

# **The Effects Of Traditional Farming In Eastern And West Khasi Hills District Of Meghalaya On The Environment, A Crucial Issue Of The Twenty-First Century**

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## **Abstract**

*The traditional farming (Jhum) practices in Eastern and West Khasi Hills District of Meghalaya hold significant cultural and economic importance in the twenty-first century for the local communities. The region's indigenous methods, including jhum (shifting) cultivation, are deeply rooted in ancestral knowledge and promote a symbiotic relationship with nature. These practices, driven by population pressures and economic demands, have led to deforestation, soil erosion, and biodiversity loss. This study examines the environmental effects of traditional farming in the regions focusing on land degradation, water resource depletion, and carbon footprint. It also explores how climate change exacerbates these impacts, creating a feedback loop of environmental degradation. The research highlights the need for sustainable farming interventions that balance cultural preservation with ecological restoration. Adopting agroforestry, soil conservation techniques, and integrated farming systems can mitigate adverse environmental effects while supporting local livelihoods.*

**Keywords:** *Traditional Farming, Traditional Influences, Jhum Cultivation, Deforestation, Global Warning, Employment.*

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## **I. Introduction**

The Eastern and West Khasi Hills are characterized by indigenous farming methods such as jhum (shifting cultivation), bun cultivation, and terrace farming. These practices have evolved to adapt to the region's unique topography and climatic conditions. Jhum cultivation, for instance, involves slashing and burning forested areas to create temporary agricultural plots, a common practice in the Eastern and West Khasi Hills, where land is cultivated for a few years before being left fallow to regenerate. This practice can result in soil depletion and loss of forest cover when not managed properly, but when done sustainably, it allows ecosystems to recover, while terrace farming prevents soil erosion on steep slopes (*Traditional Farming*).<sup>1</sup> The construction of terraced fields on the hilly terrain of the areas helps reduce soil erosion and improve water retention in the soil. Many traditional farmers integrate trees into their agricultural systems, which can promote biodiversity, protect soil, and enhance water retention. These methods reflect an intricate understanding of the local environment but also present challenges when analyzed through an ecological lens. Meghalaya, known for its lush landscapes and diverse ecosystems, is home to traditional farming practices that have sustained local communities for generations. These methods, deeply rooted in cultural heritage, are predominantly practiced in the Eastern and West Khasi Hills. However, as environmental concerns intensify globally, the impact of these practices on the local environment warrants critical examination. This literature review aims to explore the environmental effects of traditional farming in these regions, focusing on deforestation, soil health, biodiversity, water resources, and climate implications. Shifting cultivation, or "jhum," is a predominant practice in the region, where patches of forest are cleared, cultivated, and then left fallow to regenerate. While this method historically allowed for natural recovery, population growth and increased agricultural demands have led to shorter fallow periods, resulting in deforestation, soil erosion, and loss of biodiversity (*Jeeva, S.R.D.N., Mishra B.P., 2006; 7-18*).<sup>2</sup> The fragile ecosystem of the Khasi Hills is particularly vulnerable to these changes, with cascading effects on water resources, wildlife habitats, and carbon sequestration.

The Eastern and West Khasi Hills District of Meghalaya, renowned for their picturesque landscapes and biodiversity, have long been shaped by traditional farming practices. These methods, deeply rooted in cultural heritage and subsistence agriculture, have sustained local communities for generations. However, in the twenty-first century, these traditional farming systems are increasingly scrutinized for their environmental impacts.

Additionally, the reliance on traditional methods limits agricultural productivity, often compelling farmers to expand cultivation into forested areas. This not only threatens the region's unique flora and fauna but also contributes to climate change by increasing greenhouse gas emissions through deforestation (*Traditional Farming, Impact*).<sup>3</sup> This issue is emblematic of broader global challenges in balancing traditional knowledge systems with modern environmental sustainability goals. Addressing the environmental effects of traditional farming in Khasi Hills District of Meghalaya is critical to ensuring ecological preservation, sustainable livelihoods, and resilience against the mounting pressures of the climate crisis. This introduction sets the stage for a deeper exploration of the interplay between cultural heritage and environmental stewardship in this unique corner of India. The findings underscore the urgency of addressing traditional farming's environmental challenges in Meghalaya, presenting a critical lens for policymakers, environmentalists, and local communities to adopt sustainable practices and combat the pressing environmental crises of our era (*Traditional Farming, Impact*).<sup>4</sup>

