



The Indian Society of Agricultural Economics

86th Annual Conference

December 9-11, 2026, AAU, Jorhat (Assam)

The Indian Society of Agricultural Economics (ISAE) is pleased to announce its 86th Annual Conference at Jorhat, Assam, from December 9-11, 2026. This Conference is being organised by the Department of Agricultural Economics, Assam Agricultural University (AAU), Jorhat, Assam. Prof. Sukhpal Singh, Professor, Centre for Management in Agriculture (CMA), Indian Institute of Management, Ahmedabad (IIMA), is the Conference President. Dr Chandan Hazarika, Assam Agricultural University, will be the Local Organising Secretary of the Conference.

Conference Themes

1. Digital Agriculture, Artificial Intelligence, and Technology Adoption
2. Climate Change, Climate-Smart Agriculture, and Carbon Markets
3. Rural Labour, Livelihoods, and Structural Transformation
4. Market Access, Local Institutions, And Pathways to Sustainable Agricultural Development in North-East India

Dates to Remember

- Last date for Paper Submission
July 31, 2026
- Communication from ISAE on the acceptance of the Paper
September 15, 2026

Conference Duration

The Conference will be held for three days, i.e., December 9-11, 2026. As the Conference will start at 9.30 am on 9th December, the delegates and participants are

advised to reach Jorhat by the evening of 8th December 2026 and schedule their departure in the evening of 11th December or the following day.

Submission of Papers for the 86th Annual Conference

The conference is open to research scholars from both India and abroad. The papers may relate to India at the micro, macro, or regional levels. The papers should be submitted to isaeindia1939@gmail.com. **The contributed papers should not exceed 7000 words, including references, tables, graphs and appendices. Any paper exceeding the word limit will not be considered as a full paper.** The papers should follow the current writing style of The Indian Journal of Agricultural Economics (IJAE). For further details, please visit the website <http://www.isaeindia.com>. All papers should include a summary/abstract of not more than 200 words. Based on the Rapporteurs' recommendations, a decision will be made regarding the acceptance of the submitted papers for presentation at the conference. As recommended, all accepted papers will be published in the Conference Number of the IJAE either in full length or in summary form. While authors are encouraged to submit multiple papers to the Conference, only one full-length paper will be published by any author, either as first or co-author. The authors must ensure that their papers are original, have been thoroughly checked for plagiarism and AI-generated content, and provide an undertaking on this effect when submitting the papers. No paper will be published in full length if the plagiarism content exceeds 15%. AI-generated paper needs a mandatory disclosure that AI help was used only for language improvement, editing, grammar checking, brainstorming, and aiding in reviewing the gist. It should not exceed 20%. Use of AI in Data Fabrication, Image Generation, Substantive Content Generation in result discussion, table interpretation, conclusion and policy implications are prohibited.

Dr N.A. Mujumdar Award

The Indian Society of Agricultural Economics (ISAE) gives Dr N.A. Mujumdar Prize Awarded to young scholars under 40. The Award is given for the best paper on each Conference theme.

ISAE Fellow

The Society awards Fellowships to senior Indian scholars who have made outstanding contributions to the field of agriculture and rural development. A separate call for the Fellowship, along with complete guidelines for nominations and details, will also be available on our website at www.isaeindia.com.

Presentations by PhD. Scholars

A special session will be organised for PhD scholars from different universities and colleges to showcase their research. An award will be given to the three best PhD presentations. It is mandatory for Ph.D. Scholars who present their papers to become

members of the Society. PhD scholars can submit a one-page abstract for their presentation and bring their PowerPoint slides to the Conference Venue. The presentation may be based on their PhD research or on any relevant topic in Agricultural Economics. The abstract should be submitted via e-mail to isaeindia1939@gmail.com by September 30, 2026.

Professor S.S. Johl Award for the Best PhD. Thesis in Agricultural Policy

The Society has instituted the Prof. S.S. Johl Award since 2024 to encourage outstanding original research on agricultural policy during doctoral research. Those who have completed their PhD in 2025 are eligible to apply. The Award will consist of a Citation. A separate call will be made on this Award, and the details will be uploaded on our website www.isaeindia.com

D.K. Desai Prize Award

The Dr D.K. Desai Award is given annually. The award will be presented during the 86th Annual Conference for the best article published in the Indian Journal of Agricultural Economics in 2025 (excluding conference papers).

