. Such practices help in specie preservation. Mount Vojo Phu is considered a sacred mountain for the Akas, a tribal community of Arunachal Pradesh. Access to the mountain is restricted to help preserve the local flora and fauna. 'Dapo' is a mechanism to protect native animal populations like the Himalayan squirrel.

Agriculture

The Apatani tribes of Arunachal Pradesh are known for their sustainable agriculture practices of wet rice cultivation. Nutrients washouts from hilltops and flow in, to enable crop growth. Land irrigation is facilitated by canals linked to streams from hills. Soil fertility is maintained by organic wastes and recycled crop residues.

In terms of agricultural practices, the Kadars of Tamil Nadu pluck fruits and vegetables only from the mature stems of the plant, which are then cut and replanted for future harvest.

The Irulas, and Muthuvas, of Tamil Nadu and Kerala, practice mixed cropping system. Several types of crops are grown simultaneously in a specific area to prevent overexploitation of the water table and soil nutrients and to prevent soil erosion.

The Gond, Pradhan, and Baiga communities of Madhya Pradesh undertake Utera farming. In this method, to make use of the existing moisture from the soil before the land dries up, the seeds of next paddy crop are sown in fields before the crops are harvested. Badi cropping system is also practiced by these communities. In this system fruit crops and trees are planted along the boundaries as barricade to save fields from soil erosion, droughts and heavy rains. Mulching, burning of leaves for residue, and retainment of roots and stumps help in maintaining soil fertility and nutrient cycling.

Fishing

Tribal communities employ sustainable techniques for fishing. For example, the Wancho and Nocte tribes of the Tirap district (Arunachal Pradesh) use bamboos, stones, coir, and tree branches to create obstructions in streams to trap the fishes. Collected fishes are distributed amongst the communities by a method known as Bheta.

Adi and Galo tribes (Assam and Arunachal Pradesh) practice Lipum fishing techniques. They create large bamboo baskets lined with seaweeds. Baskets are

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placed at the bottom of streams. The seaweed attracts small insects which subsequently lure fishes. Juvenile fishes are released back into the stream. This method is practiced in winter months to discourage fishing during the breeding season. By this technique, fish populations are preserved while meeting local demands.

Medicinal plants

The Garasia tribe (in Rajasthan) have extensive knowledge of ethnomedicinal plants. Many of these plants are listed in the IUCN Red List of threatened species. Tribal communities have developed sacred groves for folk deities to protect these plants.

One sustainable practice, practiced by the Bhotias of Central Himalayas include the collection of medicinal plants by inspecting the maturity of the leaves. This prevents overharvesting of plants. Tribe members cultivate barley and buckwheat in the upper valleys during summer for consumption. After harvesting, cattle and sheep are allowed to graze on the land. This cycle of farming and grazing allows for the utilisation of pastures and is called transhumance.

Some more examples

A study in Bihar among marginal and small scale farmers showed IK in Crop management practices (e.g. mixed cropping of turmeric, potato and chillies to increase the production of all three), Grain storage practices (e.g. Neem leaves are used in storing grains to protect it from insect and pests), Crop watch practices (e.g.- elevated platform or '*machan'* is constructed using wooden poles, local grasses, paddy straw, and crop residue to protect the crops from wild animals and birds), Prediction of weather/ climatic conditions (local farmers predicts heavy rain that when ants move to a safer place with eggs in their mouth), Soil health and fertility management (farmers utilize farm based manure and green manure instead of chemical fertilizer to enhance soil fertility and food quality), plants and animals disease/ health (farmers believes that an application of paste of *Bael* reduces shoulder pain of working ox, while mixed dose of turmeric, ginger, and garlic keeps Foot and Mouth diseases away), Human health practices (e.g. common practice of planting trees of Pipal and Tulsi in and around residential area produces oxygen/O2 which is considered beneficial for all living organism, or application of a Luke warm paste of turmeric, onion, dub grass, mustard oil for pain relief of any kind of external injury) etc. Indigenous knowledge is conserving and maintaining sustainability of the environment, but incoming of modern technology in agricultural system are trying to supress this knowledge.

