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Sedentary Agricultural Challenges and Sustainable Solutions in Papum Pare District, Naharlagun, Arunachal Pradesh: A Sociological Perspective

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Abstract

This paper uses a sociological frame to study the problems of sedentary agriculture in the Papum Pare district in the hamlet of Naharlagun, Arunachal Pradesh. Transition from 'jhum' (shifting cultivation) to settled agriculture has had several socio-economic and environmental consequences such as decline in soil fertility, conflict over land ownership, declining crop productivity, and loss of culture. Through the use of mixed-methods approach, combining both qualitative and quantitative methods, in particular in-depth interviews, focus group discussions, and ethnographic observations, the project seeks to explore both the lived experiences of individual farmers as well as the wider community.It also covers sustainable alternatives including agroecological farming, integrated farming systems, locally driven initiative that match with the local socio-cultural context. The results highlight that sustainable agriculture for the area is not only a matter of ecological innovations but also the reinforcement of social organizations, the retention of indigenous know-how and the promotion of inclusive policy settings. The research recommends an integrated, community-led solution which takes account of the environment as well as local cultural traditions.

Keywords: Sedentary Agruculture, Sustainable Technologies, Papum Pare, Naharlagun, Arunachal Pradesh, Sociogical Apporach, Indigeonous Technology, Rural Development, Agricultural Change, Community Involvemment.

INTRODUCTION

Agriculture continues to be the mainstay of rural livelihoods in Arunachal Pradesh, a northeastern state endowed with rich biodiversity and diverse indigenous cultural traditions. According to the *Directorate of Economics and Statistics, Government of Arunachal Pradesh (2021)*, over **52%** of the population is directly engaged in agricultural activities. In recent decades, the Papum Pare district—particularly the rapidly urbanizing Naharlagun region—has witnessed a marked shift from traditional shifting cultivation (locally known as *jhum*) to more sedentary forms of agriculture. This transition has been propelled by increasing population pressure, developmental interventions, and urban expansion, drastically altering traditional land-use patterns (*Tajo, 2021*).

Today, sedentary agriculture in Papum Pare is characterized by declining soil fertility, ineffective irrigation systems, shrinking landholdings, and increasing dependence on external inputs like hybrid

seeds and chemical fertilizers. According to a local-level analysis by *Papum Pare Agriculture Department (2020)*, **59%** of the net sown area remains unirrigated, and farm mechanization is still minimal, with less than **15%** of farmers using powered equipment. These limitations are compounded by socio-economic constraints such as land tenure insecurity, limited market access, and insufficient institutional support (*Dutta & Goswami, 2019*).

However, the consequences of this shift extend beyond agronomic challenges. The erosion of indigenous agricultural knowledge systems and the dismantling of community-based natural resource management structures have resulted in social fragmentation and ecological imbalance (*Bani, 2022*). As *Ramakrishnan (2017)* notes, traditional shifting cultivation systems were not merely agricultural techniques but embedded cultural practices that fostered ecological sustainability and food security through communal cooperation and rotational land use.

These transformations necessitate a sociological analysis that moves beyond technical solutions to understand how changing agricultural practices are reshaping social norms, cultural identities, and environmental relationships. This paper seeks to examine the lived realities of sedentary agricultural communities in Papum Pare, with particular attention to the socio-cultural disruptions and adaptive strategies emerging in response. It argues that sustainable agricultural futures in the region must be rooted in community-led knowledge systems, participatory governance, and policies that honor cultural relevance and ecological integrity. Through a sociological lens, this study aims to illuminate how social forces both shape and are shaped by agricultural transitions in the Eastern Himalayan context.