Dr Anamitra Saha Prize Award

Dr Anamitra Saha Prize Award is given annually. The award will be presented during the 86th Annual Conference to one of the best articles published (excluding conference papers) in the Indian Journal of Agricultural Economics in 2025. Preference is given to articles published in the areas of the economics of cultivation and farming, and the economics of forestry, social forestry, and farm forestry.

Dr S.R. Sen Prize Award

This is a biennial award constituted by the Society since 1995. The award is given for an outstanding book on Agricultural Economics and Rural Development by an Indian author under 45 years of age. The members are encouraged to nominate the books for this Award.

Professor Ramesh Chandra Agrawal Prize Award

This is also a biennial award. The award is given by the Society for outstanding contributions by Indian scholars in the field of Agricultural Economics. The award will be presented during the 86th Annual Conference of the ISAE. A separate call will be issued for this award, and the details will be posted on our website.

Travel Grants for Young Scholars

The Society will provide travel grants to young scholars to encourage their participation in the 86th Annual Conference in Jorhat. Approximately 20 such travel grants will be given, depending on the funds available with the Society. The travel

grants will preferably be awarded to members of the Society, especially life members. The details will be uploaded to our website.

Registration Fee Exemption for the Students

The Society will encourage the host institute to exempt the registration fee of a limited number of students to enable them to participate in the 86th Annual Conference at Jorhat. The details will be uploaded on our website.

Details for Society's Membership and Fee Payment

The membership fee for the ISAE is as follows:

Life Membership Fee	: Rs. 7500
Annual Membership Fee	: Rs. 1500
Student Membership Fee	: Rs. 1000

The fee may be paid through NEFT/RTGS/UPI, and the details are given below:

Account Name : The Indian Society of Agricultural
Economics
Account Number : 54025434745
Bank Name : State Bank of India
Branch : M.G. Road, Fort, India
IFSC Code : SBIN0020634
MICR Code : 400002467



Please send the scanned payment proof to our email isaeindia1939@gmail.com

Key Contact Persons for the 86th Annual Conference

President of ISAE

Prof. Dinesh K. Marothia
Indian Society of Agricultural Economics,
C-104, First Floor, Sadguru Complex-I,
Near Vagheshwari, Gen. A.K. Vaidya Marg,
Goregaon (East), Mumbai - 400 063
Email: presidentisae1939@gmail.com

Conference President

Prof. Sukhpal Singh
Professor, Centre for Management in Agriculture (CMA)
Indian Institute of Management (IIMA)
Ahmedabad- 380015
Email: sukhpal@iima.ac.in

Local Organising Secretary

Dr. Chandan Hazarika
Professor,
Department of Agricultural Economics and Farm Management
Assam Agricultural University, Jorhat - 785013
Email: chandan.hazarika@aau.ac.in

Hon. Secretary and Treasurer

Dr. Kamal Vatta
Professor
Department of Economics and Sociology,
Punjab Agricultural University, Ludhiana - 141 004
Email: secretary.isae@gmail.com

SUGGESTIVE OUTLINES ON CONFERENCE THEMES FOR POTENTIAL CONTRIBUTORS

THEME I

DIGITAL AGRICULTURE, ARTIFICIAL INTELLIGENCE, AND TECHNOLOGY ADOPTION

Digital agriculture, comprising digital platforms, machine learning, artificial intelligence (AI), remote sensing, analysis of big data, geospatial technologies, Internet of Things (IoT), and algorithm-driven decision-support systems, is emerging as an important instrument for the transformation of contemporary agriculture (Briner et al., 2021; MacPherson et al., 2022). These technologies are integrated across the agricultural value chain, such as input delivery, farm management, extension advisories, farm mechanisation, marketing, finance, logistics, insurance, and governance (Ganeshkumar et al., 2023). While earlier innovations in agriculture were centred on biological and mechanical technologies, digital agriculture is information-intensive, platform-centric, and data-driven, influencing production decisions and institutional relationships within agri-food systems.

