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BEYOND JHUM: REHABILITATING ABANDONED LANDS AND PREVENTING SOIL EROSION FOR SUSTAINABLE AGRICULTURE IN NORTHEAST INDIA

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INTRODUCTION

Jhum, or shifting cultivation, is among the oldest farming systems practised by indigenous communities of Northeast India: forest vegetation is cleared, crops are grown for a few years, and the land is then left fallow so natural vegetation and soil fertility can recover. When the fallow period is long enough, natural regeneration and nutrient recycling restore soil organic carbon and ecological balance. But rising population pressure and shrinking landholdings have shortened fallow cycles across the region, forcing repeated cultivation of the same land before it has recovered. This depletes soil organic matter and accelerates erosion on the steep, fragile hill terrain, exposing bare soil to intense monsoon rainfall and runoff.

Abandoned Jhum lands need active rehabilitation, and land still under cultivation needs protection from further degradation. Improved fallow management, conservation agriculture, agroforestry, drainage, soil and water conservation,

Figure 1. Sustainable management and rehabilitation of Jhum lands through conservation agriculture, agroforestry, improved fallow management and soil and water conservation practices

and community participation together offer a way to protect these landscapes while combining traditional knowledge with modern science. This article looks at how the Jhum cycle has changed over recent decades, why degradation occurs, and what combination of agronomic, structural and community-based measures can help restore abandoned land and prevent further soil loss.

A CHANGING CYCLE

Jhum remained sustainable for generations when populations were low and fallow periods long enough for complete ecological recovery. As land availability has shrunk, the same plot is now cultivated more frequently, leaving insufficient time for soil fertility to rebuild. Soil organic matter declines, nutrients deplete, and structure deteriorates. On steep slopes the effect is sharper: intense rainfall strips exposed topsoil, cutting productivity on-site and depositing sediment in downstream water bodies. The real challenge is not eliminating Jhum but making it sustainable again — through better fallow management, soil and water conservation, and viable alternatives for communities that depend on it.

CAUSES AND CONSEQUENCES OF DEGRADATION

Degradation stems mainly from repeated cultivation, shortened fallows and loss of vegetation cover. Without time to recover, soil structure and water-holding capacity weaken while the exposed surface becomes highly vulnerable to erosion. Raindrops striking bare soil detach particles that runoff then carries away; on sloping land this can strip fertile topsoil, nutrients and organic matter rapidly. Beyond the field, the runoff and sediment silt up streams, forest clearing reduces habitat and biodiversity, and repeated burning affects carbon storage — making adequate fallow periods and soil cover essential to halting further decline.

DRAINAGE AND AGRONOMIC MANAGEMENT

In the high-rainfall Northeast, excess runoff often causes waterlogging in low-lying or poorly drained plots, reducing soil aeration and restricting root growth and nutrient uptake. Suitable surface, subsurface or natural drainage channels are needed to keep the soil environment favourable for crops. Alongside drainage, maintaining continuous soil cover through cover crops, residues and mulching shields the surface from raindrop impact; crop rotation and reduced tillage further improve structure and limit disturbance. On slopes, contour cultivation, vegetative barriers and terracing slow runoff and soil loss — field research in the region has shown that even selective weed-cover management can substantially cut soil and nutrient losses compared with traditional Jhum. Watershed-based planning that accounts for topography, drainage and land use strengthens these efforts further.

REHABILITATING ABANDONED LANDS

Rehabilitation should begin with assessing slope, soil type and degree of degradation before selecting appropriate practices. Extending the fallow period allows soil organic carbon to recover progressively, and planting nitrogen-fixing trees such as Alnus nepalensis (Nepalese alder) accelerates fertility recovery while supplying biomass and fuelwood — alder-based Jhum systems have shown better soil fertility than conventional short-fallow systems. Conservation agriculture — minimum disturbance, continuous cover and crop diversification — further reduces erosion and improves soil moisture retention, while agroforestry, where tree roots stabilise soil and canopy softens rainfall impact, adds another layer of protection. The goal is restoring not just productivity but biodiversity and community livelihoods together.

CONSERVATION AGRICULTURE WITH TREES (CAT)

CAT combines conservation agriculture with agroforestry: minimum soil disturbance, continuous cover and crop diversification integrated with suitable trees. Trees add biomass, improve soil organic matter and stabilise soil through their root systems, while continuous ground cover cuts runoff and erosion. Diversifying crops and trees also improves use of above- and below-ground resources and adds sources of food, fuelwood, fodder and income — making CAT a promising route to rehabilitating abandoned Jhum land while sustaining long-term ecosystem health.

PREVENTING SOIL EROSION

On steep Jhum slopes, erosion control should combine vegetative, agronomic and structural measures. Contour planting, grass strips and permanent vegetation slow runoff and trap eroded soil; residues, mulching and cover crops protect the surface and improve infiltration; terraces, contour bunds and check dams control runoff where needed; and conservation tillage with

suitable rotations further improves structure. Recent watershed-level research in the Northeast hills underscores the value of pairing geospatial erosion assessment with watershed planning to target erosion-prone areas with site-specific measures.

COMMUNITY PARTICIPATION AND LIVELIHOODS

Technical interventions alone cannot rehabilitate Jhum lands. Local communities must be involved in planning, implementing and monitoring restoration, with traditional knowledge of crops, trees and soils integrated alongside modern conservation practice. Alternative livelihoods — agroforestry, horticulture, livestock and forest-based enterprises — reduce pressure on forest resources, while community-based forest management and participatory watershed development reinforce protection of degraded landscapes.

CONCLUSION

Combining traditional ecological knowledge, scientific tools and community participation can turn degraded Jhum landscapes into productive, resilient ecosystems, contributing to soil conservation, biodiversity, climate resilience and sustainable livelihoods across Northeast India. Sustained investment in this direction, backed by policy support and long-term community engagement, will ultimately determine whether Jhum-dependent landscapes recover their productivity or continue to decline.

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