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Research Article

The Paradox of Jhum Cultivation in Arunachal Pradesh: A Contestation Between Livelihood Rights and Sustainable Development

Sukamal Deb[1, *], **Puneet Kumar**[2]

[1]Anant Centre for Documentation, Development of Craft, Anant National University, Ahmedabad, India

[2]Anant Centre for Indigenous Knowledge Systems and Practices, Anant National University, Ahmedabad, India

Abstract

Jhum cultivation is an indigenous agricultural practice followed by some tribal communities in Arunachal Pradesh. It involves burning trees and vegetation to clear plots of land for growing crops. This form of cultivation is closely linked with the traditions, customs, and knowledge systems of the communities that practise it. The present study aims to examine the practice of Jhum cultivation in Arunachal Pradesh, drawing attention to the indigenous knowledge and traditional farming methods associated with it. The paper also addresses the conflict between preserving cultural ethos and confronting the growing ecological unsustainability of Jhum cultivation within current environmental and development policy frameworks. These issues are at the heart of the current socio-economic dynamics in the tribal polluted areas, hence they are important to be acknowledged and resolved for devising effective policies that support sustainable life forms and dignified livelihoods. While the focus area is Arunachal Pradesh, references from other Northeastern states where Jhum is practised have also been included. An attempt is made to understand how Jhum cultivators can be encouraged to shift towards other sustainable practices without compromising their livelihood rights. The paper stresses the need for a realistic and community-based approach in addressing the issue of Jhum cultivation. This paper contributes to proposing the alternative paradigm of leading development through the inclusive participation of the indigenous communities in India.

Keywords

Jhum Cultivation, Arunachal Pradesh, Livelihood, Bio-diversity Hotspots, Agriculture

1. Introduction

Agriculture began as one of the first civilisational activities initiated by human beings, and indeed a very important one too. It introduced the settled way of living, with embankments built around land parcels to protect crops from being harmed by natural elements. India is rich in agro-ecological diversity; hence, it has a variety of agricultural practices from North to South. The geographical and climatic conditions determine the situationality and seasonality of these practices. There are various indigenous agrarian methods, including mixed cropping patterns, agroforestry, crop rotations, and water management techniques.

Arunachal Pradesh, nestled in the foothills of the Himalayas,

*Correspondence: Sukamal Deb (Sukamal.deb@anu.edu.in), Sukamal Deb (sukamal05@gmail.com)

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has an area of 83,743 sq. km (the third-largest in the country) and a population of 1,382,611. It is one of the 25 Biodiversity Hotspots in the world. With 98% of its area comprising land and only 2% water, four-fifths of the state is forest-covered. It shares an international border of 1,680 km and an internal border of 859 km. It is inhabited by 26 significant and 110 sub-tribes, with a total population estimated at 15,80,000. The state is predominantly mountainous and horseshoe-shaped. It lies near the Tropic of Cancer, between latitudes 26 °30' N and 29 °31' N and longitudes 91 °30'E and 97 °30'E, on the north-eastern extremity of India (Mandal, 2009) [32]. The state is endowed with scenic Himalayan ranges and is often described by locals as a paradise on earth. According to the Census 2011, its population comprises only 0.11 per cent of India's total. Joram Begi, while narrating the education scenario in the state, referred to it as *Terra Incognita*, or a No Man's Land, until the early twentieth century (Joram, 2008) [15].

Within this diversity, the traditional agricultural practices in Arunachal Pradesh stand out. Jhum cultivation is one such traditional agricultural practice and is a means of livelihood for some tribal communities in Arunachal Pradesh. The process involves selecting a site on a slope, clearing the forest, and then burning the vegetation to start cultivation. In the same area, multiple crops, sometimes around 8 to 30, are grown together. During the burning process, the soil is also burnt, which temporarily increases its nutrient content due to potash. However, after a few cultivation cycles, the soil loses fertility, resulting in barren land. At that stage, the cultivators shift to a new plot. Hence, Jhum is also known as 'shifting cultivation'. This method is in direct conflict with the principles of sustainable development (Borthakur, 1979) [3].