LITERATURE REVIEW

1. Tajo, L. (2021). "Documentation of the Agroforestry Systems in the Papum Pare District of Arunachal Pradesh." In Multi-Disciplinary Approaches for Development of Agriculture and Allied Sectors in Global Scenario (pp. 200–210). Vidyakutir Foundation. This study explores the various agroforestry systems practiced in Papum Pare, particularly focusing on their role in sustainable land management. It underscores how these systems, including agri-silviculture and agro-horticulture, have been adopted to address soil degradation and improve farmers' livelihoods while maintaining ecological balance.
2. Bani, T. (2022). "Tradition in Transition: The Transformation of Traditional Agriculture in Arunachal Pradesh, North East India." Current Science, 123(2), 220–225. Bani examines the shift from traditional jhum cultivation to more sedentary agricultural practices, particularly in districts like Papum Pare. The paper highlights the socio-economic and ecological benefits of this transition, while acknowledging the challenges faced by communities in adopting new agricultural models, such as the erosion of traditional knowledge.
3. Deuri, M. (2024). "Assessment of Socio-Economic Status of Agroforestry Farmers: A Case Study in Eastern Arunachal Pradesh." Indian Journal of Agroforestry, 26(2). Deuri's research focuses on the socio-economic conditions of agroforestry farmers in eastern Arunachal Pradesh. The study identifies livelihood strategies and the challenges of transitioning from traditional farming methods to agroforestry practices, which are also relevant to Papum Pare's agricultural shift.
4. Lobsang, P. (2022). "Agricultural Development and Socio-Economic Profile of Farmers in Arunachal Pradesh: With Special Reference to Tawang District." International Journal of Multidisciplinary Research and Analysis, 5(7). While focusing on Tawang District, this paper offers valuable comparative insights into the socio-economic profiles of farmers in the state. It also

discusses the broader challenges faced by farmers in Arunachal Pradesh, including limited access to markets, inadequate infrastructure, and land tenure insecurity, all of which resonate with issues in Papum Pare.

RESEARCH OBJECTIVES

1. To study the Socio-economic and environmental problems of settled agriculture in Papum Pare.
2. To consider the contribution of local knowledge and social systems in addressing these issues.
3. To determine prevailing land use patterns among farming communities.
4. To offer sociologically-informed policy recommendations.

RESEARCH METHODOLOGY

This research utilizes a mixed-methods approach, combining both qualitative and quantitative techniques to explore the challenges of sedentary agriculture and identify sustainable solutions in Papum Pare, Naharlagun of Lekhi Village, Borum Village, and Tarajuli Village. The methodology is designed to capture the socio-cultural, economic, and environmental dimensions of agricultural practices in the region.

STUDY AREA

The study focuses on Papum Pare district, specifically the areas surrounding Naharlagun of Lekhi Village, Borum Village, and Tarajuli Village which has experienced rapid urbanization and a shift from traditional shifting cultivation to sedentary agriculture in recent decades. The Lekhi Village, Borum Village, and Tarajuli Village represents a unique case of agricultural transformation, marked by both opportunities and challenges.

SAMPLE SIZE

To understand the existing conditions of sedentary agricultural challenges and sustainable solutions in Papum Pare District, Naharlagun, Arunachal Pradesh, data was collected using a purposive sampling method through structured questionnaires. The study was conducted with a sample of 60 respondents from Lekhi Village, Borum Village, and Tarajuli Village under the Naharlagun area of Papum Pare District. Both male and female participants, all of whom are engaged in sedentary agricultural practices, were included as respondents in the study.

PROFILE OF THE STUDY AREA:

The study area Lekhi Village 627 people, Borum Village 235 people, and Tarajuli Village144 people, under the Naharlagun area of Papum Pare District Arunachal Pradesh. The village is 15 km away from Captial of Arunachal Pradesh. The three village with the total population of 1006 as per census 2011 and out of that total population 484 are male and 522 are female.

