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Popular Article

Indigenous Farming Systems In North East India

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INTRODUCTION

North East India's native farming systems are an intriguing fusion of cultural history, ecological farming methods, and traditional wisdom. Over the course of millennia, many indigenous people in this eight-state region have created distinctive farming methods. These systems, which have their roots in the local environment, make effective use of natural resources while protecting biodiversity. The Zabo system in Nagaland, bamboo drip irrigation in Meghalaya, shifting farming (referred to locally as jhum), and wetland rice cultivation by the Apatani tribe in Arunachal Pradesh are some of the important techniques. These techniques incorporate soil and water conservation, organic farming, and mixed cropping in addition to addressing the difficulties posed by the mountainous terrain and abundant rainfall. Investigating these systems provides important information about resource management, resilient traditional societies, and sustainable agriculture. They demonstrate the inventiveness of indigenous knowledge and its applicability to solving contemporary agricultural problems. This subject offers a wealth of research opportunities, emphasizing the relationship between innovation, ecology, and tradition.

Shifting cultivation

It is a farming practice used in northeastern regions where land covered by woods or other natural flora is cleared using the slash and burn method, then planted with typical arable crops for a few years before being left untended until the natural vegetation returns. The fallow period is typically 10–20 years, however in many places, it has recently been shortened to 2–5 years. The system has degraded and the fallow season has been substantially cut due to the increasing population pressure. This has resulted in significant soil erosion, which has reduced soil fertility and reduced productivity. Numerous annual and perennial crops with a range of growth patterns are cultivated in northeastern India.

Benefits of Shifting Cultivation:

Low Input Farming: This method uses few outside resources, including machinery or chemical fertilizers.

Restoration of Soil Fertility: Decomposed vegetation replenishes nutrients as abandoned land

organically regenerates.
Maintenance of Biodiversity: The technique frequently entails mixed cropping, which encourages biodiversity and helps manage pests.
Maintains Livelihoods: Gives many rural and tribal tribes access to food and financial resources. Its capacity to adapt to hilly terrain makes it ideal for areas with steep hills and forests where mechanized farming is impractical.

Demerits of Shifting Cultivation:

Deforestation: Forest clearing can result in less carbon sequestration and habitat loss.
Soil Erosion: Soil erosion is more likely to occur when there is no vegetation left over after clearance, particularly on slopes.
Limited Productivity: In general, the method produces less reliable and lower agricultural output.
Depletion of Forest Resources: Forest ecosystems can be harmed by frequent changes and shorter fallow times.
Impact on the Climate: Burning plants contributes to greenhouse gas emissions by releasing carbon dioxide.

***Taungya* cultivation**

The Taungya system resembles a well-planned, scientifically controlled shifting farm. The name is said to have come from Myanmar (Burma), where tauang means hill and ya indicates agriculture, or the cultivation of hills. It was brought to Bengal and Chittagong regions of colonial India in 1890 and entails growing crops in forests or forest trees in cultivated fields. Later, it had spread to Latin America, Africa, and Asia. In the early years of the forest plantation's construction, the method basically consists of planting forestry species alongside yearly arable crops. The forest department owns the property or has large-scale leases on it, which permit subsistence farmers to grow crops while also safeguarding tree seedlings. It is an opportunity to fairly engage in a diverse and sustainable agroforestry economy, not just a short-term usage of a plot of land and a wage that barely covers the basics.

Benefit

Forest Regeneration: It helps with reforestation efforts by making it easier to develop forest plantations at a reduced cost.
Land Utilization: By integrating agriculture and forestry, the system guarantees improved land usage.
Soil Fertility: By fixing nitrogen, leguminous crops improve soil fertility, which is advantageous for trees and crops alike.
Economic Opportunities: Farmers help manage forests while earning money from their produce.
Weed Control: By preventing the growth of weeds, crop cultivation lessens the need for forest plantation upkeep.

Zabo cultivation

An traditional farming method called Zabo is used in the hilly areas of the northeast, especially in Nagaland. This system is a mix of agriculture, fisheries, livestock, and forests with a solid foundation in soil and water conservation. Rainwater is collected in a pond with seepage control from the catchment of protected hilltops on slopes higher than 100%. Before the runoff water enters the pond, silt retention tanks are built at multiple locations. The amount of water held in the pond is the only factor that affects the cultivation. The main crop grown on the property is rice. This technology is typically used in hilly, high-altitude locations where building terraces and/or irrigation channels across the slope is not feasible. This is a distinctive farming method for producing food to support a living. Zabo is an acronym for water impoundment. The Kikruma hamlet in Nagaland's Phek district is said to be the birthplace of the Zabo farming system.

Benefits:

Water conservation is ensured by the system's ability to impound rainfall, which makes it available for irrigation during dry spells.

Soil Fertility: By using sustainable land management techniques, it improves soil fertility and stops soil erosion.

Biodiversity: Zabo cultivation sustains a variety of plant and animal species by fusing forests and agriculture.

Sustainable Livelihoods: It offers a variety of revenue streams, such as forest products, livestock, and crops.

Environmental Balance: By combining different elements, shifting cultivation's detrimental effects are lessened and ecological harmony is encouraged.

Bamboo drip irrigation system:

Bamboo drip irrigation is an indigenous method that was invented by the tribal farmers in Muktapur, Jaintia Hills District, Meghalaya. Water trickles or drips at the foot of the crop in this arrangement, which irrigates betel vines planted with areca nuts to sustain the supporting tree. Through the use of bamboo tubes and supports, this system transfers water from naturally occurring streams at higher elevations to the plantation site via gravity flow.