The tribal communities in Arunachal Pradesh maintain an intrinsic symbiotic relationship with the forest from cradle to coffin. This attribute is anthropogenic (Deb, 2009) [10]. The farmers continue practising Jhum due to the scarcity of plain land in the hilly terrain. The weak industrial and infrastructural status of the state further contributes to the dependence on this unsustainable agricultural practice (Bhattacharya, 2008) [4], (Bhattacharjee, 2001) [5]. This situation is not unique to Arunachal Pradesh but is a common characteristic of other hilly states in the Northeast (Elwin, 1957) [11], (Elwin, 1959 [12] and (Elwin, 1970) [13]. While the Jhum practice varies from tribe to tribe, its essential features remain the same. However, a critical perspective is that debarring Jhum cultivators from this practice amounts to a betrayal of their livelihood rights, as it is their life-sustaining activity. In addressing the issue, the Arunachal Pradesh Agricultural Policy emphasises improved land management and proposes that shifting cultivators be gradually weaned away from Jhum through the introduction of better cultivation options, which are a better alternative (Agricultural Policy, 2001) [28]. One notable success story comes from Nagaland, where agroforestry has been integrated into traditional Jhum through assisted planting of fast-growing, economically valuable timber. This model suggests that Jhum can be improved through targeted research, adaptive strategies, and community-based innovation.

2. Research Methodology

This study primarily adopts a qualitative research methodology of discourse analysis as the tool to examine and understand the socio-cultural, ecological, and economic dimensions of Jhum cultivation. The cultivation is accessed from different perspectives, like government recommendations, community stories, and economic growth discourse. The analysis focuses on unpacking the underlying meanings, assumptions, and power relations in practising and sustaining this agricultural practice.

Figure 1. *The district map of Arunachal Pradesh.*

This study is based on a combination of primary and secondary data sources. The primary data were collected through field visits, structured questionnaires, interviews, and informal discussions with stakeholders directly or indirectly engaged with Jhum cultivation in Arunachal Pradesh. Three detailed interviews have been included in the study, along with relevant photographic documentation gathered during the fieldwork.

The secondary data were drawn from a range of published and unpublished sources, including academic books, peer-reviewed journals, government reports, newspapers, gazetteers, and statistical abstracts related to Arunachal Pradesh. The efforts were made to cross-verify secondary data with primary findings to ensure consistency and validity, wherever possible.

3. An Overview of Arunachal Pradesh

It is a fact that the territory that, through several changes, evolved into Arunachal Pradesh was severely isolated. To be brief, this border region acquired an identity of its own for the first time with a notification issued in 1914 by the Foreign and Political Departments of the Government of British India. The notification extended the Assam Frontier Tracts Regulation, 1880, to the hills. As a result, the North East Frontier Tract (NEFT) came into being. Later, in 1951, the NEFT was renamed the North East Frontier Agency (NEFA). NEFA was subsequently upgraded to a Union Territory and renamed Arunachal Pradesh. The first Assembly election was held in 1978, and full-fledged statehood was granted on 20th February 1987. Let's know more about it.

Figure 2. *A Jhum field, photo Agriculture Department.*

3.1. Climate and Rainfall

The biodiversity of the state has earned it global recognition. Four-fifths of the state is covered by forests, with evergreen and semi-evergreen forests constituting 69% of the geographic area and degraded forests another 13%. Its distinct topography and the unique influence of the monsoon support a diversity of ecosystems, forest types, and wetlands. The southwest monsoon makes Arunachal Pradesh one of the wettest regions in the country, with rainfall reaching as high as 4,500 mm per year in the foothills. The higher altitudes are relatively drier, receiving around 800 mm annually, resulting in an average annual rainfall of about 3,000 mm (Subudhi, 1996) [25].

Rainfall occurs from the pre-monsoon showers in March through the heavy, incessant downpours of June and July, tapering off in September and October. The foothills become hot and humid, with summer temperatures reaching up to 38 degrees Celsius. The middle or Lesser Himalayan region has a temperate climate, although certain locations remain chilly in spring due to strong winds through deep gorges.

3.2. Economy

The economy of Arunachal Pradesh is mainly based on agriculture and forests. Due to the predominantly rural character of the state's backward areas, traditional industries also play a significant role, around 3.5 lakh people in the state live below the poverty line. The economy heavily relies on government funds, a significant portion of which comes as grants from the Government of India.

The number of employees, including those in contingent jobs, is disproportionately high, putting pressure on government resources. This observation was noted in the State's Statistical Report (Statistical Abstract of AP, 2012) [16, 31]. The government allocates significant funds to unproductive expenditures and large establishments. However, the state holds immense potential for hydroelectric power generation. With an estimated 58,000 MW of hydropower potential, Arunachal Pradesh possesses nearly 40% of the country's total capacity.

Figure 3. *Jhum field under regeneration with Lantela Camera, nitrogen-fixing shrub, 3-year fallow period.*

3.3. Livelihood

Natural resources are crucial for sustaining the livelihoods of indigenous communities in the state. Proper planning is essential for the sustainable utilisation of these resources, as regional development depends on resource availability, strategic planning, and community participation (Chaudhari, 2004) [8]. Unemployment has risen, and the dignity of labour has declined. The concepts of livelihood rights and sustainable development sometimes place society in a dilemma, making it challenging to decide which should take precedence, especially

when promoting one could potentially undermine the other.

