NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Small-scale tea farming sustainability: A case study of Darjeeling hill region, India

TEA

Bivek Subba, Et al

POLICY IMPLICATIONS

The economic constraints can be tackled by improving market access and offering targeted incentives to growers with very small landholdings. Investments in healthcare, education, and basic infrastructure are essential to reduce village level social gaps and strengthen social sustainability. Training programmes should focus on building experience among newer farmers, helping them adopt practices that improve both productivity and environmental outcomes. Finally, policies must take a holistic approach, recognising the close links between economic, environmental, and social dimensions so that progress in one area does not undermine the others.

Aim of the paper

The study aims to provide a comprehensive assessment of the farming sustainability of Small Tea Growers (STGs) in the Darjeeling hill region of India. It evaluates sustainability across three interconnected dimensions—environmental, economic, and social—to identify the specific challenges and interrelationships affecting these small-scale producers.

Findings

The findings show that environmental sustainability is moderate at 0.48 on the sustainability index index (0–1 scale) and is the strongest of the three dimensions in the study area. Economic sustainability is the weakest at 0.38, mainly due to small landholdings of less than 10 hectares and limited farming experience among growers. Social sustainability scores relatively higher at 0.54, but this masks clear differences across villages, largely shaped by unequal access to education, healthcare, and basic infrastructure. Using Pearson correlation analysis, the study also highlights that environmental, economic, and social sustainability are closely linked and influence one another rather than operating independently.

Method of Study

The study used a quantitative case study approach based on a survey of 927 small tea growers in the Darjeeling hill region. Principal Component Analysis was applied to identify and weigh the key challenges across environmental, economic, and social dimensions of sustainability. Pearson correlation coefficients and significance tests ($p < 0.05$) were used to examine how these dimensions are linked to one another. Together, these methods were used within a three-pillar framework to construct an overall sustainability index for small tea growers.

Reference

Subba, B., Mondal, S., Mandal, U. K., & Tamang, L. (2024). "Small-scale tea farming sustainability: A case study of Darjeeling hill region, India." Farming System 2: 100080.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Impact of climate on tea production: a study of the Dooars region in India

TEA

Piyashee Mallik and Tuhin Ghosh

POLICY IMPLICATIONS

Serious thinking is needed regarding the climate adaptation in tea gardens, especially to counter the yield losses caused by rising summer and monsoon temperatures. Stronger local weather monitoring systems should be put in place so garden managers can track drought and rainfall intensity and make timely irrigation or drainage decisions. Investment in water management infrastructure is critical to handle more frequent floods and dry spells, ensuring water availability when needed and quick drainage during heavy rain. Finally, promoting heat-tolerant and climate-resilient tea clones is essential to protect productivity under the increasingly warm and wet conditions facing the region.

Aim of the paper

The study aims to investigate the impact of climatic variables—including temperature, precipitation, drought intensity, and the magnitude of warm-wet conditions on tea yield in the Dooars region of West Bengal, India. It seeks to fill a research gap by providing a statistical seasonal analysis of how weather patterns affect an industry that contributes approximately 25% of India's national tea yield.

Findings

The findings show that tea yields decline when temperatures rise during the summer and monsoon seasons. In contrast, slightly warmer temperatures in winter and the early summer–winter transition period are linked to better yields. Rainfall remains important for tea production, but the study shows that the intensity of warm and wet conditions plays a key role in shaping productivity rather than rainfall alone. Overall, the tea sector in the Dooars is becoming more vulnerable to climate extremes such as droughts, storms, and floods, which are increasingly damaging both production and the regional economy.

Method of Study

The study built a detailed panel dataset using monthly data from tea gardens across the Dooars region over a ten-year period. It statistically examined key climate variables, including temperature, rainfall, drought intensity, and precipitation intensity. Seasonal analysis was then used to separate and compare how these weather factors affect tea production at different times of the year.

Reference

Mallik, P., & Ghosh, T. (2022). "Impact of climate on tea production: a study of the Dooars region in India." Theoretical and Applied Climatology 147: 559–573.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April - June 2025

Perception of climate change and adaptation strategies in tea plantations of Assam, India

TEA

Pradip Baruah and Gautam Handique

POLICY IMPLICATIONS

Rainwater harvesting should be prioritised to help tea gardens cope with longer dry spells and secure water during droughts. Climate resilient infrastructure is also essential to protect tea bushes and soil from intense rainfall and strong winds. Integrated pest management strategies need to be updated and tailored to deal with new and more aggressive pests and diseases emerging under changing temperature and humidity conditions. Stronger regional information sharing networks can help spread effective adaptation practices across tea-growing zones, building collective resilience among growers.