DATA COLLECTION

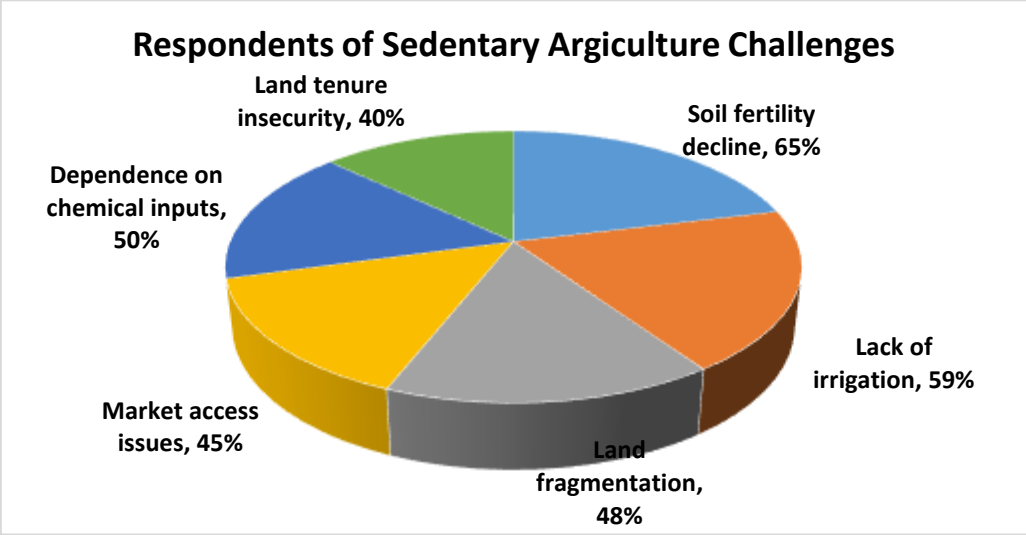
Fieldwork was conducted in selected villages within and around Naharlagun such as Lekhi village, Borum village and Nyorch village, chosen through purposive sampling to represent a mix of agricultural practices, and ethnic compositions. Participants included farmers (both male and female), village elders, local agricultural officers, and members of community-based organizations. In total, 60 individuals were

interviewed.

Primary data were collected using in-depth interviews, focus group discussions (FGDs), and participant observation. Secondary sources included government reports, academic literature, and statistical data. Thematic analysis was applied to identify patterns and draw connections between structural factors and local responses. Ethical considerations such as informed consent and cultural sensitivity were maintained throughout the study.

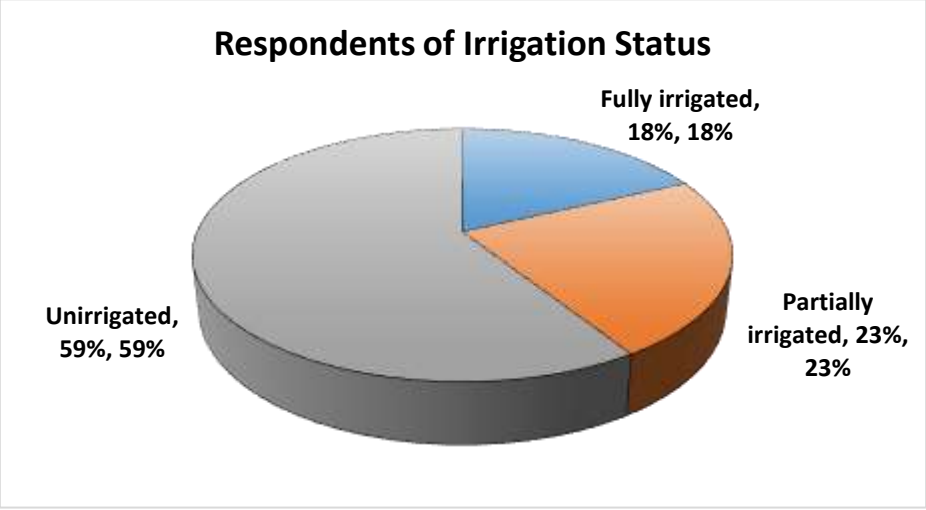
DATA ANALYSISAND INTERPRETATION

1) What are the main challenges faced in sedentary agriculture by farmers in Papum Pare?