4. Jhum Cultivation in Arunachal Pradesh: Indigenous Origins and Emerging Alternatives

Arunachal Pradesh, often called the lungs of India, is home to immense biodiversity. It hosts over 20,000 identified species of medicinal plants, many of which remain undocumented. Of these, more than 500 have been officially recorded, with 250 used in Ayurvedic formulations. The broader Himalayan range, where Arunachal is situated, contains more than 80% of the world's medicinal flora. The state also houses 5,000 flowering plant species, 550 orchid varieties, 91 species of bamboo, and 18 species of cane. The tribals are well aware of the use of these medicinal plants while relying on their indigenous knowledge bank.

The tribal way of life in Arunachal Pradesh is deeply rooted in nature. A. Borang observed that these communities believe in Forest Gods or devils, and out of reverence or fear, they refrain from destroying forests unnecessarily (Borang, 1995) (Borang, 1996) [2, 6]. Mibang further highlighted how their rites, culture, and traditions are intricately interwoven with the forest, wildlife, and agricultural practices (Mibang, 1994) [19], (Mibang, 1994) [26]. As their lifestyle revolves around the forest, no other community understands or values it as intimately as the tribal population of the region.

Jhum cultivation is not just an economic activity; it is a cultural inheritance. It forms a core part of the ethos and tradition of these communities. Any move toward its abolition must therefore be approached with care and cultural sensitivity. A passionate, gradual reform process must originate from within the community itself. An example of such an internal transition is the establishment of the first commercial tea estate in the state, the Donyi Polo Tea Estate. It helped reduce Jhum practices, improved ecological conditions, and facilitated access to both domestic and international markets.

The Shukla Commission Report 1997, in its examination of development in the Northeast Region, noted that hill farming is predominantly under Jhum. However, the practice has become less productive due to the shrinking Jhum cycle, which has led to erosion and forest degradation in several areas. The report acknowledged that most Jhum resettlement schemes have not succeeded uniformly, and therefore, the practice cannot be ended abruptly. Rather, the issue needs to be addressed with sensitivity, ensuring that transitions are both sustainable and culturally grounded.

5. From Symbiosis to Stress: Ecological Implications of Jhum

Jhum cultivation has been practised in Arunachal Pradesh since time immemorial. It is rooted in a deep symbiotic relationship between tribal communities and the forest. According to estimates, over six lakh tribal families across the Northeast Region, Odisha, Andhra Pradesh, and Himachal Pradesh continue to practice this form of shifting cultivation (Shifting Cultivation, NIRDPR - NERC, 2016) [24, 30]. However, the practice has long been controversial. The critics point out that Jhum (i) destroys forests and ecosystems, (ii) depletes soil fertility, (iii) causes soil erosion, and (iv) consumes excessive time and labour (Borang, 1996) [7]. The shrinking Jhum cycle has exacerbated these issues, allowing insufficient time for soil and forest regeneration.

Despite this, Borang noted that most tribes prefer to live in hilly regions, considering plains more prone to disease outbreaks. He clarified that Jhum in Arunachal Pradesh is not nomadic but site-bound. Traditionally, Jhum cycles ranged from 8 to 15 years, giving fallow land enough time for natural forest regeneration, thus preserving a sub-tropical ecological balance. Supporting this, Prof. P. S. Ramakrishnan found that a ten-year Jhum cycle is both ecologically and economically viable. Yet, the cumulative impact of Jhum and development activities has led to the disappearance of numerous species of flora and fauna. This loss is increasingly seen as irreversible and threatens ecological sustainability. The region now faces multiple pressures, such as population growth, increasing ethnic diversity, rapid deforestation, reduced viability of shifting cultivation, evolving rural lifestyles, and expanding townships. Arunachalam warned that with the extinction rate reaching two species per day, species conservation is becoming indispensable for human survival (Arunachalam, Khan, 2002) [1].

The ecological concern is further amplified by the challenge of climate change. Deforestation is a global crisis, which is partly driven by forest burning for Jhum cultivation. The wildfires, often sparked during forest clearing for Jhum, can easily spiral out of control, engulfing surrounding bamboo groves and elephant grass, contributing to air pollution and global warming. Arunachal Pradesh is particularly vulnerable, with two of India's 100 most climate-sensitive districts located in the state. In the long term, Jhum disrupts ecosystem equilibrium. It takes nearly 1,000 years to form just one inch of topsoil in nature. Recognising the gravity of this, the Indian Council of Agricultural Research (ICAR) proposed a three-tier hill farming system combining forestry, horticulture, and terrace cultivation, adjusted to altitudinal gradients. These strategies offer ecologically sound alternatives to Jhum.