From the perspective of agricultural economics, digital and AI-enabled agriculture raises critical questions about technology adoption, efficiency gains, income distribution, employment generation, labour displacement, market power, and institutional design (Acemoglu and Restrepo, 2018). In developing agrarian economies such as India, characterised by small and fragmented landholdings, diverse agro-climatic conditions, imperfect markets, and limited and unequal access to extension, digital technologies have the potential to address these long-standing structural constraints (Sharma et al., 2025). At the same time, they may increase inequalities if adoption barriers, data asymmetries, and other issues are not adequately addressed (World Bank Group, 2016).

Major issues and strands in existing research

A growing body of literature has examined the economic impacts of digital technologies on agriculture. Evidence has emerged that digital advisories, precision technologies, and remote sensing can significantly improve input-use efficiency, reduce production risks, and increase crop yields (Finger et al., 2019). In the Indian context, digital tools have been introduced as substitutes or complements to traditional extension systems, particularly in remote regions with poor extension reach. The research evidence indicates potential gains, although results vary due to differences in design, advisory credibility, and local conditions (Mittal and Mehar, 2016).

Research on digital technology adoption highlights the barriers faced by small and marginal farmers, including limited digital literacy, poor internet connectivity, risk aversion, and a lack of trust in digital advisories. Studies also point to social and institutional factors-such as land tenure insecurity, gender norms, and caste-based

exclusion—that affect the adoption of these technologies but are usually ignored in technology-centric narratives (Aker, 2011; Fabregas et al., 2019). In India, there are significant variations in adoption across regions, farm-size categories, and farmers' socio-economic classes.

Another set of research has focused on digital platforms and the integration of markets. E-mandis, digital procurement systems, and platform-based aggregation models have been promoted to improve price discovery, reduce marketing and transaction costs, and strengthen farmers' linkages to wider markets. Despite some evidence on improvements in transparency and access, issues of platform monopolisation, exclusion of small and marginal farmers, and the shift of market power from traditional intermediaries to digital aggregators have emerged (Borrero and Mariscal, 2022). The interaction between digital platforms and existing institutions such as MSP procurement, FPOs, and cooperatives is another area of meaningful research.

Digital agriculture also has implications for labour, skill development, and mechanisation. Automation, AI-driven decision tools, and precision-based machinery may significantly reduce demand for manual labour across various agricultural operations. At the same time, it may increase demand for skilled operators, technicians, and data intermediaries. In labour-surplus economies like India, promotion of digital agriculture may raise important questions on employment quality, skill change, and inequality (Autor, 2015). As Indian agriculture continues to support a large workforce, understanding the labour impacts of digital agriculture is particularly important.

Another emerging area relates to data ownership, governance, and ethics. Digital agriculture relies heavily on farm-level data, often collected and controlled by private platforms. Concerns have been raised regarding data ownership, consent, privacy, transparency, and the unequal extraction of value from farmer-generated data (Bronson and Knezevic, 2016; Dittmer et al., 2016). These issues have significant implications for competition, farmer autonomy, and the long-term sustainability of digital ecosystems.

Key gaps and questions

Despite rapid growth in digital initiatives in the agricultural sector, gaps remain, leaving several questions unanswered. First, there is limited rigorous causal evidence on the long-term income and welfare impacts, particularly for smallholders. Second, there is uncertainty on the scaling up and long-term sustainability of digital advisory and platform models beyond the pilot phases. Third, the interaction between digital agriculture and existing agricultural policies—such as subsidies, MSP, and extension systems—has not been adequately analysed. Fourth, labour and distributional consequences of digitalisation remain underexplored. Finally, comparative analyses across Indian states and international contexts are scarce, limiting policy learning.

Indicative areas for paper submission

In light of the above background, papers are invited on the following areas. However, submissions on other related areas of the theme that are not covered in the following list are also welcome.