In the northeast India tribal communities extensively practicing shifting cultivation (also called slash and burn) since time immemorial and it is found that these communities have developed their own knowledge system for co-existence with the environment. Research has shown that the use of Nepalese alder (*Alnus nepalensis*) and many species of bamboo in shifting cultivation, as a part of traditional agro-ecosystem management in north-east India, where the former fixes nitrogen while the later conserves potassium and phosphorus for better soil fertility and food production.

The concept of 'sacred groves, village restricted forests, village supply forests, clan forests and other traditionally managed forests' in comprises about 90% of total forest area of Meghalaya. This enables the tribal communities to nurture and conserve forest/ trees in the vicinity of their habitations, near water sources, steep slopes, and other ecologically sensitive regions. This forest cover accommodates rich aquatic and terrestrial biodiversity and

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species of medicinal plants, wild food, herbs, and many other economically important resources. This traditional practice conserve forest cover, biodiversity and natural resources and also act as a 'resource ground for different requirements' for the communities. As per community belief Sacred Forest is the home of a deity who protects the village from natural calamities, famine and diseases.

The Soligas tribes of Chamarajanagar district, Karnataka possess a rich traditional knowledge of their ecology, forest conservation, agricultural system, land use pattern, and water and other resource management. They derive most of their basic requirements such as food, fodder, fuel, fruit, medicine, herbs, etc. from forest. They practised controlled ground fire, shifting cultivation. The Soligas tribe reflect indigenous knowledge of fauna, flora, dense forest, waterfalls, flowers, valley, etc through folklores, and folktales. This helps to conserve and keep alive the knowledge of the community and enable them to transfer indigenous knowledge from one generation to other.

In Tripura, many tribal groups practice mixed cropping and cereals, seasonal vegetables, fibre, and tree crops are grown together. This provides permanent rich soil cover in addition to variety food crops and other products. In addition, 'sacred groves' are there for sustainable land uses.

To combat the increasing global climate change, rural women in Uttarakhand took initiative to encourage planting of broad leaf trees to increase oxygen level in the environment.

Threats to Indigenous Knowledge

Increasing population pressures, immigrants, food demand, etc adversely affect he land area and soil quality. Non-traditional approaches lead to unsustainable practices.

Traditional agricultural system (crop rotation, organic waste management, recycling of nutrients through the use of livestock for ploughing and threshing, and non-utilization of chemical fertilizers etc) is being replaced in tribal areas with the introduction of chemical fertilizers and High Yielding Varieties (HYV) thereby declining the soil fertility. This on the one hand threatened the traditional ecological knowledge of the people and on the other hand brought about changes in socio-cultural system of tribals.

The exploitation of forest resources by rich and influentials threatened social, economic and cultural life of the hill people. This resulted in protest by them keeping in mind the future implication of the fragile ecosystem. The world famous Chipko movement is the result of this development.

Indigenous knowledge systems are, becoming highly vulnerable because of global forces and pressures, modern science and technology, and run for development.

Indigenous and tribal communities favour simple, sustainable, and locally available resources/knowledge to conserve the environment and biodiversity. "Human beings are the centre of concerns for sustainable development and indigenous communities have a vital role in environmental management and development because of their ecologically sustainable knowledge and approaches towards the environment" (United Nations Conference on Environment and Development (UNCED) held at Rio in June 1992). It is of utmost importance to recognize and duly support identity, culture, tradition, knowledge system, and interests of indigenous communities to enhance their effective participation to achieve the goal of sustainable development.

Commercialization of forestry has led to erosion of indigenous knowledge in

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many parts of India especially in the North-east region. Land is increasingly cleared to meet day to day requirements of indigenous people and also to accommodate increasing population.

Bio-piracy' is also a threat to the indigenous knowledge system of indigenous people.

At present, the traditional knowledge held by local communities is at risk from various factors, including globalization, development initiatives, environmental challenges, the growing notion of private ownership, concerns regarding land and forest rights, conflicts over the management of natural resources, gender inequality, the effects of modernization on traditional belief systems, and the lack of knowledge transfer to younger generations.