6. From Subsistence to Sustainability: Economic Pathways Beyond Jhum Cultivation

Forests in Arunachal Pradesh are not merely ecological assets but also potential economic lifelines. They are rich in minor forest products such as herbs, medicinal plants, and edible items. Bamboo, found in abundance at high altitudes, holds

considerable promise for developing bamboo-based industries that could support the economic upliftment of Jhum cultivators. Another sustainable avenue is scientific beekeeping or apiculture, which not only improves crop productivity through cross-pollination but also yields high-altitude honey. This honey, valued both domestically and internationally, commands a higher market price than standard varieties. Apiculture offers equal opportunities for both men and women and contributes directly to five of the seventeen Sustainable Development Goals (SDGs).

Despite such prospects, tribal populations continue to face entrenched poverty. Globally, tribal people constitute 15% of the world's poor, with around 370 million living across 90 countries, making up 5% of the global population. In India, there are 645 recognised tribal communities with a population of 104 million, representing 8.6% of the nation's population. These communities often operate outside the mainstream economy, depending on subsistence-based livelihoods and experiencing limited development. According to the Census 2011, their progress in terms of Human Development Index (HDI) indicators remains low (Census of India, 2011) [11], (Census of India, 2011) [21].

As history has shown, all societies undergo transitions. New socio-economic realities inevitably emerge. Yet, such transitions mustn't trample upon the ethos, traditions, and cultural identities of indigenous communities. This sensitivity is especially critical for tribal groups. In the context of Jhum cultivation, this means that policy shifts must be careful and calibrated. A hasty dismantling of Jhum could damage the intricate social systems and cultural values that have long been intertwined with this practice. Instead, a gradual introduction of viable alternatives, rooted in local contexts and ecological realities, offers a more just path forward. There is also an urgent need to rehabilitate lands already degraded by shifting cultivation. Encouragingly, the prevalence of Jhum cultivation has already started to decline organically over recent decades.

7. Legal Frameworks and Land Challenges in Jhum Regions

The land conditions in Arunachal Pradesh present serious agricultural challenges. It is geologically young, highly leached, and susceptible to frequent landslides, erosion in the hills, and floods in the foothills. Despite regulatory attempts like the Shifting Cultivation Regulation Act, 1947, and the ban on timber logging, these measures have not yielded tangible improvements in either curbing deforestation or rehabilitating degraded Jhum lands.

Historically, large-scale timber extraction took place until 1995–96, after which the Supreme Court of India halted such activities in its judgment on 12 December 1996 in response to a writ petition (Civil No. 202) filed by T. N. G. Thirumulkpad (Mandal, 2006) [18]. In recognition of its ecological value, the central government granted Arunachal Pradesh a Green Bonus, considering the Himalayan region as the planet's lungs.

India's legal response to environmental degradation has included the Wildlife (Protection) Act of 1972, the Environment (Protection) Act of 1986, and the National Forest Policy of 1988, with earlier efforts incorporated into the Fifth Five-Year Plan (1974–78). At the state level, Arunachal Pradesh's New Agricultural Policy acknowledged the adverse effects of Jhum cultivation and proposed measures to encourage improved land management and the introduction of agroforestry-based slope cultivation (Agricultural Policy, 2025) [27]. The policy outlines a strategy for gradually guiding Jhum farmers towards more sustainable practices while preserving livelihood concerns.

In addressing the issue of land tenure, Mandal offered several policy recommendations to streamline tribal land rights (Mandal, 2009) [17]:

1) Documentation of customary land laws across tribal communities, followed by the formulation of a uniform land policy;
2) Imposition of ceilings on cultivable land due to scarcity of plains;
3) Redistribution of land to the landless poor;
4) Regulation and monitoring of land sales;
5) Discouragement of sharecropping;
6) Mandatory registration of all land transactions;
7) Restrictions on the sale of agricultural land to non-cultivators;
8) Introduction of a progressive land tax.

These recommendations aim to address both the legal ambiguity and socio-economic precarity associated with land in tribal areas, ensuring that any transition away from Jhum is supported by a stable legal and economic framework.

8. Gender, Labour, and Social Dimensions in Jhum Cultivation

An underlying concern in the practice of Jhum cultivation pertains to the entrenched gender roles and labour hierarchies. Women are valued largely for their roles in both production and reproduction, forming the backbone of this labour-intensive agricultural system. However, this instrumental valuation also reflects the socio-cultural limitations of the Jhum economy. In several tribal communities, such as the Aka, Miji, Nyishi, Adi, and Singpho, historical reliance on bonded labour and multiple wives to sustain Jhum cultivation has been observed. This structure, in effect, tacitly endorses polygamy (Mibang, 1994) [9]. On the other hand, among the Galo tribe, labour is sourced from paid local workers rather than from extended familial structures.