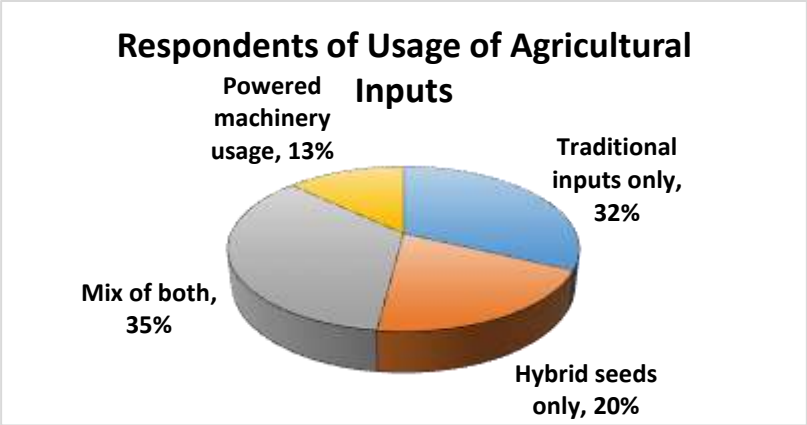
Interpretation: The majority (65%) report declining soil fertility. Irrigation inadequacy (59%) and rising reliance on chemical inputs (50%) highlight systemic agricultural degradation and dependency.

2) How much of the respondents' agricultural land is irrigated versus unirrigated?



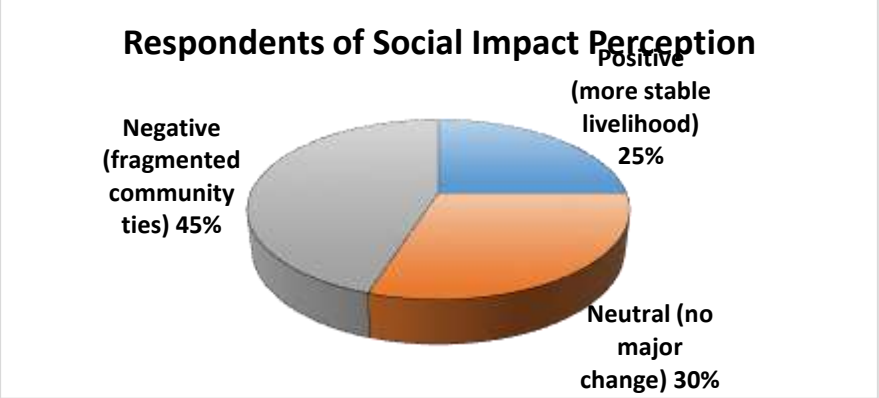
Interpretation: 59% of respondents lack irrigation access, indicating a critical infrastructural barrier to productive farming

3) What percentage of farmers use traditional versus modern inputs (like hybrid seeds, machinery, etc.)?



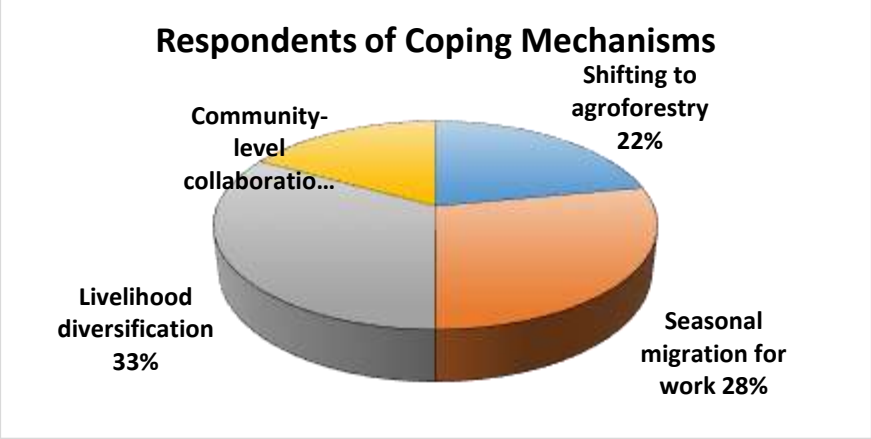
Interpretation: Only 13% use powered machinery, while 67% still depend on traditional or mixed methods, showing low mechanization levels.

