

Betel Leaf Farming in Alipurduar: Hurdles and Horizons

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ABSTRACT: Delving into the verdant realm of Alipurduar, where the allure of betel leaf cultivation thrives, this paper unveils the captivating tale of "paan" farming. Across the lush landscapes of West Bengal, Odisha, and beyond, betel leaf emerges as a flourishing cash crop, weaving prosperity for farmers amidst challenges and prospects. In the quaint village of Brajerkuthi, nestled in the heart of Alipurduar district, betel leaf cultivation paints a tapestry of livelihood and resilience. However, amidst the verdant bounty, hurdles lurk – from natural adversities to pest plights. This study ventures into the pulsating heart of betel leaf farming, unraveling its trials and triumphs, and offering a roadmap to navigate the verdant horizons ahead.

Keywords: Agriculture, Betel, Cultivation, Livelihood, Prosperity

Introduction:

Entwined in the verdant tapestry of West Bengal, betel vine, also known as "paan," unfolds its perennial charm. Belonging to the dioecious shade-loving creeper family Piperaceae, this evergreen creeper traces its origins to the lush landscapes of Malaysia (Chattopadhyay and Maity, 1990). Throughout history, the significance of betel leaves has transcended mere sustenance, finding mention in ancient literature as a cornerstone of social, cultural, and religious customs, resonating even in contemporary times (Guha, 2006).

The economic prowess of betel leaf cultivation is underscored by its widespread consumption, with approximately 15-20 million individuals indulging in its consumption regularly across India (Jana, 1996). With over 55,000 hectares dedicated to its cultivation nationwide, the annual turnover eclipses Rs. 9000 million. In West Bengal, the allure of betel leaf transcends geographical boundaries, with cultivation spanning all districts except the hilly terrains of Darjeeling and Kalimpong, as well as the arid landscapes of Bankura and Purulia.

Constituting a staggering 66% of the nation's production, West Bengal boasts approximately 20,000 hectares of betel vine plantations, nurturing 4-5 lakh "boroj." This vibrant industry contributes significantly to the national income, generating Rs. 6000-7000 million annually and providing sustenance to 25 million farming families. Moreover, West Bengal's betel leaf exports to the Middle East and European nations, totaling Rs. 30-40 million, underscore its global appeal (Guha, 2006).

However, amidst the verdant bounty lies the specter of disease susceptibility, posing a perennial challenge to farmers. The humid, shaded conditions conducive to betel vine growth also foster disease proliferation, often resulting in substantial economic losses. Despite the voracious demand for betel leaves in the northern districts of West Bengal, the dearth of

improved varieties and inadequate management practices necessitates reliance on supplies from the southern regions.

To bolster production and enhance the livelihoods of farming communities, both governmental and non-governmental organizations such as the National Horticulture Mission and the National Horticulture Board extend subsidies and support to betel vine growers across various districts of West Bengal, propelling the industry towards sustainable growth and prosperity.

Study Area:

The focal point of this investigation is the idyllic village of Brajerkuthi nestled within the verdant expanse of Alipurduar district in West Bengal. Alipurduar district, comprising six CD blocks namely Kumargram, Alipurduar –I, Alipurduar –II, Falakata, Kalchini, and Madarihat-Birpara, serves as the backdrop for this study. Brajerkuthi, situated within the Alipurduar –II CD block, is ensconced by the embrace of its surroundings, bordered by Cooch Behar district to the east and south, Purba Chikliguri village to the west, and Dakshin Parokata to the north.

With a population tallying 2107 as per the 2011 census, the chosen village pulsates with agricultural vitality. The livelihoods of its residents revolve predominantly around farming, with the majority of farmers classified under the marginal category, wielding land holdings ranging from 1 to 2 acres.

Objectives of the Study:

In the backdrop of Brajerkuthi village nestled within the Alipurduar -II block of Alipurduar district, this paper embarks on a comprehensive exploration of the challenges and opportunities within betel farming. The primary objectives of this study are delineated as follows:

- 1) Assessing the Physical and Economic Support for Betel Vine Cultivation
- 2) Exploring the Prospects of Betel Leaf Farming
- 3) Identifying Challenges Faced by Betel Leaf Farmers
- 4) Proposing Solutions to Overcome Identified Challenges

Data Source and Methodology:

To illuminate the intricacies of betel leaf farming in Brajerkuthi village, Alipurduar-II Block, a comprehensive research approach blending fieldwork and analytical rigor was adopted.