It is equally important to note that not all tribes in Arunachal Pradesh follow Jhum cultivation. Communities such as the Monpa, Sherdukpen, Apatani, and Khampti have adopted alternate and more sustainable forms of agriculture (Nanda, 1982) [20]. These tribes generally practice monogamy and are

not tied to the gendered labour dynamics associated with Jhum. The Monpa tribe, for instance, gathers oak (Parmong) leaves, which aid in water retention and compost formation (Gupta, 2005) [14]. The Apatani tribe's mountain-based paddy–fish integrated farming system is a prime example of sustainable cultivation, similar to practices found in China, Japan, Indonesia, the Philippines, Vietnam, Malaysia, Thailand, and Myanmar. These alternatives offer promising models of ecological sustainability within the broader tribal context of the state.

The status and empowerment of women play a critical role in the overall well-being of any community. The persistence of polygamy, reinforced through traditional agricultural systems like Jhum, along with prevailing taboos and myths, poses barriers to gender equity. The women continue to be denied equal access to political participation and property rights. Though often overlooked, there is a significant correlation between the structural framework of Jhum cultivation and the ongoing challenges to women's empowerment in these regions.

9. Data Analysis

According to the Department of Agriculture, Government of Arunachal Pradesh data, 31.6% of GSDP is contributed by agriculture and allied sectors, which is disproportionately low compared to the fact that about 70% of the population is directly or indirectly dependent on the farm sector. The total cultivable area is 2.00 Lakh hectares, under Jhum 1.10 Lakh hectares and 0.90 Lakh hectares under permanent cultivation. The Department claims the right interventions enabled the reduction of the total area under Jhum cultivation from 1,10,000 to 84,000 hectares in the last ten years. The table below gives an idea of the status of Jhum cultivation. (Status of Agriculture in AP, Base Year 1999 - 2000) [33].

Table 1. *District-wise, the area under Jhum Cultivation and Treatment Under Watershed Development Project in Shifting Cultivation Areas (WDPSCA).*

Sl. No.	District	Jhum area, based on Remote Sensing	Treatment under WDPSCA			% of the area treated
			IXth	Xth	Total	
1	Tirap	84804	492	5500	5992	7.06
2	Changlang	25232	Nil	1000	1000	3.96
3	Lohit	3428	1520	120	1640	47.84
4	Dibang Valley	12130	Nil	120	120	0.99
5	East Siang	1923	-	120	120	6.24
6	West Siang	19928	-	240	240	1.20
7	Upper Siang	7077	-	240	240	3.39
8	Upper Subansiri	2634	1220	360	1580	59.98
9	Lower Subansiri	35870	5345	360	5705	15.90
10	Papum Pare	27963	7166	247	406	24.48
11	East Kameng	28396	669	240	909	3.20
12	West Kameng	52348	2193	480	2673	5.10
13	Tawang	7075	494	-	494	6.98
	Total	308808	19099	9020	28119	-

The up-to-date area under WDPSCA=28,119 Ha, i.e., 9.1% of the total area under shifting cultivation; 13 projects covering 6500 Ha in Tirap and Changlang districts were started during 2006 - 07; Twenty-one projects covering 10,500 Ha spread over all the districts except Tirap and Changlang; Implementation started from 2006-07.
Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 2 below shows that some progress has been made in shrinking the Jhum cultivation.

Table 2. Shrinking Jhum Cultivation.

Total Area under Jhum (current Jhum & Fallow 2001-02)	3,08,808 Hectare
Total Area under Jhum (Net)	84,002 Hectare
The percentage area in the Jhum operation currently	27.2
Percentage area left fallow for vegetative regeneration	72.8

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

The table below shows the district-wise data.

Table 3. District-wise area (Target) Treated under WDPSCA during XIth Plan.

District	Area treated (Ha)
Tawang	500
West Kameng	2,340
East Kameng	1,420
Papum Pare	1,420
Lower Subansiri	960
Kurung Kumey	1,420
Upper Subansiri	1,880
West Siang	1,420
Upper Siang	1,420
East Siang	960
Dibang Valley	500
Lower Dibang Valley	560
Lohit	500
Anjaw	960
Changlang	500
Tirap	500
Total	17,650

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 4. Rice scenario in Arunachal Pradesh – 2013.