4) How do farmers perceive the impact of sedentary agriculture on community cohesion?



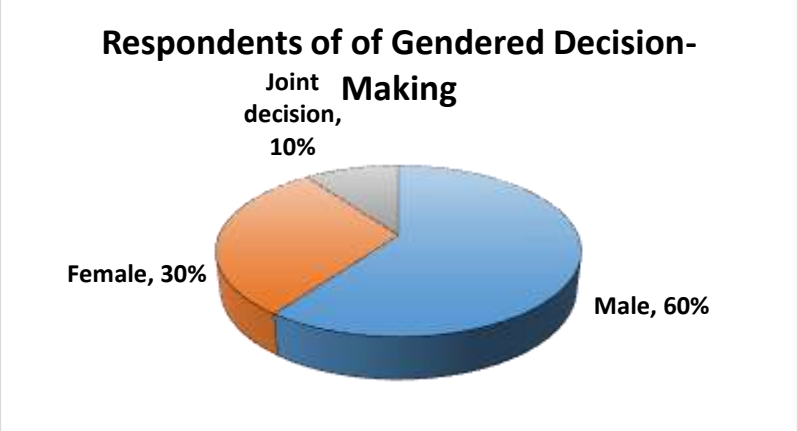
Interpretation: 45% feel that sedentary agriculture negatively affects community ties, suggesting sociocultural disruptions linked to declining traditional practices.

5) What are the most common coping strategies adopted by farmers?



Interpretation: Farmers adapt through livelihood diversification (33%) and migration (28%), reflecting socioeconomic stress and instability**.**

6) What is the gender distribution of those involved in key farming decisions?

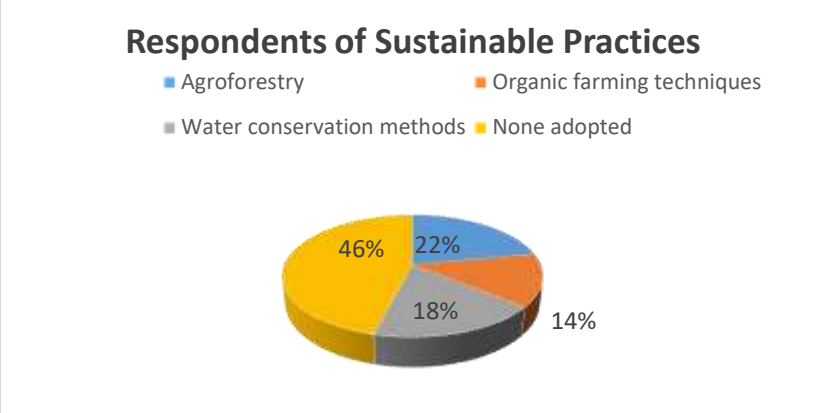


Interpretation: Males dominate decision-making (60%), indicating gendered power imbalances in farm operations.

7) How do farmers evaluate institutional support (government schemes, training, subsidies)?

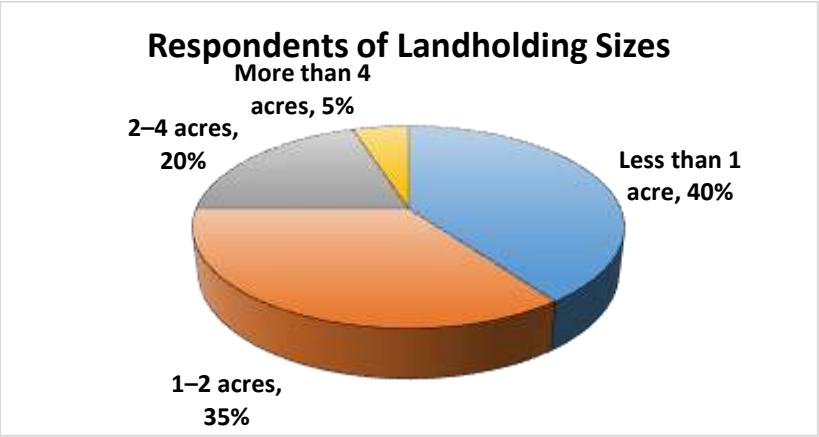
Interpretation: Nearly half (45%) find institutional support unhelpful, revealing a significant policy-implementation gap.