Aim of the paper

The study aims to analyze tea growers' awareness of climate change, its perceived impacts on tea cultivation, and the adaptive management strategies currently undertaken or planned for the future in Assam, India. It focuses on four major tea-growing regions: Upper Assam, South Bank, North Bank, and Cachar.

Findings

The findings show that most tea growers are well aware of climate change and clearly recognize its negative effects on tea production. They report facing prolonged droughts, short spells of intense rainfall, temperature extremes, and stronger winds. Growers also observe a rise in pest and disease attacks, the appearance of new pest species, and faster weed growth. Despite these challenges, tea growers display a positive and proactive attitude toward adopting management practices to cope with and reduce climate-related risks.

Method of Study

The study used a structured questionnaire survey administered to tea growers across four major tea-growing zones in Assam Upper Assam, South Bank, North Bank, and Cachar. The analysis focused on growers' perceptions of changing weather patterns and then linked these views to the specific adaptation measures being practiced on their plantations.

Reference

Baruah, P., & Handique, G. (2021). "Perception of climate change and adaptation strategies in tea plantations of Assam, India." Environmental Monitoring and Assessment 193: 165.

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https://link.springer.com/article/10.1007/s10661-021-08937-y

NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April - June 2025

What will drive the small tea growers towards environment-friendly cultivation? Implications from the tea sector in Assam, India

TEA

Nabajyoti Deka, et al

POLICY IMPLICATIONS

Farmers' yeild loss during the three year transition to environment friendly farming can be addressed through compensation . The organic certification process also needs to be simplified and made cheaper so small tea growers are not locked out by high costs and paperwork. Extension services must be strengthened, with the Tea Board and allied agencies offering hands-on training in bio-pesticides, organic inputs, and soil management. Clear market linkages with specialty and premium tea buyers are essential so growers actually receive higher prices for adopting sustainable practices.

Aim of the paper

The study aims to identify the factors that influence Small Tea Growers (STGs) in Assam to adopt environment friendly cultivation (EFC) practices. It explores the motivations, constraints, and socio-economic determinants that drive or hinder the transition from conventional chemical-intensive farming to more sustainable methods.

Findings

The findings show that adoption of environment-friendly cultivation (EFC) is more likely among tea growers with higher education, access to technical training, and membership in grower associations. Many growers are economically motivated by the possibility of earning premium prices for organic or eco friendly tea. Health concerns related to chemical pesticide use and worries about long term soil degradation also play an important role in encouraging adoption. However, the strongest barrier for smallholders is the fear of yield loss during the initial transition phase. The study also points out that institutional support is weak, and wider adoption will require easier access to certification systems and reliable markets for environment-friendly tea.

Method of Study

The study used a quantitative analytical approach in Assam, India, the country's largest tea producing state. Primary data were collected through field surveys of small tea growers across major tea growing districts. Probit and logit regression models were applied to identify the socio economic and institutional factors influencing the adoption of environment-friendly cultivation practices. The surveys gathered detailed information on cultivation costs, yields, and growers' perceptions of environmental and health risks.

Reference

Deka, N., Goswami, K., & Anurupam, K. (2022). "What will drive the small tea growers towards environment-friendly cultivation? Implications from the tea sector in Assam, India." Climate and Development 14(5): 443-458.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April-June 2025

Invisible workers: unpacking gendered commercialisation of agriculture in Assam, India

RUBBER

Sonali Boro , Madhurima Goswami

POLICY IMPLICATIONS

Women's unpaid plantation work in official agricultural data and policy needes to be recognised , instead of treating it as family help. Securing women's formal land rights is equally important, as land ownership would strengthen their bargaining power and economic independence. Women also need direct inclusion in market transactions, so they can access income from cash crops without relying on male relatives. Social safeguards are necessary to ensure that the expansion of perennial crops like rubber reduces rural poverty without worsening existing gender inequalities.

Aim of the paper

The study aims to investigate how the commercialisation of rubber reshapes gender relations among the indigenous Bodo and Rabha communities in rural Assam. It specifically explores how the transition from subsistence to cash crops interacts with male migration patterns and indigenous property norms to affect women's labour and bargaining power.