Total area under Rice cultivation	126500 ha
Production	27 MT
Average Productivity	21.74 Qtls /ha (23.00 NA)
Shifting/ Jhum Cultivation	
Rice under Shifting cultivation	50000 ha
Production under Shifting cultivation	56000 MT

Productivity under Shifting cultivation	11.20 QTLs/ha
Settled Cultivation	
Rice under Settled cultivation	76500 Ha
Production under Settled cultivation	219000 MT
Productivity under Settled cultivation	28.6 Qtls/Ha

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

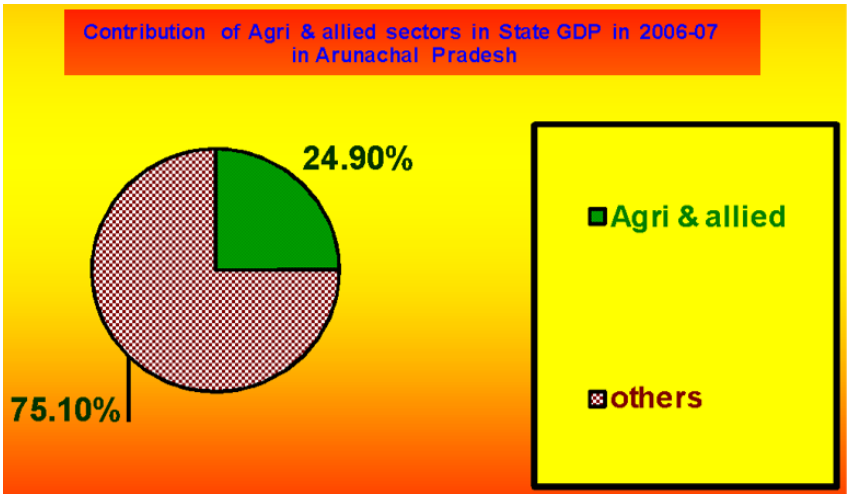

Figure 4. Contribution of Agri & Allied sectors in state GDP in 2006-07 in Arunachal Pradesh.

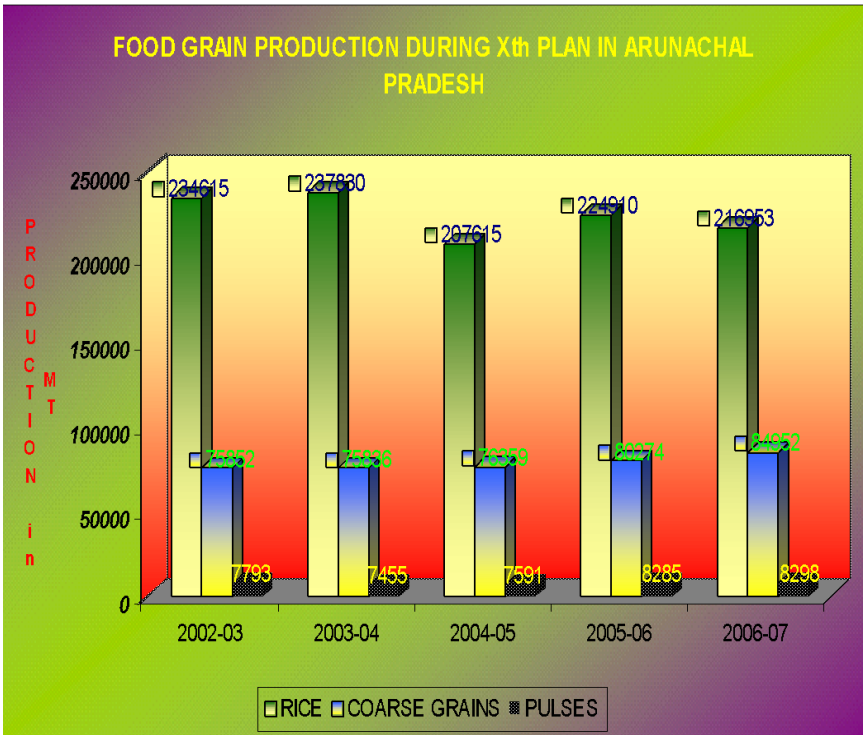

Figure 5. Food Grain production during Xth Plan in Arunachal Pradesh.