Primary Data Collection:

- A purposive sampling technique was employed to ensure the representation of relevant stakeholders.
- A meticulous household survey was conducted, encompassing 100 households in Brajerkuthi village.
- Among these households, 50 were actively engaged in betel leaf cultivation, while the remaining 50 were not.
- Notably, all households surveyed possessed land holdings below 2 acres, reflecting

the prevalent agricultural landscape.

- Data gathering was facilitated through scheduled interviews, enabling structured insights into the nuances of betel leaf cultivation.

Secondary Data Collection:

- Secondary data was gleaned from a diverse array of published and unpublished sources, including scholarly books, journals, and governmental reports.
- Additionally, data were sourced from the Alipurduar-II Block Development office and the Parokata Gram Panchayat office, enriching the research with administrative insights and local perspectives.

Data Analysis:

- The collected data underwent rigorous evaluation, processing, and analysis, employing statistical techniques to derive meaningful insights.
- Analytical methodologies included percentage analysis of respondents, offering a quantitative understanding of the surveyed population's perspectives and practices.
- Furthermore, cartographic methods were employed to visually represent spatial patterns and distributions, enhancing the presentation of findings.

The synthesis of primary and secondary data, coupled with robust analytical methodologies, facilitated a comprehensive examination of the challenges and opportunities inherent in betel leaf farming in Brajerkuthi village. Through this interdisciplinary approach, the present study aims to offer actionable insights for stakeholders and policymakers alike, fostering informed decision-making and sustainable agricultural practices.

Favorable Conditions for Betel Leaf Cultivation:

Soil and Climate: Betel leaf thrives in a diverse range of soil types, including sandy loam and heavy clayey loam, with clay soil being particularly favorable. Optimal soil conditions include fertility, good drainage, and rich organic matter, with a balanced pH level. Saline or alkaline soils are unsuitable, as is waterlogging, which can harm the crop. Betel leaf flourishes in tropical climates characterized by high rainfall and shade, requiring ample sunshine and humidity for optimal growth.

Garden Preparation: The preparation of the garden is a crucial step in betel leaf cultivation. The selected land should undergo thorough plowing, with the removal of weeds and debris from previous crops. The soil should be enriched with farmyard manure to enhance fertility. Garden structures, known locally as "Pan Boroj," are constructed using bamboo poles and sticks, with roofs shaded using dry grass or paddy straw. Betel vines are planted in a linear pattern, with a minimum distance of 45 cm between rows. Planting typically occurs between March and April.

Manures and Fertilizers: The nutritional needs of betel vines vary based on factors such as variety, soil type, and climatic conditions. Soil testing is recommended to determine specific fertilizer requirements. Organic manure and chemical fertilizers are applied accordingly, with balanced doses of nitrogen, potassium, and phosphorus. Following fertilization, light irrigation is administered to facilitate nutrient absorption.

Irrigation: Initial irrigation is provided at the time of planting, with subsequent irrigation scheduled based on soil moisture levels. Regular irrigation is essential during the dry season, particularly in March, April, and May, to sustain optimal growth and development.

Expenditure: Betel leaf cultivation entails significant capital and labor investments. Construction of rectangular-shaped "boroj" structures for closed-system cultivation requires initial investments ranging from Rs. 2-3 lakhs per hectare, which decreases to approximately Rs. 0.8-0.9 lakhs per hectare in subsequent years. Additional expenses, including labor, irrigation, and fertilizers, amount to approximately Rs. 1-1.5 lakhs per hectare, reflecting the capital-intensive nature of betel leaf farming.

Result and discussion: The present study was primarily based on primary data collected from the study area, meticulously arranged and tabulated to yield insightful results. The findings are discussed as follows:

1. Age group of betel cultivators:

Notably, the highest proportion of cultivators falls within the 30-40 years age bracket, comprising 28% of the total. Following closely, 26% of cultivators are aged between 40-50 years, while 20% belong to the 50-60 years age group. Additionally, 18% and 8% of cultivators fall within the age ranges of 20-30 years and above 60 years, respectively.