1. **Economics of digital and AI-enabled agricultural technologies:** Studies assessing the impact of digital tools, AI-based advisories, precision-based agriculture, automated machinery, etc., on productivity, efficiency, profitability, and risk reduction across various crops, enterprises, regions, and farm-size categories.
2. **Adoption of digital technology, its diffusion, and behavioural constraints:** Studies examining adoption, lessons learnt, trust in digital options, farmers' risk preferences, and behavioural barriers, including the role of networks, information asymmetries, and institutions. It may also include blockchain technologies.
3. **Digital advisory services and agricultural extension:** Evaluations of public, private, and hybrid digital extension models, their complementarities/competition with traditional extension systems, and their reach to the farmers, especially small and marginal farmers.
4. **Digital platforms, markets, and price discovery:** Studies on e-markets, digital procurement, platform-based aggregation, and supply-chain digitisation, with a focus on transaction costs, price transmission, competition, and market power.
5. **Farm incomes, risk management, and finance:** Research on the use of digital technologies in access to credit, insurance, payments, and income stabilisation, including links with DBT and other initiatives of financial inclusion.
6. **Labour, skills, mechanisation, and employment effects:** Studies examining the impact of automation, Artificial Intelligence, and mechanisation on demand for human labour, skill requirements, wages, and rural employment.
7. **Engagement of Institutions, FPOs, and other collectives with digital agriculture:** Studies examining how FPOs, cooperatives, and other collectives engage with digital platforms, tools, and data-driven decision-making.
8. **Data governance, regulation, and ethical issues:** Research focusing on ownership, privacy, and transparency of data and also examining the competition and regulatory frameworks related to digital agriculture.
9. **Regional inequalities and inclusiveness:** Studies undertaking comparison across states, agro-climatic zones, and socio-economic groups on who benefited and who is left behind in digital initiatives.
10. **Lessons from global experiences:** Comparative studies highlighting global experiences in digital agriculture, with relevance for Indian agriculture.

- 11. Role of Agricultural Universities and Research Institutions:** The Role of Agricultural Universities and Agricultural Research Institutions in the Changed Context of Evolving AI Digital Agriculture, Artificial Intelligence and Technology Adoption and the need for Re-visiting the mandate, including course curriculum
- 12. The existing policy regime to promote AI Digital Agriculture, Artificial Intelligence, and Technology Adoption:** Studies evaluating the existing policy regime/framework, its adequacy, gaps, and changes/amendments required in view of evolving technologies and lessons learned from the experience of different countries in promoting these technologies.

REFERENCES

- Acemoglu, D., & Restrepo, P. (2018). Artificial intelligence, automation, and work. In *The economics of artificial intelligence: An agenda* (pp. 197-236). University of Chicago Press.
- Aker, J. C. (2011). Dial “A” for agriculture: a review of information and communication technologies for agricultural extension in developing countries. *Agricultural economics*, 42(6), 631-647.
- Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of economic perspectives*, 29(3), 3-30.
- Birmer, R., Daum, T., & Pray, C. (2021). Who drives the digital revolution in agriculture? A review of supply-side trends, players and challenges. *Applied economic perspectives and policy*, 43(4), 1260-1285.
- Borrero, J. D., & Mariscal, J. (2022). A case study of a digital data platform for the agricultural sector: A valuable decision support system for small farmers. *Agriculture*, 12(6), 767.
- Bronson, K., & Knezevic, I. (2016). Big Data in food and agriculture. *Big Data & Society*, 3(1), 2053951716648174.
- Dittmer, K. M., Burns, S., Shelton, S., Costa Jr, C., & Wollenberg, E. (2025). Digital tool innovations for smallholder inclusion. *Outlook on Agriculture*, 54(3), 212-221.
- Fabregas, R., Kremer, M., & Schilbach, F. (2019). Realizing the potential of digital development: The case of agricultural advice. *Science*, 366(6471), eaay3038.
- Finger, R., Swinton, S. M., El Benni, N., & Walter, A. (2019). Precision farming at the nexus of agricultural production and the environment. *Annual Review of Resource Economics*, 11(1), 313-335.
- Ganeshkumar, C., Jena, S. K., Sivakumar, A., & Nambirajan, T. (2023). Artificial intelligence in agricultural value chain: review and future directions. *Journal of Agribusiness in Developing and Emerging Economies*, 13(3), 379-398.
- MacPherson, J., Voglhuber-Slavinsky, A., Olbrisch, M., Schöbel, P., Dönitz, E., Mouratiadou, I., & Helming, K. (2022). Future agricultural systems and the role of digitalization for achieving sustainability goals. A review. *Agronomy for sustainable development*, 42(4), 70.
- Mittal, S., & Mehar, M. (2016). Socio-economic factors affecting adoption of modern information and communication technology by farmers in India: Analysis using multivariate probit model. *The Journal of Agricultural Education and Extension*, 22(2), 199-212.
- Schroeder, K., Lampietti, J., & Elabed, G. (2021). *What's cooking: Digital transformation of the agrifood system*. World bank publications.
- Sharma, K., Katoch, S., Mohapatra, S., Kaur, M., & Kumar, A. (2025). Access to digital services and its impact on farm income: Empirical evidence from eastern India. *Agricultural Economics Research Review*, 38(2), 184-193.