Table 5. *Salient features of Achievement under WDPSCA during the IXth & Xth Plans.*

Total Jhumia families (as in 2001- 02)	64260
Total Jhumia families converted to P/cultivation	5213
Percentage Conversion during the IXth & Xth Plans	8.1%
Total Jhum area in operation (2001 - 02)	84002 Ha.
Area Treated under WDPSCA (up to Xth Plan)	28119 Ha
% Area treated under WDPSCA 33.5%	

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 6. *Contribution of Jhum Cultivation towards Total Area & Production in Arunachal Pradesh (Xth Plan).*

The area under crops (Total)	2,60,000 Ha
The area under Jhum	84,002 Ha
Share of current Jhum Land to total crop area	32.3%
Total crop production	4,42,400 MT
Crop productions under Jhum	61,000 MT
Contribution of JHUM to total crop production	13.8%
32.3% of the area contributes 13.8% of the state's total crop production.	

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 7. *The trend in vegetative regeneration in the Jhum area.*

Total Area under Jhum (current Jhum & Fallow 2001- 02)	3,08,808 Hectare
Total Area under Jhum (Net)	84,002 Hectare
Percentage of area in Jhum operation currently	27.2%
Percentage of area left fallow for vegetative Regeneration	72.8%

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 8. *Relevant Details on Agriculture in Arunachal Pradesh in 2007.*

No. of Projects	13 (saturated)
The target area for treatment	6500 Ha
Estimated cost	650 Lakh
The area treated up to 2006-07	641 Ha.
Allocation of GOI up to 06-07	650 Lakh
No of Districts covered	14
SHG formed (Women)	22 Nos.
SHG formed (Male)	8 Nos.
User Group	24 Nos.
Composite Nursery established	13 Nos.
Soil conservation, terracing, etc.	1,744 Hectares
Dry-land horticulture	645 Hectares
Agro-forestry	656 Hectares
Demonstration on Agri, Horticulture, and Fisheries	1,027 Nos.

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 9. *Relevant Details on Agriculture in Arunachal Pradesh in 2007.*

Mushroom cultivation, Horticulture plantation	207 Nos.
Household Production System	800 Nos.
Rural Household Industry	234 Nos.
Goatery & Poultry units	24 Nos.

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

Table 10. *Relevant Details on Agriculture in Arunachal Pradesh in 2007.*

Target in terms of No. of Projects	37 Nos. (includes 21 projects of 2006-07)
The target area for treatment	17650 Hectare
Estimated cost	1765 Lakh
Area treated during 2006-07	850 Hectare
Allocation of GOI during 06-07	85 Lakh
Financial requirement during XIth Plan	1,765 Lakh
No of Districts covered	16

Source: Unpublished Report by the Department of Agriculture, Government of Arunachal Pradesh, 2007.

10. Ground Realities and Future Pathways: Insights from the Field

Three interview excerpts collected during fieldwork reflect a spectrum of opinion on the issue of Jhum cultivation, ranging from support for its gradual elimination to regulation to continued practice with sustainable alternatives.

Mr A. K. Purkayastha, former Director of Agricultural Marketing, who has been associated with Jhum cultivation for the last four decades, supports the gradual abolition of Jhum. He advocates replacing Jhum with horticultural crops. He noted that rare species of cereals, pulses, oilseeds, and local vegetables of medicinal value are still grown in Jhum areas. According to him, these products have market potential, and there is a need to develop market mechanisms to support this transition. While highlighting the disadvantages of Jhum, he also admitted that its complete elimination may not be practical (Purkayastha, 2008) [22].

Mr Techi Taura, an agricultural development official in the state government and member of a family of Jhum cultivators, favours the continuation of Jhum but under strict regulation. He pointed out that Jhum cultivation ensures food security for tribal families, who rely on it to grow food for their daily requirements. He strongly believes that a total ban on Jhum cultivation is not feasible. Instead, he recommends a scientific method to restrict its practice, including the repeal of the Jhum Cultivation Regulation Act of 1947 and amendments to the State Land Act. He proposed that only individuals, clans, or communities that can demonstrate hereditary land rights should be allowed to practice Jhum. Others should be restricted from clearing new lands for Jhum. He also stressed empowering Village Heads and local governance bodies to manage and regulate Jhum. Mr Taura highlighted that Jhum farming involves multiple cropping and yields organic produce, although not officially certified. He added that people in the community prefer consuming rice grown on Jhum plots over the government-distributed rice under the public distribution system.

Figure 6. *Mr. Techi Taura and his wife in a traditional House.*

Mr Tadar Jaju, a resident of Arunachal Pradesh working in the Gauhati High Court, also comes from a family of Jhum cultivators. He continues the practice himself. He took the research team to a plot of previously cultivated Jhum land that had been lying fallow for five years and is now used for bamboo cultivation. Mr Jaju defended the relevance of Jhum by linking it to the survival of Mithun (Bos Frontalis), a culturally and economically significant animal for the local people. He owns twelve Mithun valued at around ₹12 lakh and asserted that without Jhum, Mithun would not survive.