Table-1: Age of betel farmers of study area

Age group	20-30	30-40	40-50	50-60	> 60
No. of cultivator	9	14	13	10	4
%	18	28	26	20	8

Source: Data collected by the author through field survey (March, 2021)

The data from Table 1 underscore the prevalence of middle-aged individuals in betel cultivation activities within the study area. The substantial representation of cultivators in the 30-40 and 40-50 age groups highlights the pivotal role played by individuals in their prime years in this agricultural pursuit. This demographic trend suggests a reliance on experienced individuals who possess the knowledge and expertise necessary for successful betel leaf cultivation. Moreover, the presence of cultivators beyond the age of 60 signifies the enduring commitment of seasoned farmers to this traditional practice, contributing to the continuity and sustainability of betel cultivation in the region.

2. Educational level of betel leaf farmer

Education plays a pivotal role in enhancing agricultural practices by fostering the adoption of new information and technologies. Table 2 provides insights into the educational attainment of betel leaf cultivators in the surveyed area.

Table-2: Educational level of betel leaf cultivators

Educational level	Primary	Secondary	Graduate and above	Illiterate
No. of farmer	31	13	4	2
%	62	26	8	4

Source: Data collected by the author through field survey (March, 2021)

The data of table 2 indicate that the majority of surveyed farmers, constituting 62%, have received primary education. This suggests a foundational level of literacy and numeracy among a significant portion of betel leaf cultivators, enabling them to engage with basic agricultural knowledge and practices.

Furthermore, 26% of cultivators have attained secondary education, indicating a higher level of educational attainment among a substantial minority. This group may possess a more nuanced understanding of agricultural techniques and may be more receptive to adopting advanced farming methodologies.

Interestingly, a small proportion of cultivators, comprising 8%, have received education at the graduate level or above. While relatively modest in number, this segment likely represents individuals with a deeper understanding of agricultural sciences and modern farming techniques, potentially serving as innovators and leaders within the agricultural community.

Conversely, 4% of cultivators surveyed are illiterate, indicating a lack of formal education. Despite this, these individuals may still possess valuable traditional knowledge and practical skills passed down through generations, contributing to the rich tapestry of agricultural practices in the region.

Overall, the educational profile of betel leaf cultivators reflects a diverse spectrum of educational backgrounds, each contributing to the collective knowledge and expertise within the agricultural community. This heterogeneity underscores the importance of tailored extension services and capacity-building initiatives to cater to the varied needs and aspirations of farmers across different educational levels.

3) Income level of betel leaf and non betel leaf farmers:

Generally income level of small and marginal farmer always remain very poor if they not farm in scientific and modern way. But in case of betel leaf cultivator income level is much higher in comparison to other small and marginal farmer, who is not engage in betel leaf farming.

Table- 3: Income level of betel leaf and non betel leaf farmers

Annual income (Rs.)	< 2 lakhs	2-3 lakhs	3-4 lakhs	4-5 lakhs	> 5 lakhs
No. of family of betel leaf farmer	2	6	21	13	8
% of family	4	12	42	26	16
No. of family of	23	17	7	2	1

non betel leaf farmer					
% of family	26	34	14	4	2

Source: Data collected by the author through field survey (March, 2021)

The disparity in annual income between betel leaf and non-betel leaf farmers within the study area is notable, with betel leaf producers demonstrating markedly higher income levels. Table 3 provides a comparative analysis of the income distribution among these two groups of farmers.