Some Laws to Safeguard Indigenous Knowledge with reference to Environment in India

Indigenous knowledge is characterized by generational transmission, community ownership and cultural and environmental relevance. This valuable knowledge must be protected for equity, biodiversity conservation and prevention of bio-piracy.

India has several laws to protect the environment, supported by the Constitution. Article 48A directs the government to safeguard forests and wildlife, while Article 51A(g) makes it a duty for citizens to protect nature. The Environment (Protection) Act (1986) is a key law that allows the government to take action against pollution and environmental damage. The Air Act (1981) and Water Act (1974) regulate pollution by setting limits and creating Pollution Control Boards. The Wildlife Protection Act (1972) ensures the safety of wild animals and plants, while the Forest Conservation Act (1980) prevents forests from being used for non-forest purposes. The Indian Patents Act (1970) and Geographical Indications (GI) Act (1999) are important to protect IK. The protection of Plant Varieties and Farmer's Rights (PPVFR) Act (2001) protect rights of plant breeders. The Patents (Amendment) Act (2005) further protects the rights of Indigenous people. Forest Rights Act (2006) provides for Community rights over forest resources and traditional practices.

Other important laws include the Biological Diversity Act (2002) and Biological Diversity (Amendment) Bill (2021), which protects India's rich biodiversity and ensures fair use of its resources, and the National Green Tribunal Act (2010), which created a special court to handle environmental disputes quickly.

All these laws work together to protect air, water, forests, wildlife, and overall environmental health, ensuring that future generations inherit a clean and safe natural world and our Indigenous Knowledge keep on passing from generations to generations for sustainable development.

Conclusion:

Thus, there is need to acknowledge and recognise indigenous knowledge of indigenous communities. Its ecological significance and efficacy in conservation measures have to be kept in mind. It is also necessary that policy makers, environmentalists, conservationists, natural resource management committee, etc should incorporate local communities, their ecological knowledge and resource management methods, in planning and development of the natural resources.

India, home to about 744 (approx) tribal communities, ethnic groups, and diverse cultural background (Census 2011), has a strong and vibrant cultural diversity. Each cultural group or community have developed their own knowledge systems over the years and

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passed it down through oral traditions. India thus has a storehouse of Indigenous Knowledge. The close dependency of the people on their immediate environment for their survival and livelihood enables them to develop knowledge about the resources and their sustainable utilization. Ethnic minorities, tribal communities, and rural populations, in India who live close to nature and are dependent on forest and natural resources available for their livelihood establishes a kind relationship with the given environment. This can be seen through their harmonic co-existence and sustainable approach towards resource management. This eventually conserves the whole environment.

Therefore, it is of importance to heard the voice of the local communities who are the bearers of extensive ecological knowledge of the ecosystem while framing policies and developmental planning, of the natural resources.

In a nutshell, indigenous communities engage in wildlife conservation efforts through several avenues, including community-driven conservation programs, tribal management of wildlife, scientific studies combined with traditional wisdom, conservation initiatives, and traditional ecological practices. Their participation is important for conserving wildlife and its habitats as well as producing better conservation outcomes.

Indigenous Knowledge system constitutes an important driving force for Sustainable Development 'development that meets the needs of the present without compromising the ability of the future generations to meet their needs' (Brundtland Report/ WCED Report, 1987, p 41). Indigenous knowledge has its roots outside the formal institutions. It was only through United Nations Conference on Environment and Education in 1992, World Conservation Strategy of International Union and Conservations of Natural Resources in 1980, Brundtland Commission, and World Commission on Environment and Development, 1987, the concept of Indigenous Knowledge gained its worldwide recognition and its efficacy was realised. These events highlighted the significance of Indigenous Knowledge in environmental sustainability and validated its presence in every nation, community, and society.

The biodiversity is declining rapidly and the environment is under crisis throughout the world. However, these changes are generally lower in the indigenous lands. Traditional ecological knowledge and practices have been successful in promoting sustainable land management and sustainable development. This knowledge can help formatting the climate adaption strategies.

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