Figure 7. *Photo taken on 21 March 2015 with Mr Tadar Jaju, an educated Jhum cultivator, along with family members.*

The excerpts suggest that while the future of Jhum cultivation is debated, there is an urgent need for strategies that account for the region's ecological, economic, and cultural complexity. Any intervention must also take into account the climatic vulnerability of the region. The link between poverty and environmental degradation is evident, and efforts to address Jhum cultivation must also consider food security, livelihood provision, and the quality of life of the local communities.

The way forward may involve a combination of strategies to transition towards more sustainable and dignified practices. These include:

1) Motivating and building awareness among Jhum cultivators.
2) Capacity building of farmers and Panchayat leaders.
3) Coordinated action by land-based development agencies.
4) Application of Indigenous Traditional Knowledge in land-use practices.
5) Technological research and dedicated R&D projects for localised agro-ecological solutions.
6) Plantation of fast-growing vegetation/tree species on Jhum fallow lands (e.g., *Lantana camera*, China weeds).
7) Mass cultivation of fruit-bearing plants, oilseeds, and timber species.
8) Increasing the Jhum cycle through scientific means.
9) Promoting rainwater harvesting for irrigation purposes.
10) Facilitating niche markets for organic Jhum produce.
11) Developing marketing strategies, including proper packaging for Jhum products.
12) Soil and water conservation and integrated nutrient management.

13) Vegetative conservation to reduce soil run-off.

14) Growing protective and productive crops in Jhum areas.

These insights underline the importance of addressing Jhum cultivation through a participatory and inclusive approach that is rooted in local realities (Purkayastha, 2008) [22], (Purkayastha, 2012) [23].

11. Conclusion

The question of replacing or reforming Jhum cultivation in Arunachal Pradesh cannot be addressed in isolation. It requires a careful, participatory, and phased approach that respects the cultural ethos and livelihood rights of the tribal communities. The banning of Jhum cultivation outrightly, without proper alternatives or community involvement, risks alienating those whose lives are deeply rooted in this practice. Therefore, the state must take a realistic initiative to offer viable options that emerge from within the community and are acceptable to the cultivators themselves.

The Government of Arunachal Pradesh has outlined its broader vision through the New Agriculture Policy. This policy includes key initiatives such as the Kiwi Mission, the Spice Mission, and the Medicinal and Aromatic Plants Mission. The horticulture sector is positioned as a major alternative to shifting cultivation, with efforts focused on increasing productivity, promoting climate-resilient practices, discouraging excessive chemical use, and improving irrigation and water conservation. These efforts also include the conversion of Jhum areas into permanent terraced farming and the promotion of organic cultivation of high-value crops like turmeric, ginger, cardamom, black pepper, and medicinal herbs (New Agricultural Policy, 2025) [29].

Crop diversification and mechanised farming are being encouraged alongside goals of rural development and eco-tourism. However, awareness campaigns need to be strengthened, particularly in the local dialects, to disseminate scientific knowledge about the ecological consequences of Jhum cultivation. Additionally, large-scale regeneration of degraded Jhum land must be undertaken to improve soil health and biodiversity.

Field interactions reflect a mixed response to the transition away from Jhum. Farmers like Ms Nargis Kipa of Kra Daadi district have shifted to large cardamom cultivation, which offers a profitable alternative. However, she points out the unintended consequence of deforestation caused by the expansion of cardamom farming. On the other hand, successful examples such as kiwi fruit farming by Ms Rita Tage of the Apatani tribe and the Monpa farmers in Dirang offer sustainable models that do not rely on Jhum and maintain ecological balance.

These stories highlight that sustainable farming is possible when indigenous knowledge is combined with new opportunities. The state can upscale its economy through organic agriculture without compromising ecological integrity. At the same time, the unique topography and biodiversity of Arunachal Pradesh must be preserved with great care.

In this context, honouring Indigenous Knowledge Systems and Practices (IKSP) becomes critical. Rather than viewing Jhum only as a problem to be solved, it should also be examined as a knowledge system that may hold the key to more sustainable land-use practices. The scientific research should focus on innovating Jhum itself, perhaps evolving it into a more regenerative or modified agroforestry model. Simultaneously, there is an urgent need to document indigenous knowledge before it fades, ensuring that any intervention builds on, rather than erases, the community's wisdom and heritage.

Abbreviations

GOI	Government of India
HDI	Human Development Index
ICAR	Indian Council of Agricultural Research
NEFA	North East Frontier Agency
NEFT	North East Frontier Tract
MW	Mega Watt
SDG	Sustainable Development Goals

Conflicts of Interest

The authors declare that there is no conflicts on interest.

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