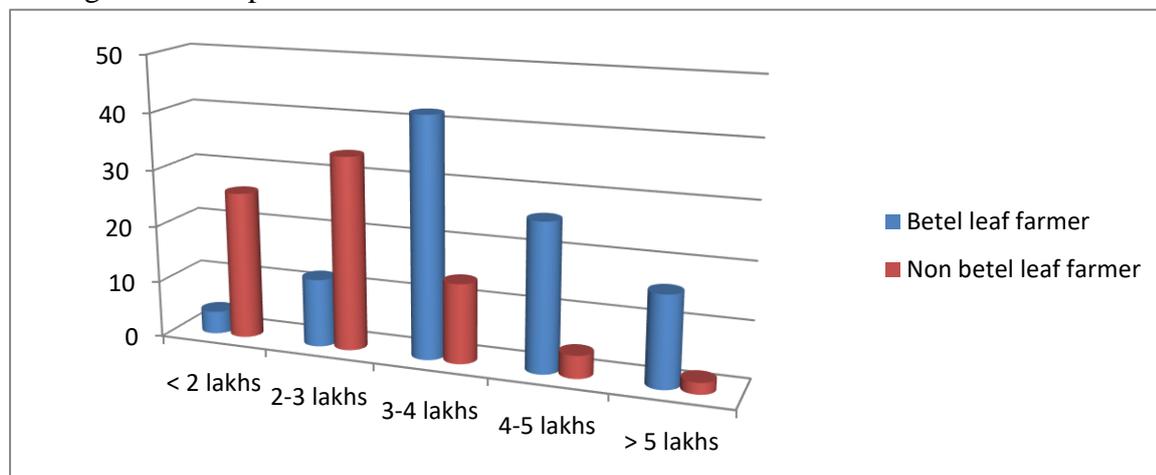
Among betel leaf farmer families, a significant proportion, comprising 42%, report annual incomes ranging between 3-4 lakhs, reflecting the substantial economic returns associated with betel leaf cultivation. In contrast, only 14% of non-betel leaf farmer families achieve similar income levels, underscoring the disparity in earning potential between the two groups. Furthermore, a noteworthy 26% of betel leaf farmer families report annual incomes of 4-5 lakhs, while the corresponding percentage among non-betel leaf farmer families is merely 4%. This stark contrast underscores the substantial income advantage enjoyed by betel leaf producers within the study area.

Conversely, a larger percentage of non-betel leaf farmer families, comprising 26%, report annual incomes below 2 lakhs, highlighting the comparatively lower earning potential of traditional farming practices. In contrast, only 4% of betel leaf farmer families fall within this income bracket, further emphasizing the economic benefits associated with betel leaf cultivation.

Moreover, the data reveal that a notable proportion of betel leaf farmer families, accounting for 16%, achieve annual incomes exceeding 5 lakhs, whereas such high-income levels are rare among non-betel leaf farmer families, constituting only 2%.

These findings underscore the transformative impact of betel leaf cultivation on the income levels of small and marginal farmers, offering a pathway to significantly enhance their annual earnings. By capitalizing on the economic opportunities afforded by betel leaf farming, farmers can potentially uplift themselves from poverty and achieve greater financial stability and prosperity.

Figure-1: Comparative income level of betel leaf and non betel leaf farmers



Problem faced by the betel leaf farmer: Despite the promising prospects of betel leaf farming, cultivators in Brajerkuthi village encounter several challenges that impede their progress. One chief problem identified in the study report is outlined below:

1) Capital Problem: Betel leaf cultivation demands substantial capital investment compared to conventional farming practices. Expenses such as garden preparation, construction of closed structures, and procurement of skilled and unskilled labor, purchase of fertilizers and manure, and arrangement of irrigation systems necessitate significant financial resources. However, small and marginal farmers often struggle to amass this capital independently. Consequently, many betel leaf cultivators are compelled to borrow funds from government banks or private lenders. This indebtedness poses a significant burden on farmers, as they must repay both the principal amount and the accrued interest.