8) What proportion of farmers have adopted agroforestry or sustainable methods?



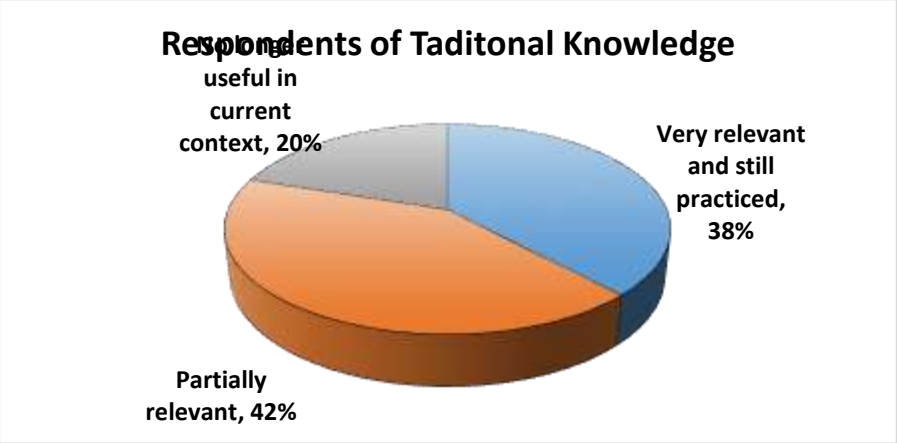
Interpretation: 46% haven't adopted any sustainable practices, underlining the need for better education and support structures.

9) What is the average size of landholding among respondents?



Interpretation: 75% of respondents hold less than 2 acres, which limits scalability and income potential.

10) How do farmers rate the relevance of traditional knowledge in modern farming contexts?



Interpretation: 80% believe traditional knowledge remains relevant, supporting its integration into sustainable models**.**

LIMITATIONS

1. The study's reliance on self-reported data from farmers may introduce bias, as respondents might overstate or understate certain issues.
2. The sample size may limit the generalizability of the findings, but the mixed-methods approach will provide rich contextual insights.

FINDINGS AND DISCUSSION

The study identifies several interrelated challenges in the transition to sedentary agriculture in Papum Pare: soil degradation, land fragmentation, erosion of traditional knowledge, weak market access, and limited institutional support. Farmers also reported declining productivity and growing dependence on chemical inputs. However, sustainable solutions such as agroforestry, composting, and mixed cropping are emerging through local innovation. Social cohesion and community-led initiatives remain key to effective adaptation. Customary institutions continue to provide a platform for collective action, underscoring the role of social structures in shaping sustainable agricultural outcomes. The discussion

concludes that addressing these challenges requires a sociological framework that values local knowledge, participatory governance, and ecological sustainability.

CONCLUSION AND RECOMMENDATIONS

The transition to sedentary agriculture in Papum Pare has exposed significant socio-ecological challenges. Yet, local innovations rooted in indigenous practices offer pathways to sustainability. This study recommends: (1) participatory agricultural policymaking, (2) strengthening customary land governance, (3) integrating traditional knowledge into extension systems, (4) promoting ecological farming practices, (5) improving market infrastructure, and (6) fostering community-led research and peer learning. Sustainable transformation requires a culturally grounded, inclusive approach that bridges traditional and modern agricultural paradigms.

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