World Bank Group. (2016). World development report 2016: Digital dividends. World Bank Publications.

THEME II

CLIMATE CHANGE, CLIMATE-SMART AGRICULTURE, AND CARBON MARKETS

Global agriculture and food systems are facing a serious challenge of climate change. Rising temperatures, changes in rainfall patterns, rising incidence of extreme weather events, and heightened climate variability are adversely affecting productivity, resource use, and income sustainability (Hu et al., 2024; Ortiz-Bobea et al., 2021). In countries such as India, where a large proportion of land is under rainfed agriculture, cultivated mostly by smallholder farmers, climate change seriously threatens food security and farmers' livelihoods (BIRTHAL et al., 2014; Choudhary and Gupta, 2024).

Within this broader context, climate-smart agriculture (CSA) has emerged as a promising integrated framework for achieving three interlinked objectives: (i) sustainable growth in agricultural productivity and farm incomes, (ii) strengthening adaptation to climate change and climate resilience, and (iii) reducing or removing greenhouse gas (GHG) emissions where feasible. Alongside CSA, policy interest in carbon markets, carbon pricing, and payment for ecosystem services (PES) has grown significantly, indicating efforts to mobilise climate finance, internalise environmental externalities, and incentivise mitigation, adaptation and conservation outcomes in agriculture (Khurana et al., 2024).

Major issues and strands in existing research

There are a number of studies that have examined the impacts of climate change on productivity, output, profitability, and farm incomes. Studies in India have highlighted that rising temperatures and increased rainfall variability adversely affect the yields of major crops such as wheat, rice, and coarse cereals, with significant variation in impacts across regions and seasons (BIRTHAL et al., 2014). Climate variability has also increased production risk, income volatility, and livelihood vulnerability, particularly among resource-poor farmers and in rainfed regions (BIRTHAL et al., 2021).

Research on adaptation highlights a wide range of farm-level responses, such as changes in sowing dates, crop diversification, adoption of stress-tolerant varieties, efficient water use, and agroforestry. However, poor access to information, credit, irrigation, and markets, as well as tenure insecurity and policy distortions, have discouraged the large-scale adoption of such options (Aryal et al., 2020; Bahinipati et al., 2024). In India, public extension systems, crop insurance, and procurement are

not fully aligned with climate resilience objectives, although they significantly influence the design of adaptation strategies.

The literature on climate-smart agriculture has expanded fast, focusing on conservation, precision irrigation, integrated nutrient management, and regenerative approaches (Lipper et al., 2014). While experimental and pilot studies on CSA have often shown increased resource-use efficiency and resilience, there is limited large-scale evidence of sustained increases in income and reductions in risk. Often, CSA practices involve short-term costs and delayed benefits, raising adoption challenges for liquidity-constrained farmers.

A number of studies have examined mitigation potential and carbon sequestration in various agricultural activities, including soil carbon storage, improved livestock management, crop residue management, and agroforestry (Smith et al., 2014). Such practices have been promoted as low-cost options. However, the economic feasibility of large-scale promotion of such practices depends critically on measurement, reporting, and verification (MRV) systems, transaction costs, and institutional arrangements (Cariappa et al., 2024).

