

TRADITIONAL KNOWLEDGE FOR RESILIENT AGRICULTURE IN NORTHEAST INDIA

Climate change presents global challenges by affecting food security, human health, water availability, and socioeconomic development, potentially decreasing crop yields by 3-7 percent as temperatures rise. This could result in a higher likelihood of hunger and undernourishment for 86 percent small and marginal farmers in India. The importance of Indigenous Knowledge is its relevance to contemporary issues, including food insecurity, biodiversity loss, and climate change.

Indigenous Practices

Indigenous knowledge system offers valuable insights and provides innovative solutions in the agricultural sector that optimize productivity and resilience while simultaneously reducing environmental impact.

- Shifting cultivation (Jhum) is a complex, multi-cropping, agricultural system that is well-adapted to certain conditions, environmental limitations of the tropics and poses significant challenges. Indigenous farmers in the Northeast engage in forest clearing, burning, and crop planting, contributing to the in-situ conservation of crop genetic resources and agrobiodiversity through forest regeneration. The practice ensures food security for the communities, facilitates high genetic diversity which is identified as a key element in adaptation strategies to climate change.
- Panikheti system of paddy cultivation helps to divert water from hills to terraces for judicious farming.

- In Zabo farming system of Nagaland, paddy husk is used to plug the earthen bunds of the crop fields to reduce seepage loss.
- Integrated Rice-fish farming system of Apatani plateau protects soil erosion, conserve water for irrigation and paddy-cum-fish culture. This farming is an eco-friendly, and required low inputs.
- Alder based agriculture crops are cultivated alongside alder trees as intercrops in an agroforestry system. This practice is highly profitable as it converts wasteland into agricultural land.
- In Rotating cowsheds with vegetable fields, urine, bovine dung, litter, and other materials are promptly mixed with the soil to accelerate decomposition, enhancing fertility management, followed by immediate ploughing.
- Traditional fishing with piscicidal

plant is employed to harvest fish making it biodegradable and maintains healthy food chain.

Institutional Support

Recognizing the importance of local institutions and implementing strategies to strengthen their capacity will be crucial for maintaining or adopting diversity-rich approaches. These institutions, which include local seed supply systems, community networks and local social organizations of various kinds, play a significant part in providing the framework in which local communities organize and manage local production strategies in ways that support the use of agricultural biodiversity. The Dong Bundhs System is a gravity-based seasonal river channelization system that is community-led and primordial indigenous engineering knowledge. This system guarantees water security within the community, ensuring judicious distribution and preventing water wastage through traditional practices. Pakho Khet, Bun System of Cultivation, and the Bamboo Drip Irrigation System prevent soil erosion, conserve water and soil moisture, enrich soil fertility and preserves natural resources.



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Rooted in Culture

Indigenous agriculture system has deep rooted impact on the cultural attributes of the indigenous communities. Agricultural land is where people prized and cherished application of indigenous knowledge. The rituals related to agriculture are mainly associated with: work related rituals, seed sowing ritual, better germination ritual, pre-harvest rituals-protection from curse, worship for pest control, purification ritual, harvest rituals, storage ritual, etc. Moreover, people employed in agricultural practices function as symbolic representations of culture and tradition, while food items and cuisines hold significant cultural value.

Traditional clothing and performances at harvest festivals act as living history lessons. Songs, stories, and attire all come together to celebrate the agricultural past, strengthening cultural traditions and fostering a sense of community.

A Balancing Act

Traditional agricultural systems are endangered by modern farming techniques that prioritize grain production over environmental health. These indigenous methods flourished with lower population densities but now struggle in areas like the NER, where increasing population have caused rapid deforestation and unsustainable practices. This has significantly shortened fallow periods, decreased crop yields, and deteriorated soil quality. Intensive cultivation further impedes soil resilience. Proper management and conservation of soil, water, plants, and animals are crucial to sustaining a healthy environment and preventing further degradation of natural resources in the region.

The assessment of potential management strategies under REDD+ suggests that sparing old-growth forests from conversion into shifting cultivation by intensifying cropping in a smaller area is the most optimal strategy for protecting landscape carbon. Maintaining a longer fallow cycle, for instance at a 15-year cultivation cycle can also sequester

considerable levels of carbon compared to landscapes with short fallow cycles.

The indigenous farmers of Northeast India possess a diverse knowledge for water conservation, pest and disease management, soil fertility management, organic farming, incorporation of fish and animal components, and forestry. Incorporating Indigenous Agricultural Knowledge (IAK) can enhance scientific data, significantly impacting climate adaptation and mitigation efforts. One such is the Phumdis and Ataphums of Manipur, Loktak Lake, Manipur. Phumdis are natural floating mats composed of decomposed vegetation, soil, and organic matter which provide unique habitats for diverse flora and fauna. Local communities have created Ataphums, which are artificial floating gardens, by piling layers of vegetation and soil on interconnected bamboo frames. Both these elements capture carbon, clean the air, hold soil, store water, and nurture crops, safeguarding wildlife homes.

A study on mainstreaming community conserved areas for biodiversity conservation in Nagaland was successfully implemented by TERI supported by GEF. The work explored solutions involving village communities as well as rejuvenating traditional conservation practices. The outcome of the intervention showed a significant rise in the safeguarding of natural resources following the establishment of collaboratively managed Community Conservation Areas (CCAs), as well as an enhancement in the governance of shared resources.

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Raising Awareness

It is important to note that while indigenous traditional knowledge exists in the Northeast region, its documentation is not a priority among the local communities. Promptly recording and educating younger generations about the importance of Indigenous Agricultural Knowledge (IAK) alongside modern agricultural practices is crucial. This documentation serves to conserve and ensure continuity for future generations.

Optimizing investments in indigenous research capability can enhance adaptability, vegetation surveillance, resource conservation technologies, variety development, and land use management. Policies can effectively encourage resource conservation by providing incentives, enhancing resource use efficiency, setting appropriate resource prices, offering credit for adopting adaptation technologies such as investing in water management infrastructure and increasing farm insurance coverage, improving communication about climate changes and available adaptation strategies, developing alternative livelihood options, and reducing agricultural subsidies.

As affirmed by the UN on the Rights of Indigenous Peoples, indigenous peoples are entitled to their territories, resources, and participation in relevant decision-making processes, including FPIC for related laws and initiatives. Despite the efforts of indigenous communities and their organizations, effective participation in discussions regarding climate change mitigation schemes such as REDD has been denied. Furthermore, their rights to forest products, intellectual property, territories, and resources remain disregarded. Traditional wisdom of northeast India can build a resilient and sustainable agriculture landscape that sustain its rich heritage while supporting livelihood, ensuring food security, judicious uses of natural resources despite extreme climate like flood, cyclones and drought.