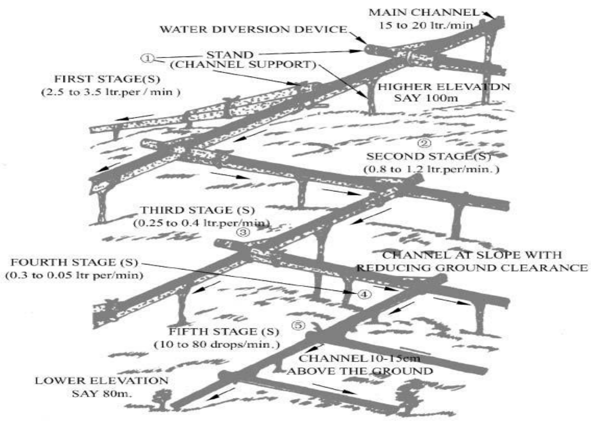

Fig 1 : Bamboo drip irrigation system

Benefits

Water Efficiency: It uses water very efficiently by delivering water straight to the root of plants, reducing evaporation and runoff.

Sustainability: The system is economical and environmentally sustainable because it is made of bamboo, a natural and renewable resource.

Precision: With exact control over the flow rate, the design minimizes leakage and guarantees little water waste.

Adaptability: It works best in rocky and steep areas where traditional irrigation techniques are impracticable.

Low Maintenance: Because the system uses gravity to move water rather than pumps or electricity, it is easy to set up and maintain.

Alder Based Farming System

The Alder-Based Farming System is an innovative and sustainable agroforestry practice, prominently used in regions like Nagaland, India. This system revolves around the integration of alder trees (*Alnus nepalensis*) with crop farming. Alder trees are known for their remarkable ability to fix nitrogen in the soil through a symbiotic relationship with certain bacteria. This enriches soil fertility naturally, eliminating the need for chemical fertilizers.

Farmers typically plant alder trees in and around their fields, creating an environment conducive to diverse crop cultivation. The system is especially beneficial in areas prone to soil erosion and nutrient depletion, as the roots of the alder trees help stabilize the soil and prevent degradation. Additionally, these trees provide multiple benefits—they offer firewood, timber, and even fodder, while their leaves and branches enhance composting. Over time, this system has been refined through traditional knowledge and experimentation. Farmers began to optimize the spacing and management of alder trees to balance crop cultivation and ecological benefits. Practices like pollarding (cutting tree branches to promote regrowth) were introduced to ensure a continuous supply of firewood and timber without harming the trees. In recent years, the system has gained recognition for its ecological and economic benefits, leading to efforts to document and replicate it in other regions.

Soil Fertility Enhancement: Alder trees (*Alnus nepalensis*) fix nitrogen in the soil, naturally enriching it and reducing the need for chemical fertilizers.

Erosion Control: The deep roots of alder trees stabilize the soil, preventing erosion, especially in hilly terrains.

Agrobiodiversity: This system supports the cultivation of diverse crops alongside alder trees, promoting biodiversity and resilience.

Resource Utilization: Alder trees provide timber, firewood, and fodder, making them multifunctional resources for farmers.

Conversion of Wastelands: It enables the transformation of low-fertility or degraded lands into productive agricultural areas.

Sustainability: The system integrates traditional knowledge with ecological principles, ensuring long-term environmental and economic benefits.

Apatani cultivation

The Apatani tribe in Arunachal Pradesh's Ziro Valley engages in apatani cultivation, which is a remarkable illustration of integrated and sustainable farming. This ancient approach creates a healthy balance between aquaculture and agriculture by combining wet rice production with fish rearing in a unique way. It is out for its meticulous water management, which supports the growth of fish while nourishing the rice fields through a complex system of irrigation channels.

Through water conservation, soil fertility maintenance, and biodiversity enhancement, this method not only guarantees high agricultural productivity but also advances ecological sustainability. It also demonstrates the Apatani tribe's environmental knowledge and cultural inventiveness, which makes it a topic of great interest to ecologists, scholars, and farmers alike.

Fig 2. Apatani cultivation

Benefits

Sustainability: The system relies on natural processes to be productive while reducing the usage of external inputs such as artificial pesticides and fertilizers.
Resource Efficiency: It maximizes the utilization of water and land, guaranteeing good fish and rice yields.
Nutritional Value: Including fish aquaculture improves communal food security by offering a source of protein.
Ecological Balance: The method preserves the environment's health by promoting biodiversity and halting soil erosion.

CONCLUSION

North East India's indigenous agricultural systems are a prime example of how traditional knowledge, ecological sustainability, and cultural legacy may work in harmony. Examples of the region's creative ability to adapt to its challenging topography and ecological conditions include the Zabo system, shifting cultivation (jhum), alder-based agriculture, Apatani wet rice-fish production, and bamboo drip irrigation.

These systems serve as models for sustainable agriculture methods because they emphasize the value of biodiversity, soil and water conservation, and the prudent use of natural resources. In addition to improving the standard of living for the local populace, they also provide important lessons in sustainability and resilience that are relevant to modern farming practices. For the region and beyond to maintain ecological balance, cultural identity, and food security, these traditional methods must be preserved and promoted.