Traditional farming practices in Meghalaya's Eastern and West Khasi Hills are a double-edged sword, offering both ecological benefits and challenges. While they sustain local livelihoods and reflect deep ecological understanding, their environmental impacts require urgent attention in the twenty-first century. Sustainable interventions that respect cultural heritage while promoting environmental conservation are essential to ensuring the long-term health of this unique ecosystem. Further research and policy efforts should prioritize these dual objectives to address the pressing environmental issues of our time (*Saha, R., & Khan, S. K. 2011; 3813-3825*).<sup>5</sup>

## **II. Research Methodology**

The present investigation is assessed by employing an exploratory and investigative study method to seek and identify the effect of traditional farming in Eastern and West Khasi Hills District of Meghalaya on the environment. The study is heavily based on the tools of historical analysis. For this purpose, the primary and the secondary data were confined. Primary data is based on the observation and experiences and secondary data was collected from books, articles, journals, magazines, related works, and records. Limitation of the study. The present article is focused on the effect of traditional farming in Eastern and West Khasi Hills District of Meghalaya on the environment. All sources of information from books, diaries, magazines, records, articles, and journals are acknowledged as references.

## **III. The Effects Of Traditional Farming**

Traditional farming practices in Eastern and West Khasi Hills District of Meghalaya have influenced the region's environment. While these methods have sustained local communities for centuries, their environmental impact has become a pressing concern in the twenty-first century. Firstly, the traditional farming leads to deforestation and habitat loss. Traditional farming like shifting cultivation involves clearing forested areas, burning vegetation to enrich the soil with ash and plant different types of crops, and cultivating crops for a few years before moving to a new site (*Modak, K., Sharma, B. 2024; 7-18*).<sup>6</sup> This practice has led to several environmental challenges like deforestation, soil erosion, loss of biodiversity, water scarcity and pollution, air pollution, unsustainable land use, climate changes, and disruption of forest ecosystems. The clearing of forests for cultivation has resulted in a reduction of forest cover in Meghalaya, from 69.06% to 63.06% over 15 years. Deforestation-one of the most significant environmental issues associated with traditional farming, particularly shifting cultivation. A common traditional practice involves clearing forested areas to grow crops. Farmers often rely on wood for cooking and heating, further contributing to deforestation. The Khasi Hills, known for their rich biodiversity, face habitat destruction, which threatens plant and animal species. Traditional farming (locally known as *jhum farming*), have been identified as significant contributors to deforestation and habitat loss. While this form of agriculture has been practiced for generations and is deeply embedded in the cultural fabric of the Khasi people, its environmental impacts have raised concerns over time. Farmers clear forested areas for cultivation, often by burning vegetation (*Indigenous farming, Meghalaya*).<sup>7</sup> After a few cropping cycles, the soil loses fertility, prompting farmers to move to a new forested area. This cyclical process leads to the continuous loss of forest cover. Large tracts of forests are cleared, reducing the density and diversity of forest ecosystems. Natural regeneration of forests is slow due to the frequent disturbance of the land. The clearing of forests destroys habitats for many species of plants and animals. Rare and endemic species, particularly in the biodiversity-rich West Khasi Hills, are at risk of extinction. Traditional farming practices in regions, can contribute to carbon emissions under certain conditions, but the extent and nature of these emissions depend on specific agricultural practices. The process releases significant amounts of carbon dioxide (CO<sub>2</sub>) stored in the biomass and soil. Repeated cycles can reduce forest cover, lower carbon sequestration capacity, and degrade soil quality (*Environmental, Degradation*).<sup>8</sup>