Findings

The 8 to 10 year pre-harvest phase of rubber cultivation pushes men to migrate for work, leaving women to juggle domestic care, subsistence farming, and plantation tasks at the same time. As a result, women work around 11 hours a day, with no seasonal breaks, leading to severe time pressure and little space for rest or community life. Even though women gain skills such as latex processing, their work is often seen as family help rather than paid labour, making it economically invisible. The shift to rubber has also weakened women's control over land, as plantations are usually registered in men's names, reinforcing patriarchal ownership patterns. While women use small amounts of cash from remittances or occasional wages to meet urgent household needs, they remain excluded from land ownership and major production and marketing decisions.

Method of Study

The study used a mixed-method approach based on 15 days of immersive fieldwork in Sijubari village in Kamrup district, Assam. It followed an Indigenous Community-Based Participatory Research framework and involved 30 semi-structured interviews with 15 male smallholder farmers and 15 female household and field workers. In addition, two focus group discussions were conducted: one with men and one with women, each with 8 to 10 participants. The researchers also carried out participant observation by closely recording daily routines, domestic work, and agricultural activities. All data were manually coded and thematically analyzed to understand patterns in labour division, decision-making, and land ownership.

Reference

Boro, S., & Goswami, M. (2025). "Invisible workers: unpacking gendered commercialisation of agriculture in Assam, India." Development in Practice. DOI: 10.1080/09614524.2025.2573970.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April-June 2025

RUBBER

Land Ownership and Socio-economic Dependence on Rubber Plantations: Insights from Smallholder Farmers in Tripura, India

Prabhakar, Prodyut Bhattacharya

POLICY IMPLICATIONS

Support can be extended to the expansion of rubber plantations on underutilized land, given the crop's high profitability and the heavy dependence of households on it. Farmers' incomes can be further improved by providing technical training in modern tapping methods and latex processing to raise productivity. Better processing and storage infrastructure is also needed so smallholders can add value before selling and reduce their reliance on middlemen. At the same time, policies should promote livelihood diversification through intercropping and allied activities to protect households from price shocks in the rubber market.

Aim of the paper

The study aims to analyze the socio-economic conditions of smallholder rubber farmers in Tripura, India, and evaluate their level of economic dependency on rubber plantations. It specifically examines how factors such as land ownership, family size, and income influence this dependency within a state where rubber is a primary livelihood strategy

Findings

The findings show that rubber plantations are the main source of livelihood for almost the entire population, with about 98 per cent of respondents depending on them economically. On average, rubber cultivation brings in around ₹11,617 per month, making it a major contributor to household income. Most respondents cultivate rubber on relatively small plots, with an average landholding of 2.57 acres. The analysis indicates that larger land size and higher income from rubber increase dependency on the crop, while bigger families also tend to rely more heavily on it. Overall, the rubber industry supports over 0.1 million farmers in the state and plays a crucial role in sustaining the rural economy.

Method of Study

The study used a quantitative approach combining household surveys and econometric analysis. Face-to-face surveys were conducted with 355 randomly selected households across two major rubber growing districts of Tripura, Sepahijala and Gomati. To identify the factors shaping socio-economic dependency on rubber, the researchers applied generalized logistic regression. They also checked for multicollinearity among the independent variables using the Variance Inflation Factor (VIF), ensuring the robustness of the model.

Reference

Prabhakar, & Bhattacharya, P. (2025). "Land Ownership and Socio-economic Dependence on Rubber Plantations: Insights from Smallholder Farmers in Tripura, India." Journal of Land and Rural Studies 13(2): 181-196

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

The large-scale expansion of rubber plantations in southern India: major impacts and the changing nature of drivers

RUBBER

Dhanya Vijayan, et al

POLICY IMPLICATIONS

The rubber-based agroforestry needs to be promoted as it improves biodiversity and soil health. Smallholders also need protection from sharp swings in global rubber prices through price-stabilisation funds or insurance schemes. Stricter land-use rules are necessary to stop the conversion of ecologically sensitive forests and important food-crop land into rubber plantations. Farmers in non traditional and climate-stressed regions should receive technical support and access to drought-resistant rubber varieties to reduce climate risks and long-term vulnerability.

Aim of the paper

The study investigates the environmental and socio-economic impacts resulting from the large-scale expansion of rubber plantations in South India. It specifically analyzes the changing patterns of drivers behind land-use changes, moving from traditional rubber-growing regions to non-traditional areas and evaluates how these shifts affect local ecosystems and rural livelihoods.