In recent times, interest in carbon markets and PES has grown significantly. It is argued that carbon pricing and PES will not only align climate mitigation with agricultural production practices but also provide additional income to farmers (Ishtiaque et al., 2024). Critics, however, point to challenges related to additionality, permanence, leakage, and equity. Evidence from developing countries indicates that benefits from carbon projects are primarily captured by larger or better-connected farmers (Cariappa and Krishna, 2025). India also faces challenges of land fragmentation and uncertain land tenures.

The distributional and equity aspects of climate change and climate policies have also drawn attention. Women, tenant farmers, landless workers, and marginal producers often face higher exposure and lower adaptive capacity (Lecoutere et al., 2023). Similarly, climate finance and carbon market mechanisms may widen inequalities in the absence of strong benefit-sharing mechanisms. For climate-smart strategies to be inclusive, it is necessary to understand distributional and equity dimensions.

Institutional and policy architecture for climate action is another aspect of the paper submission. Agricultural subsidies, irrigation pricing, power tariffs, and MSP-based procurement systems create conflicting incentives for climate goals. Often, input subsidies and free electricity discourage the adoption of water-saving and emissions-reducing practices, while price-support regimes may lock farmers into climate-vulnerable cropping patterns. There is a need to design policy frameworks that balance food security, farmers' incomes, and environmental sustainability (Gulati and Juneja, 2022).

Key gaps and unresolved questions

Despite extensive research on this subject, many gaps remain that researchers may address. First, there is limited micro-level causal evidence on the long-term income, risk, and welfare impacts of CSA practices under real-world conditions. Second, due to high MRV and transaction costs, the evidence on the potential of carbon markets and their economic viability is still lacking, especially for small and marginal farmers. Third, the conflict/trade-off between existing agricultural support systems, such as subsidies, MSP, and insurance, and climate goals remains under-analysed. Fourth, there is a lack of proper understanding of the impact of adaptation/mitigation strategies on labour and livelihoods. Finally, comparative analyses of alternative institutional models for climate action in agriculture are scarce.

Indicative areas for paper submission

The researchers are encouraged to submit their papers on any of the following areas, although they are free to explore other relevant areas to the theme.

- 1. Impact of climate change:** Empirical analyses of the impact of climate change, variability, and extreme events on crop yields, profitability, income, and risks. The analysis may address variations across crops, regions, and farming systems.
- 2. Adoption and economics of adaptation and mitigation strategies:** determinants of adoption, costs, benefits, and constraints of adaptation strategies. Papers may focus on various strategies such as diversification, stress-tolerant varieties, and other climate-smart technologies and practices.
- 3. Climate-smart practices and farm-level outcomes:** Evaluations of climate-smart practices with respect to productivity, resilience, profitability, and resource-use efficiency, including trade-offs and complementarities.
- 4. Carbon markets, carbon pricing, and mitigation incentives:** Research on the design, performance, and economic impact of carbon markets, carbon pricing, and offsets, that are relevant to agricultural systems, and farmer stakes and engagement.
- 5. MRV systems, transaction costs, and institutional framework:** Analyses of MRV challenges, transaction costs, and institutional arrangements affecting farmer participation in carbon and PES schemes.
- 6. PES and biodiversity outcomes:** Assessment of PES mechanisms, ecosystem service valuation, and the impact of such interventions on resource-conservation, productivity, farmers' livelihoods, and land-use decisions.

7. **Distributional and gender implications of climate policies:** Research examining who pays and who benefits from climate interventions, with special reference to gender, caste, land tenure, and regions.
8. **Policy coherence: climate action, subsidies, MSP, and food security:** Analyses of interactions between climate goals/objectives and current agricultural policies, and pathways for aligning incentives.
9. **Institutional roles of FPOs, cooperatives, and local governance:** Studies on how collective action, institutional innovations, and local governance play an important role in adaptation/mitigation.
10. **Comparative and international perspectives on climate-smart agriculture:** Studies drawing lessons from other countries with CSA, carbon markets, and climate funding, which are relevant for Indian agriculture.