**Soil Degradation:** Traditional farming practices in the Eastern and West Khasi Hills of Meghalaya can contribute to soil degradation due to several factors, particularly those tied to the region's unique geography, climate, and agricultural methods. Shifting cultivation, involves clearing forests, burning vegetation, and cultivating crops on

the same plot for a few years before abandoning it for fallow periods. This practice can lead to loss of topsoil due to erosion. Reduction in soil fertility because the nutrients are not replenished effectively. Increased vulnerability to landslides, especially on the steep slopes of the Khasi Hills. Continuous cultivation without adequate fallow periods has led to soil erosion and decreased fertility, affecting agricultural productivity. Repeated cycles of burning and cultivation without adequate fallow periods have led to soil erosion and nutrient depletion. The loss of topsoil diminishes soil fertility, affecting agricultural productivity and increasing vulnerability to erosion. Despite the use of terracing and other soil conservation techniques, soil erosion can still occur due to the steep topography and heavy rainfall. This can result in the loss of fertile soil and lower agricultural productivity. The slash-and-burn technique leads to the loss of soil fertility over time. Heavy rainfall in the region exacerbates soil erosion, particularly on steep slopes, leaving the land less productive. Traditional farming affects soil health. These areas, known for their unique climatic conditions and hilly terrains, employ traditional agricultural methods such as shifting cultivation (locally called *jhum*), terrace farming, and organic methods. While these practices have sustained the local communities for generations, they can have mixed impacts on soil degradation (Sarmah, R., & Arunachalam, A. 2010; 25-36).<sup>9</sup> Jhum farming allows the soil to regenerate during fallow periods, supporting biodiversity and maintaining soil fertility when properly managed. Continuous cycles of shifting cultivation without adequate fallow periods lead to deforestation, loss of organic matter, soil erosion, and nutrient depletion. Steep slopes exacerbate erosion risks, washing away topsoil during the monsoon season. Traditional practices often involve clearing forested areas to create agricultural fields. This leads to reduced vegetation cover, which accelerates soil erosion and lowers water retention capacity. Over time, the loss of forest cover contributes to land degradation. Terrace farming, prevalent in the Khasi Hills, helps reduce surface runoff and erosion by creating level platforms for cultivation. This practice can enhance water conservation and sustain soil fertility when managed properly. By blending traditional knowledge with modern sustainable practices, the Eastern and West Khasi Hills can mitigate soil degradation while preserving their rich agricultural heritage (Sangma, S. S., & Galand, A. 2023; 1-10).<sup>10</sup>

**Climate Change Vulnerability:** Traditional farming practices in the Eastern and West Khasi Hills of Meghalaya, while deeply rooted in the cultural heritage and livelihoods of the local communities, can contribute to climate change vulnerability in various ways. These vulnerabilities arise due to both environmental degradation and limited resilience to climate extremes. The Khasi community has observed that local climate variability, including erratic rainfall and rising temperatures, has impacted farm productivity and diversity. Traditional farming methods, such as shifting cultivation, are increasingly challenged by these climate changes, affecting food security and resilience. Role of shifting cultivation in carbon release due to deforestation and biomass burning. Erosion and loss of soil organic matter reducing agricultural productivity and water retention. Vulnerability to erratic rainfall and temperature fluctuations impacting crop yields. Reiterating the need to balance traditional practices with sustainability and emphasizing the urgency of addressing climate vulnerabilities to protect both the environment and local communities are the major effects of traditional farming on climate change vulnerability (*Indigenous Farming, Impact*).<sup>11</sup>

**Water Pollution:** Traditional farming practices in the region have both direct and indirect impacts on water pollution. The region is known for their rich biodiversity, unique agricultural techniques, and dependence on natural resources. Shifting cultivation, a common traditional practice in the region, involves clearing vegetation, burning biomass, and cultivating crops on slopes. This can lead to soil erosion, loose topsoil is carried into rivers and streams during rainfall, increasing sedimentation, ash from burnt vegetation can wash into water bodies, altering pH levels and contributing to water pollution. The slash-and-burn method used in traditional farming releases significant debris and ash, which can be transported to water bodies. This increases turbidity and reduces light penetration, disrupting aquatic ecosystems. Although traditional farming in these regions tends to rely on natural pest control, some farmers may use chemical pesticides and herbicides. These chemicals can leach into water bodies, causing contamination that affects both human and aquatic health. The reliance on forests for agriculture often leads to deforestation, reduces natural barriers that prevent sediment and runoff from entering water bodies. Decreases water table recharge, leading to changes in water flow patterns (*Government, Meghalaya, 2014*).<sup>12</sup>