Findings

The findings show a rapid shift of farmland and natural forests toward rubber monoculture, especially in non traditional regions of South India. This expansion has caused environmental damage, including loss of crop diversity, soil erosion, and changes in local water systems because rubber trees need a lot of water. While earlier growth was driven by high prices and government subsidies, recent expansion is increasingly linked to climate stress and farmers searching for more stable livelihoods in drought prone areas. Although rubber initially improved incomes, small farmers are now more exposed to global price fluctuations and rising input and labour costs. At the same time, replacing diverse farming systems with rubber monocropping has reduced important ecosystem services such as carbon storage and natural pest control.

Method of Study

The study adopted a multidisciplinary approach that combined geospatial and socioeconomic methods. Satellite imagery and remote sensing were used to map land use changes and track the spread of rubber cultivation over several decades. Household surveys and focus group discussions with farmers helped explain why land was shifting to rubber and how farmers perceived its impacts. The researchers also reviewed historical data and policy documents to understand how the rubber sector evolved in India. By integrating environmental evidence with socio-economic insights, the study offered a comprehensive picture of the effects of rubber monoculture.

Reference

Vijayan, D., Girindran, R., Sam, A. S., Sathyan, A. R., & Kaechele, H. (2024). "The large-scale expansion of rubber plantations in southern India: major impacts and the changing nature of drivers." Environmental Monitoring and Assessment 196: 356.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Determinants, constraints and adoption dynamics of recommended practices by rubber growers of Tripura

RUBBER

Bhaskar Datta, et al

POLICY IMPLICATIONS

The cost barrier should be tackled by offering targeted subsidies or low-interest loans for rain guarding and basic mechanization. Extension services also need a reset by moving beyond generic advice to hands on support for poorly adopted practices like root trainer planting and scientific fertilizer use. Intercropping should be actively incentivized, for example with pineapple or medicinal plants, so farmers earn income during rubber's long pre harvest phase. Setting up regional modernization hubs that share machinery and technical expertise would make mechanization feasible for small and marginal growers instead of keeping it out of reach.

Aim of the paper

The study investigates the adoption of recommended agricultural practices among rubber growers in Tripura, India. It aims to identify the extent of adoption, the socioeconomic determinants influencing these decisions, and the systemic constraints that prevent farmers from integrating scientific recommendations into their farm management.

Findings

The findings show that most farmers have adopted basic practices, with almost all using improved clones and polybag plants. However, more advanced technologies like mechanization and root trainer planting have not been adopted at all, revealing a clear gap between research and what actually reaches farmers. Very few growers practice intercropping or use rain guarding, which leaves them exposed to price swings and disruptions during the monsoon tapping season. These low adoption levels are mainly driven by lack of money, limited technical knowledge, and poor access to credit.

Method of Study

The study used a structured approach to understand how and why farmers adopt different practices. A stratified random sample of 250 rubber growers was surveyed across six major rubber-producing districts in Tripura. Field level surveys were conducted in March 2025 to collect detailed information. The analysis then focused on identifying the factors and constraints that explain why some recommended practices were widely adopted while others were largely ignored.

Reference

Datta, B., Ray, D., Chatterjee, R., & Jessy, M.D. (2025). "Determinants, constraints and adoption dynamics of recommended practices by rubber growers of Tripura." Rubber Science 38(1): 56-64.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Social Entrepreneurship for Empowerment and Inclusive Business Model among Meghalaya Rubber Farmers

RUBBER

Robin Thomas , P. J. Lukose

POLICY IMPLICATIONS

Growing business ventures that prioritise collective community benefits over narrow individual profit needs to be proioritised. Strengthening rubber grower cooperatives through legal and institutional support is crucial, as this improves their bargaining power and long-term stability. Inclusive business models should be designed so smallholders are treated as partners in the value chain, sharing both risks and returns rather than remaining passive suppliers. Targeted leadership training for tribal youth and community leaders can build the skills needed to sustain collective action, innovation, and empowerment in the rubber sector.

Aim of the paper

The study examines a rubber grower cooperative in the East Garo Hills of Meghalaya, North East India. It aims to measure the empowerment of tribal rubber farmers, identify the socio economic problems they face, and evaluate the scope of inclusive business models to scale up rubber development through collective actions

Findings

The findings show that farmer empowerment grows when leadership is genuine, new opportunities are created, and farmers are encouraged to take risks through social business models. Cooperatives play a key role by bringing tribal communities together and enabling them to take part in large-scale rubber development that individual smallholders could not access on their own. Decisions to start rubber-based enterprises are shaped mainly by farmers' self confidence and their sense that the venture will benefit the wider community. Overall, inclusive business models improve financial inclusion for marginalized farmers by offering organized support, access to markets, and more stable income pathways.