Table- 4: Debt status among betel leaf farmers

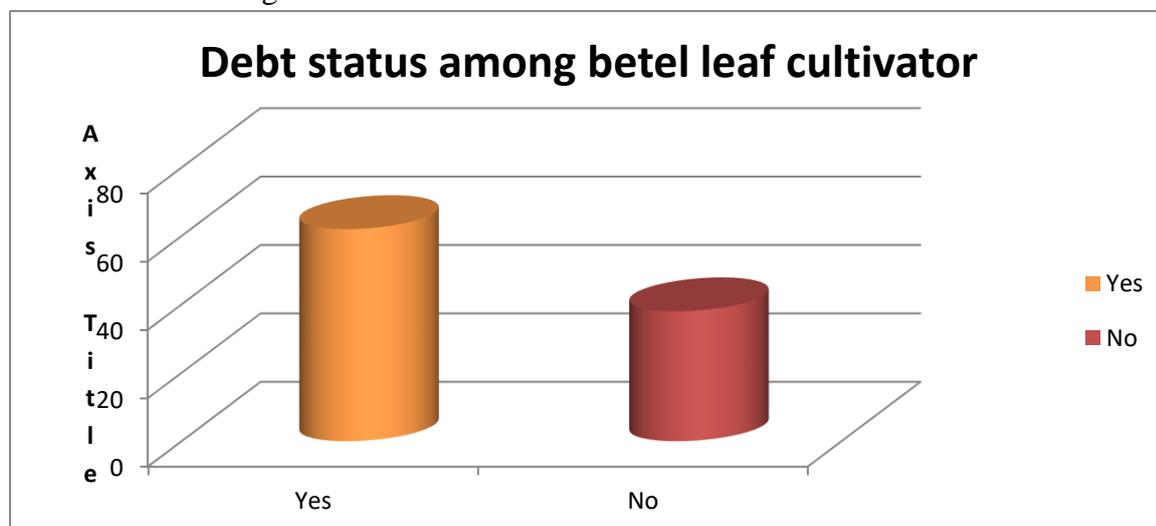
Loan for betel leaf cultivation	Yes	No
No. of family	31	19
% of family	62	38

Source: Data collected by the author through field survey (March, 2021)

Table 4 provides insights into the debt status among betel leaf farmers in Brajerkuthi village. It indicates that a majority of betel leaf farming families, constituting 62%, have availed loans for betel leaf cultivation. In contrast, 38% of families have managed to engage in betel leaf cultivation without resorting to loans.

This data underscores the prevalent reliance on external financial support among betel leaf farmers to meet the capital requirements of cultivation. The high percentage of families availing loans highlights the significant role of credit facilities in facilitating betel leaf cultivation activities in the region. However, it also underscores the financial vulnerability of betel leaf farmers, who must contend with the challenges of debt repayment while striving to sustain their livelihoods.

Figure-2: Debt % of betel leaf cultivators



2) Impact of Natural Calamities on Betel Leaf Cultivators:

Natural calamities pose significant challenges to betel leaf cultivators, often resulting in substantial losses. One such calamity prevalent in Brajerkuthi village is the norwester storm, which typically strikes during the months of March and April each year. These storms, characterized by high velocity winds, have been known to cause damage to betel leaf structures or "borojs," leading to severe losses for farmers. The aftermath of such storms often necessitates the reconstruction of damaged structures, with a significant portion of betel vines suffering irreparable damage.

Table- 4: Betel leaf cultivators affected by Natural calamity

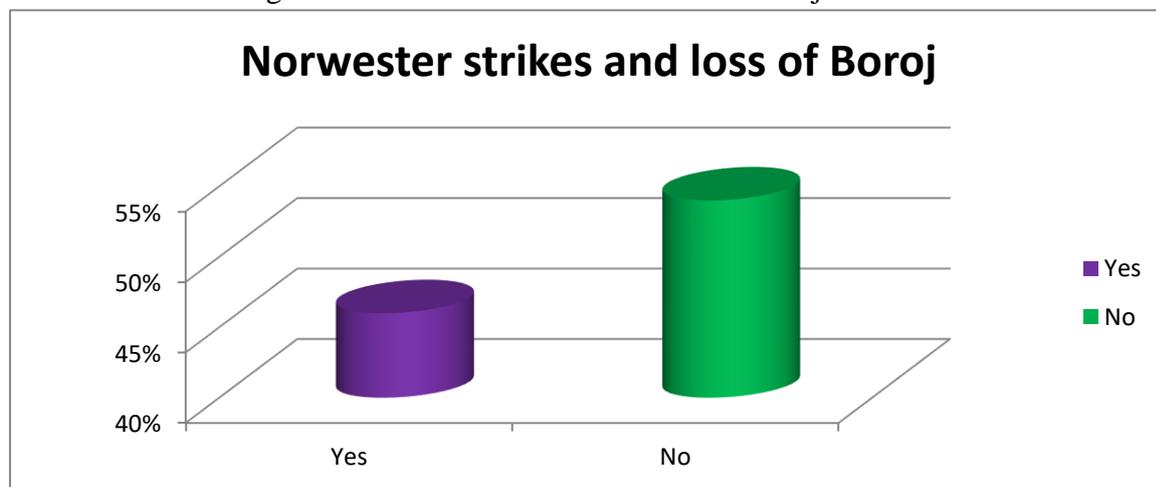
Damage by Natural calamity	Yes	No
No. of family	23	27
% of family	46	54

Source: Data collected by the author through field survey (March, 2021)

Table 4 presents the extent of damage inflicted by natural calamities on betel leaf cultivators in Brajerkuthi village. The data reveals that a substantial proportion of families, comprising 46%, have experienced damage due to natural calamities. This indicates the prevalence of vulnerability among betel leaf cultivators to the destructive forces of storms, resulting in tangible losses to their livelihoods.