**Soil Erosion:** Soil erosion is a significant environmental issue that impacts agricultural productivity and ecological sustainability. In the context of the Eastern and Western Khasi Hills of Meghalaya, traditional farming practices play a pivotal role in determining the extent and intensity of soil erosion. Widely practiced in the hilly terrains of Meghalaya, including the Khasi Hills. Land is cleared by slashing vegetation and burning it before planting crops. This method exposes the soil to rain, leading to increased erosion, particularly on steep slopes. Practiced in areas with more stable slopes, it involves creating flat terraces. Helps reduce runoff and soil erosion compared to shifting cultivation. However, improper maintenance of terraces can lead to localized erosion. The

Khasi Hills are characterized by steep slopes, which make them more prone to erosion when vegetation is removed. Meghalaya experiences heavy monsoons, with high-intensity rains accelerating soil erosion on exposed surfaces. Continuous practice of shifting cultivation without allowing fallow periods for soil recovery leads to significant topsoil loss (Meghalaya, Board, 2017).<sup>13</sup> Loss of organic matter and nutrients results in decreased soil fertility. When properly implemented, terrace farming reduces soil erosion by slowing water runoff and allowing sediment deposition. Traditional farming practices in the Eastern and Western Khasi Hills of Meghalaya significantly influence soil erosion. While practices like shifting cultivation exacerbate the problem, others like terrace farming and agroforestry offer solutions. Sustainable interventions combining traditional knowledge with modern conservation techniques can help mitigate soil erosion and ensure long-term agricultural and ecological sustainability (Meghalaya, 2025).<sup>14</sup>

#### **IV. Suggestions Of The Study**

**Awareness, Soil and water Conservation, and Support Farmers in the Region:** Providing training and support in conservation techniques, soil management, and water conservation can help mitigate negative environmental effects while maintaining agricultural productivity. Supporting the farmers of Eastern West Khasi Hills and West Khasi Hills to transition away from traditional farming requires a combination of financial aid, education, infrastructure development, and access to markets. Firstly, introducing sustainable farming alternatives introduce precision farming tools and techniques to improve productivity. Promote mixed farming systems combining agriculture with forestry for better yields and environmental sustainability and provide resources and training for high-yield, low-land-use farming practices. Secondly, Help farmers create value-added products like packaged spices, teas, and organic foods and provide workshops on food processing, branding, and entrepreneurship. Thirdly, promotion horticulture and floriculture. Eastern and Western Khasi Hills have unique climates suitable for flowers, fruits, and medicinal plants. Invest in horticulture and floriculture for better incomes. Fourthly, investing in market access. Create farmer cooperatives to streamline selling and reduce dependency on middlemen and use digital platforms to connect farmers with local, national, and international markets. Fifthly, partner with government schemes or NGOs to provide financial assistance, subsidies, and technical training and create awareness about government programmes like FPO (Farmer Producer Organization) initiatives. Sixthly, Introduce crops suited to the local climate that require less maintenance and are more profitable. Seventhly, leverage the scenic beauty of Eastern and West Khasi Hills District for tourism-based activities and encourage traditional crafts for supplementary income. Lastly, Build cold storage facilities, roads, and efficient irrigation systems to reduce post-harvest losses and improve access to markets and conduct regular training programs on modern agricultural practices, marketing, and sustainable alternatives (Traditional Farming).<sup>15</sup>

**Research and Education:** To end traditional farming practices in the Eastern and West Khasi Hills of Meghalaya, the approach should balance sustainable development, community involvement, and respect for the region's cultural heritage. Conduct ethnographic and agronomic studies to understand traditional farming methods, crops grown, and cultural significance and assess the limitations of traditional farming, such as low productivity, soil degradation, or climate vulnerabilities. Continued research into the environmental impacts of traditional farming methods and how they can be adapted to current challenges is essential. Overall, the study emphasizes the balance between preserving traditional farming practices that have sustained local communities for generations and ensuring the long-term health of the environment. Highlighting that the traditional farming methods can have environmental costs, they also offer valuable lessons in sustainability that are critical in the context of modern ecological challenges. Traditional farming practices in Meghalaya's Eastern and Western Khasi Hills, while deeply rooted in cultural heritage and sustainability, pose both benefits and challenges to the environment (Traditional Farming).<sup>16</sup>