Method of Study

The study followed a descriptive and explorative research design. Data were collected from 200 individual rubber farmers in Meghalaya. In depth interviews were used to capture how inclusive business models actually function on the ground and how farmers experience them. The analysis then focused on both psychological aspects of empowerment, such as confidence and risk-taking, and structural factors like access to institutions and opportunities within the tribal farming community.

Reference

Thomas, R., & Lukose, P. J. (2024). "Social Entrepreneurship for Empowerment and Inclusive Business Model among Meghalaya Rubber Farmers." Journal of Entrepreneurship and Innovation in Emerging Economies 10(1): 51-65.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

COFFEE

Understanding coffee farmers' poverty, food insecurity and adaptive responses to climate stress. Evidence from western Honduras

Fernando Rodriguez-Camayo, et al

POLICY IMPLICATIONS

The study suggests broadening the scope of climate-smart agriculture beyond productivity to explicitly address food security and income stability, while promoting livelihood diversification through off-farm work and complementary on-farm activities. It also underscores the need to replace top-down interventions with participatory co-design of adaptation strategies and to strengthen climate insurance and credit mechanisms so farmers are protected from debt traps during extreme weather shocks.

Aim of the paper

The study aims to evaluate the suitability of Climate-Smart Agricultural (CSA) practices promoted within the Honduran coffee sector in addressing the specific needs and vulnerabilities of smallholder households. It seeks to understand how poverty levels and food insecurity are linked to income dependency on coffee, demographic characteristics, and the responses of both farmers and value chain stakeholders to climate stressors.

Findings

Roughly 51% of surveyed households experienced food insecurity within the last 12 months. Households more dependent on coffee for their income (over 75% of total income) are poorer and more food insecure than those with diversified income sources.Most promoted CSA practices focus on coffee productivity (e.g., soil management and shade) but do not explicitly address food security or income stability. Farmers face a complex interplay of stressors; 60.6% were affected by at least one of the three major events: pests/diseases (38%), drought (36%), or low coffee prices (23%). Nearly half of the farmers had no response to climate impacts, while those who did often resorted to financial strategies like using savings or accessing credit to buy food.

Method of Study

A randomized survey of 348 coffee farmers in the departments of Ocotepeque and Copan, western Honduras was conducted using the Poverty Probability Index (PPI) for poverty measurement and the Food Insecurity Experience Scale (FIES) to assess food access. The study also carried out 55 semi-structured interviews with value chain stakeholders (exporters, NGOs, national institutions) and three focus group discussions with agronomists and farmers. Multiple Linear Regression (MLR) for poverty analysis and Machine Learning (Gradient Boosting Model) were applied to determine variables impacting food security.

Reference

Rodriguez-Camayo, F., Ramirez-Villegas, J., Borgemeister, C., Lundy, M., Giraldo, N., & Beuchelt, T. (2025). "Understanding coffee farmers' poverty, food insecurity and adaptive responses to climate stress. Evidence from western Honduras." Climate Risk Management 49: 100735.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Decoding the coffee supply chain: A systematic review of stakeholders, sustainability opportunities, and challenges

COFFEE

Fabio De Felice, et.al

POLICY IMPLICATIONS

The study suggests that sustainability efforts should be more coordinated, with farmers, companies, and policymakers working together instead of acting separately. It also ecommends supporting circular economy practices by encouraging the reuse of coffee by-products, investing in digital tools to help farmers meet ethical market demands, and creating common standards to reduce costs and complexity for producers.

Aim of the paper

The primary goal of this study is to examine how sustainability is understood and implemented across the coffee value chain using a systematic literature review. It focuses on the roles of key stakeholders, opportunities to reuse coffee residues through circular economy approaches, the influence of consumer preferences on markets, and the use of digital technologies such as IoT, blockchain, and AI to improve transparency and traceability.

Findings

The study finds that sustainability research on coffee remains fragmented across environmental, socio-economic, and technological fields rather than being integrated. It highlights large untapped potential for circular use of coffee waste such as spent coffee grounds in agriculture, cosmetics, and energy despite more than 90% currently ending up in landfills. It also notes that digital tools like blockchain and AI are becoming important for meeting consumer demands for farm-to-cup transparency and ethical sourcing. However, the adoption of sustainable solutions is constrained by high costs, limited infrastructure, and difficulties in scaling them globally.