Conversely, 54% of families have been fortunate enough to avoid such calamitous events, thus sparing them from the associated hardships and economic setbacks. However, the persistent threat of natural disasters underscores the need for proactive measures and resilience-building strategies within the betel leaf farming community. Efforts to strengthen infrastructure, implement early warning systems, and provide financial assistance for post-disaster recovery can help mitigate the adverse impacts of natural calamities and safeguard the livelihoods of betel leaf cultivators in Brajerkuthi village.

Figure-3: Norwester strikes and loss of Boroj



3. Other Problems Faced by Betel Leaf Cultivators

In addition to the aforementioned challenges, betel leaf cultivators in the study area encounter several other issues that impact their farming endeavors.

Lack of Proper Irrigation System: The study area suffers from a deficiency in government-provided irrigation infrastructure, leaving farmers to fend for themselves in arranging irrigation facilities. To address this shortfall, farmers often resort to using cello pumps to irrigate their fields, incurring additional costs and labor burdens.

Pest and Fungal Infections: Betel leaf production is frequently disrupted by pest infestations and fungal infections affecting betel vines and leaves. These pests and diseases pose significant threats to crop yield and quality, necessitating timely interventions and management strategies to mitigate their impact. Farmers grapple with the challenges of pest and disease control, which can lead to crop losses and diminished income if left unchecked.

Lack of Awareness about Crop Insurance: Many betel leaf cultivators in the study area are unaware of the benefits of crop insurance and lack access to appropriate insurance schemes. Without adequate insurance coverage, farmers are vulnerable to financial losses resulting from crop damage or failure due to natural disasters, pest outbreaks, or adverse weather conditions.

Limited Knowledge of Fertilizer and Pesticide Application: A significant proportion of betel leaf cultivators lack proper knowledge and training in the application of fertilizers and pesticides in betel leaf cultivation. This lack of awareness may result in improper use of agricultural inputs, leading to suboptimal crop growth, pest outbreaks, and environmental degradation.

Findings and Suggestions

The present study underscores the significance of betel leaf cultivation as a vital horticultural activity in Alipurduar and the study area. It reveals that betel leaf farming holds immense potential as a lucrative source of livelihood for rural farmers, offering promising profit margins.

However, the study also identifies several challenges faced by betel leaf farmers, including inadequate irrigation facilities, limited access to capital, susceptibility to natural calamities, pest and fungal attacks, and a lack of awareness about crop insurance.

In light of these findings, the following proactive measures are recommended to address the challenges and enhance the sustainability of betel leaf cultivation:

i) Facilitate Access to Concessional Loans: The government should collaborate with banks to issue loans to betel leaf farmers at concessional interest rates, enabling them to invest in essential inputs and infrastructure.

ii) Establish Cold Storage Facilities: Setting up cold storage facilities in every block or district would enable farmers to preserve betel leaf during periods of excessive production, thereby preventing spoilage and ensuring market availability year-round.

iii) Improve Irrigation Infrastructure: Government intervention is needed to enhance

irrigation systems, ensuring consistent water supply for betel leaf cultivation and maximizing crop productivity.

iv) Establishment of Research Centers: The establishment of research centers in the district would facilitate the development and dissemination of improved techniques and methods for betel leaf cultivation, promoting efficiency and yield optimization.

v) Conduct Training and Skill Development Programs: Implementing training and skill development programs in the study area would empower betel leaf farmers with the knowledge and expertise needed to adopt best practices, manage pest and disease outbreaks effectively, and enhance overall productivity.

By implementing these proactive measures, policymakers can support the sustainable growth of the betel leaf farming sector, improve farmers' resilience to challenges, and unlock the full potential of this lucrative agricultural enterprise in Alipurduar and beyond.

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