**Preservation of Biodiversity:** Traditional farming methods, such as shifting cultivation (jhum farming) and mixed cropping, promote biodiversity by maintaining varied vegetation and crop varieties. Local agroforestry systems (e.g., betel nut and broom grass cultivation) create habitats for native flora and fauna. Stopping traditional farming altogether in Meghalaya may not be the ideal solution to preserving biodiversity. Instead, a balanced approach that integrates traditional knowledge, sustainable practices, and modern conservation strategies could be more effective. The preservation of biodiversity in the Eastern and West Khasi Hills Districts of Meghalaya is of critical importance due to the region's unique ecosystems, rich cultural heritage, and the ecological services it provides. Meghalaya is part of the Indo-Burma Biodiversity Hotspot, one of the most biologically rich yet endangered regions on Earth. The Eastern and West Khasi Hills are characterized by subtropical forests, grasslands, and sacred groves. Endemic plant species like *Nepenthes khasiana* (pitcher plant) and medicinal plants. Diverse fauna, including threatened species such as clouded leopards, hoolock gibbons, and various rare birds. Sacred groves like Mawphlang are ecologically significant and culturally revered (Meghalaya, 2014).<sup>17</sup> They serve as natural reserves, protecting native species. Empowering local communities to manage biodiversity

through traditional knowledge and sustainable practices. Strengthening the role of village councils in conservation efforts. Enhanced protection and promotion of sacred groves to maintain their ecological and cultural importance. Encouraging agroforestry and organic farming to minimize deforestation and soil erosion. Strict enforcement of environmental laws to regulate mining and deforestation. Reforestation of degraded lands using native plant species to restore ecosystems. The Khasi people have deep-rooted traditions that value harmony with nature. Incorporating their indigenous knowledge and customary practices can enhance biodiversity conservation. Sacred groves are prime examples of community-led conservation rooted in spiritual beliefs. The preservation of biodiversity in the Eastern and West Khasi Hills districts requires a collaborative effort between local communities, government bodies, NGOs, and researchers. By combining traditional wisdom with modern conservation strategies, the region can sustain its rich biodiversity for future generations (Meghalaya, 2014).<sup>18</sup>

**Soil Fertility Maintenance:** Organic farming practices involve minimal use of chemical fertilizers and pesticides, preserving soil health over generations. Stopping traditional farming practices, such as shifting cultivation (commonly known as *jhum* in Northeast India), in the Eastern and West Khasi Hills of Meghalaya could be considered as a strategy for soil fertility maintenance. However, this needs to be approached carefully because traditional farming is deeply rooted in the culture, livelihoods, and food security of the local communities. Maintaining soil fertility in the Eastern and West Khasi Hills of the region is crucial due to the region's hilly terrain, high rainfall, and unique agricultural practices. These areas are predominantly inhabited by tribal communities who rely on traditional farming methods. Construct terraces to reduce water runoff and prevent soil erosion. Plow along the contours of slopes to reduce water flow and soil erosion. Build small check dams and plant grass or shrubs to slow water flow. Combine organic inputs (compost, manure) with minimal chemical fertilizers to maintain a balance. Use microbial inoculants, such as nitrogen-fixing bacteria, to naturally improve soil fertility. Provide farmers with affordable soil testing kits to understand nutrient needs (Traditional farming).<sup>19</sup>