Method of Study

The study employs a systematic literature review following PRISMA guidelines, analyzing 137 peerr eviewed publications published between 2000 and 2024. It complements this with a bibliometric analysis using VOSviewer to conduct co occurrence and thematic clustering, allowing the identification of research trends and knowledge gaps. The findings are then structured into a thematic framework organized around four pillars: stakeholders, residue reuse, consumption behavior, and digital transformation.

Reference

De Felice, F., Rehman, M., Petrillo, A., & Baffo, I. (2025). "Decoding the coffee supply chain: A systematic review of stakeholders, sustainability opportunities, and challenges." Sustainable Futures 10: 101105.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Institutional Engagement and Its Role in Livelihood Transformation of Tribal Coffee Farmers in Araku Valley

COFFEE

Bailupati Lalu, et al

POLICY IMPLICATIONS

Promoting stronger coordination among institutions rather than isolated interventions to achieve more durable development outcomes. The study recommends replicating the Araku Valley institutional engagement model as a scalable approach for sustainable development in other marginalized and tribal regions. The study also emphasizes the need for holistic interventions that go beyond income generation to include social empowerment, skill development, and stronger local governance, while ensuring inclusive, community led engagement to sustain long term impacts.

Aim of the paper

The study aims to understand how institutional engagement influences the livelihoods of tribal coffee farmers in Araku Valley, Andhra Pradesh. It identifies the specific roles, presence, and linkages of various institutions including governmental, non-governmental, and private organizations and evaluates their collective contribution to improvements in income, skill development, gender empowerment, and overall community well-being.

Findings

The findings show that the Naandi Foundation emerged as the central institutional actor, with strong connections across all surveyed villages. Villages with higher levels of institutional engagement experienced clear gains in income, market access, and skill development. Programs such as self-help groups and financial literacy initiatives strengthened women's role in economic and household decision making. Overall, coordinated institutional efforts helped shift farmers from subsistence farming to market oriented organic coffee production, while also building local capacity and resilience by turning farmers into active participants in economic transformation.

Method of Study

The study adopted an exploratory sequential mixed method research design conducted between 2024 and 2025. It involved a random sample of 180 tribal coffee farmers from six villages in the Araku Valley block. Data were collected using structured questionnaires, focus group discussions, and key informant interviews. Social Network Analysis was carried out using UCINET software to map institutional linkages and influence based on centrality measures such as degree, betweenness, and closeness. In addition, a heat map was created to visually capture the intensity of institutional engagement and its impact across villages.

Reference

Lalu, B., Deb, A., & Suman, S. (2025). "Institutional Engagement and Its Role in Livelihood Transformation of Tribal Coffee Farmers in Araku Valley." Indian Journal of Extension Education 61(3): 42-46.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Spatial Market Integration among the Major Robusta Coffee Growing Regions in India: An Econometric Analysis

COFFEE

Gaganadeepa J. T., et al

POLICY IMPLICATIONS

The study recommends strengthening real-time market information systems so farmers have better price awareness and bargaining power. It also calls for investment in transport and storage infrastructure to improve the movement of coffee across regions and enhance price integration. Promoting cooperative marketing through Farmer Producer Organizations can help small growers access wider markets and benefit from favorable price signals. Finally, the study suggests implementing uniform quality and grading standards so regional price differences reflect market conditions rather than variations in quality.

Aim of the paper

The study aims to examine the spatial market integration and price transmission among major Robusta coffee-growing regions in India, specifically Kodagu, Chikmagalur, and Wayanad. By analyzing monthly price data from 2011 to 2023, the researchers sought to determine the efficiency of these markets and understand how price signals are shared across different geographical locations.

Findings

The findings show that coffee prices in all three markets were non-stationary at levels but became stationary after first differencing, indicating a shared long-term price trend. Johansen co-integration results confirm a strong long-run relationship among Kodagu, Chikmagalur, and Wayanad, meaning prices move together over time. The VECM analysis indicates that while markets do adjust back to equilibrium after price shocks, the adjustment is relatively slow, pointing to local market inefficiencies. Among the three, Wayanad emerges as an important price-leading market, although overall price movements reflect strong interdependence across regions.

Method of Study

The study uses an econometric approach based on monthly farm gate prices of Robusta Cherry coffee from January 2011 to December 2023. Stationarity of the price series was tested using the Augmented Dickey-Fuller and Phillips Perron tests. Johansen's co integration test was then applied to examine the existence of long run relationships across regional markets. Finally, a Vector Error Correction Model was employed to capture short run price dynamics and the speed at which markets adjust back to equilibrium following shocks.

Reference

Gaganadeepa, J. T., Pradeepa Babu, B. N., Lokesha, H., & Mamatha Girish. (2025). "Spatial Market Integration among the Major Robusta Coffee Growing Regions in India: An Econometric Analysis." Journal of Experimental Agriculture International 47(3): 277-287.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

SPICES

Farmer Producer Organisations as a Resilience Strategy in Rajasthan's Mustard Farming Under Trade Liberalisation

Monica Bhati and Jitendra Yada

POLICY IMPLICATIONS

Farmer Producer Organisations should be strengthended and expanded to shield smallholders from the instability created by global trade. FPOs can also be used to lower cultivation costs by enabling bulk purchase of inputs such as seeds and fertilizers. At the same time, trade policies need closer monitoring to track and manage the impact of liberalisation on sensitive crops like mustard, so local farmers are not pushed into crisis. Investing in capacity building and management training is essential to ensure FPOs remain efficient, sustainable, and truly beneficial to their members.

Aim of the paper

The study analyzes the effects of trade liberalisation on the agricultural crisis in Rajasthan, with a specific focus on mustard crops. It aims to investigate the trends in mustard cultivation including area, production, and productivity and evaluate the role of Farmer Producer Organisations (FPOs) in mitigating the adverse impacts of liberalisation by comparing cultivation costs between FPO members and non members.

Findings

The findings show that mustard farmers in Rajasthan are highly exposed to the negative effects of trade liberalisation. However, farmers who are part of Farmer Producer Organisations (FPOs) face lower cultivation costs than non members. The study highlights FPOs as an important resilience mechanism, helping farmers cope with the pressures of a more open and competitive agricultural market. Participation in FPOs also helps stabilise, and in some cases improve, production and productivity despite increasing international trade competition.

Method of Study

The study used a comparative and statistical approach to assess the role of FPOs. Cultivation costs were directly compared between FPO members and non-members to identify differences. The researchers also examined long term trends in area under cultivation, total production, and yield levels of mustard in Rajasthan. Statistical tools, including the t-test, were applied to confirm whether the observed cost differences between the two groups were statistically significant.

Reference

Bhati, M., & Yadav, J. (2025). "Farmer Producer Organisations as a Resilience Strategy in Rajasthan's Mustard Farming Under Trade Liberalisation." The Indian Economic Journal: 1-16

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

The economic landscape of clove production in India: challenges and opportunities

SPICES

Lijo Thomas, et al

POLICY IMPLICATIONS

Genetic improvement should be prioritised by promoting high-yielding, disease-resistant clove varieties to replace ageing and low-productivity trees. Productivity can be further raised through better soil fertility management and the adoption of scientific agronomic practices. Organising clove markets is equally important to ensure farmers get fair prices and are not squeezed by inefficient middlemen. Labour shortages during harvest need to be addressed through mechanisation or other technological support systems. Finally, focused rejuvenation programmes for senile plantations are essential to secure the long-term sustainability of India's clove sector.

Aim of the paper

The study analyzes the clove economy in India, specifically focusing on production trends, trade patterns, and the cost of production and profitability of clove farming. It seeks to identify the key constraints hindering domestic production and explore intervention opportunities to reduce India's heavy import dependency.

Findings

Findings show that domestic clove production in India has remained largely stagnant, forcing the country to depend heavily on imports to meet strong demand. Producing dry clove is costly, with estimates around ₹581 per kilogram, which puts pressure on farm profitability. Productivity is held back by low genetic diversity, weak agronomic practices, poor soil fertility management, and pest and disease stress. The sector also suffers from aged plantations, unorganized marketing systems, and serious labour shortages during the peak harvest period. Unless these structural and production constraints are addressed, India is unlikely to close the gap and achieve self-sufficiency in clove production.

Method of Study

The study combined field-level evidence with secondary data analysis. Primary data were collected from 40 clove plantations across five major growing regions, covering districts in Kerala (Idukki, Kozhikode, and Kollam) and Tamil Nadu (Kanyakumari and Tenkasi). These field surveys were used to estimate the cost of production and assess the profitability of clove cultivation. In addition, the researchers analyzed long-term trends in production and trade using data from FAOSTAT, the Ministry of Commerce and Industry, and the Spices Board to place farm-level findings in a broader national context.