**Minimal Use of Chemical Inputs:** The Eastern and West Khasi Hills District are known for their rich biodiversity, traditional agricultural practices, and unique climatic conditions, are ideal regions for promoting minimal use of chemical inputs in agriculture. Practiced widely relies on natural soil fertility and minimizes the need for chemical inputs. Encouraging sustainable forms of shifting cultivation can reduce soil erosion and maintain productivity. Farmers traditionally use cow dung, compost, and other organic materials as fertilizers, reducing reliance on synthetic chemicals. Traditional knowledge often involves using local plants like neem and other herbal solutions to control pests and diseases. Minimal chemical usage ensures the protection of the rich flora and fauna, including endemic and rare species found in the Khasi Hills. Limiting chemical inputs reduces the risk of contaminating water sources, which are vital for both human consumption and aquatic ecosystems. Organic and minimal chemical use practices help maintain soil fertility and structure, ensuring long-term agricultural productivity (Modak, K., & Sharma, B. 2024; 7-18).<sup>20</sup> Lastly, the government and NGOs can assist farmers in transitioning to certified organic practices through training, subsidies, and market linkages. Integrating trees with crops reduces the need for chemical fertilizers and pesticides while enhancing biodiversity and soil quality. Combining biological pest control methods with traditional knowledge can minimize chemical pesticide use. Regular testing of soil to determine nutrient needs prevents overuse of synthetic fertilizers and establishing seed banks with native varieties that are resistant to pests and adaptable to local conditions can reduce dependency on chemical inputs. By integrating traditional wisdom with modern sustainable practices, the Eastern and West Khasi Hills District can serve as a model for eco-friendly and low-chemical agricultural systems, benefiting both the environment and local communities (Modak, K., & Sharma, B. 2024; 7-18).<sup>21</sup>

**Promotion of ecosystem services:** The Eastern and West Khasi Hills District are rich in biodiversity, cultural heritage, and traditional ecological knowledge. Promoting ecosystem services in these regions involves leveraging their unique natural and cultural assets while ensuring sustainable development. Protecting the sacred forests traditionally maintained by local communities. These groves are biodiversity hotspots and play a crucial role in water retention, soil fertility, and carbon sequestration. Encouraging mixed farming systems that integrate trees, crops, and livestock to enhance biodiversity and improve livelihoods. Strengthening the traditional forest management systems, ensuring the sustainable harvest of non-timber forest products (NTFPs) like broom grass, honey, and medicinal plants. Secondly, Implementing rainwater harvesting, check dams, and natural spring rejuvenation techniques to ensure water security. Promoting the use of traditional water conservation methods, such as bamboo drip irrigation, for sustainable water usage in agriculture. Protecting river ecosystems through afforestation along banks and pollution control initiatives. Engaging communities in planting native trees and restoring degraded lands. Introducing schemes where downstream beneficiaries, like hydro-power companies or urban municipalities, compensate communities for conserving forests that regulate water flows and sequester carbon. Documenting flora and fauna to create conservation strategies that align with local needs and global biodiversity goals. Establishing community-run seed banks and nurseries for native plants to promote

reforestation and safeguard biodiversity. Identifying and protecting wildlife movement corridors to prevent habitat fragmentation. Promoting ecosystem services in Eastern and West Khasi Hills requires a participatory approach that respects the traditional knowledge of indigenous communities while integrating scientific and modern techniques for sustainability. This balanced strategy can ensure ecological preservation, economic growth, and cultural continuity in the region ((Modak, K., & Sharma, B. 2024; 7-18).<sup>22</sup>

## V. Concluding Remarks

Traditional farming practices in the Eastern and West Khasi Hills of Meghalaya are deeply rooted in the region's cultural heritage and have been a cornerstone of the local communities' way of life for generations. However, as the twenty-first century grapples with critical environmental challenges, it is imperative to evaluate the impact of these practices on the environment. Traditional farming practices in these regions have been highlighted such as deforestation and habitat lost, soil degradation, climate change vulnerability, water pollution and soil erosion. Addressing the environmental impact of traditional farming in the Eastern and West Khasi Hills District require a balanced approach that respects cultural traditions while promoting sustainable agricultural practices, and a multi-faceted approach. It was also suggested that the challenges were easily solved by providing awareness, soil and water conservation and support farmers in the regions, Research and education, preservation of biodiversity, soil fertility maintenance, minimal use of chemical inputs and promotion of ecosystem services. The traditional farming practices in Meghalaya's West Khasi Hills are an integral part of the region's identity, their environmental impact highlights the need for modernization and sustainable interventions. A collaborative effort that blends tradition with innovation can help preserve both the environment and the cultural heritage of the Khasi people, addressing one of the twenty-first century's crucial issues.

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