Reference

Thomas, L., Anees, K., & Nissar, V. A. M. (2023). "The economic landscape of clove production in India: challenges and opportunities." Journal of Spices and Aromatic Crops 32(2): 161-169.

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Do the Macroeconomic Determinants of Export Destinations Matter? The Case of Indian Black Pepper

SPICES

Raksha Jain, et al

POLICY IMPLICATIONS

Export can focus on high-GDP markets with stable macroeconomic conditions, as these destinations offer more reliable and sustained demand for Indian black pepper. India also needs to push harder in trade negotiations to reduce tariff barriers in key importing countries and improve price competitiveness. Since export performance is sensitive to currency movements, mechanisms to manage or cushion exchange rate volatility are essential. Finally, India should capitalise on rising global demand by strengthening quality standards and branding, highlighting the distinct medicinal and functional properties of Indian black pepper to reclaim lost market share.

Aim of the paper

The study aims to analyze the export performance of Indian black pepper and examine the influence of key macroeconomic factors from the perspective of its major export destinations. It seeks to understand the reasons behind India's declining share in the global spice market despite being a major producer and exporter.

Findings

The findings rank the major destination countries for Indian black pepper exports and show that export performance is strongly shaped by macroeconomic factors such as exchange rates, GDP, interest rates, inflation, tariffs, and global crude oil prices. Although global demand for black pepper has increased because of its health and culinary benefits, India has struggled to retain its share in international markets. Export patterns are highly sensitive to global economic changes and the macroeconomic stability of importing countries, making exports vulnerable to external shocks.

Method of Study

The study used an econometric approach based on long-term secondary data covering the period from 1988 to 2021. It examined key macroeconomic variables such as exchange rates, GDP of importing countries, interest rates, inflation, tariffs, and global crude oil prices. A ranking method was applied to identify India’s top black pepper export destinations, and statistical analysis was then used to assess how these macroeconomic factors influence export performance over time.

Reference

Jain, R., Elangovan, G., & Lakshminarayanan, K. (2025). "Do the Macroeconomic Determinants of Export Destinations Matter? The Case of Indian Black Pepper." Journal of Industry, Competition and Trade 25: 15

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NATIONAL RESEARCH PROGRAMME ON PLANTATION DEVELOPMENT (NRPPD) CENTRE FOR DEVELOPMENT STUDIES

Policy Brief

April- June 2025

Assessing risk and sustainability factors in spice supply chain management

SPICES

Vimal Kumar, et al

POLICY IMPLICATIONS

A clear shift is needed, away from short-term profit chasing toward long-term sustainability, as this is key to reducing resource wastage in spice supply chains. The identified risk factors should be built into a standardized monitoring framework so disruptions can be anticipated rather than reacted to. Decision-making tools such as FDM and FDEMATEL should be actively used to deal with uncertainty in the global spice trade instead of relying on ad hoc judgments. Root problems like poor organization and resource constraints should be considered, rather than treating symptoms after supply chains start to fail.

Aim of the paper

The study aims to identify and analyze the primary risk and sustainability factors within spice supply chain management (SSCM). It seeks to compile a collection of characteristics and sustainable techniques that address associated risks and relevant obstacles, ultimately providing a framework to improve the long-term sustainability and performance of spice supply chains.

Findings

The findings identify key risks that weaken spice supply chains, especially resource wastage and sustainability problems. Using the fuzzy DEMATEL approach, the study shows that these risks are closely interconnected and marked by high uncertainty, rather than acting in isolation. The fuzzy Delphi method helped convert expert opinions into reliable and comparable indicators for analysis. Overall, the results point to poor supply chain organization as a major driver of risk, suggesting that stronger coordination is essential for improving performance and ensuring both environmental and economic sustainability.

Method of Study

The study followed a multi-step approach combining qualitative and quantitative methods. It began with a literature review to identify key supply chain risks and sustainability practices. Expert opinions were then processed using the Fuzzy Delphi Method to extract valid and comparable attributes. The Fuzzy DEMATEL technique was applied to handle uncertainty and map the interrelationships among these factors. Finally, qualitative risk variables were converted into a standardized scale, allowing for more objective and systematic assessment.

Reference

Kumar, V., Raj, R., Verma, P., Garza-Reyes, J. A., & Shah, B. (2024). "Assessing risk and sustainability factors in spice supply chain management." Operations Management Research 17: 233-252.

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