REFERENCES

- Aryal, J. P., Jat, M. L., Sapkota, T. B., Rahut, D. B., Rai, M., Jat, H. S., Sharma, P.C. & Stirling, C. (2020). Learning adaptation to climate change from past climate extremes: Evidence from recent climate extremes in Haryana, India. *International Journal of Climate Change Strategies and Management*, 12(1), 128-146.
- Bahinipati, C. S., Viswanathan, P. K., & Singh, A. K. (2024). Do institutions, incentives, and information enhance adoption of climate smart agriculture practices? Empirical evidence from India. *Environmental Development*, 50, 100982.
- Birthal, P. S., Hazrana, J., & Negi, D. S. (2021). Effectiveness of farmers' risk management strategies in smallholder agriculture: Evidence from India. *Climatic Change*, 169(3), 30.
- Birthal, P. S., Negi, D. S., Kumar, S., Aggarwal, S., Suresh, A., & Khan, T. (2014). How sensitive is Indian agriculture to climate change?. *Ind. Jn. of Agri. Econ*, 69(4).
- Cariappa, A. A., & Krishna, V. V. (2025). Carbon farming in India: are the existing projects inclusive, additional, and permanent?. *Climate Policy*, 25(5), 756-771.
- Choudhary, T. F., & Gupta, M. (2024). Impact of climate change on agriculture: evidence from major crop production in India. *The Indian Economic Journal*, 72(3), 442-459.
- Gulati, A., & Juneja, R. (2022). Transforming Indian agriculture. In *Indian agriculture towards 2030: Pathways for enhancing farmers' income, nutritional security and sustainable food and farm systems* (pp. 9-37). Singapore: Springer Nature Singapore.
- Hu, T., Zhang, X., Khanal, S., Wilson, R., Leng, G., Toman, E. M., Wang, X., Li, Y. & Zhao, K. (2024). Climate change impacts on crop yields: A review of empirical findings, statistical crop models, and machine learning methods. *Environmental Modelling & Software*, 179, 106119.
- Ishtiaque, A., Krupnik, T. J., Krishna, V., Uddin, M. N., Aryal, J. P., Srivastava, A. K., Kumar, S., Shahzad, M.F., Bhatt, R., Gardezi, M. and Bahinipati, C.S & Jain, M. (2024). Overcoming barriers to climate-smart agriculture in South Asia. *nature climate change*, 14(2), 111-113.
- Khurana, A., Kajale, D., Cariappa, A. A., & Krishna, V. V. (2024). Shaping India's climate future: A perspective on harnessing carbon credits from agriculture. *Outlook on Agriculture*, 53(2), 113-130.
- Lecoutere, E., Mishra, A., Singaraju, N., Koo, J., Azzarri, C., Chanana, N., Nico, G. & Puskur, R. (2023). Where women in agri-food systems are at highest climate risk: a methodology for mapping climate-agriculture-gender inequality hotspots. *Frontiers in Sustainable Food Systems*, 7, 1197809.
- Lipper, L., Thornton, P., Campbell, B. M., Baedeker, T., Braimoh, A., Bwalya, M., ... & Torquebiau, E. F. (2014). Climate-smart agriculture for food security. *Nature climate change*, 4(12), 1068-1072.
- Ortiz-Bobea, A., Ault, T. R., Carrillo, C. M., Chambers, R. G., & Lobell, D. B. (2021). Anthropogenic climate change has slowed global agricultural productivity growth. *Nature Climate Change*, 11(4), 306-312.

- Palombi, L., & Sessa, R. (2013). Climate-smart agriculture: Sourcebook, Rome. *Food and Agriculture Organization of the United Nations (FAO)*, p. xi, 557.
- Smith, P., Bustamante, M., Ahammad, H., Clark, H., Dong, H., Elsiddig, E. A., Haberl, H., Harper, R., House, J., Jafari, M. and Masera, O. & Bolwig, S. (2014). Agriculture, forestry and other land use (AFOLU). In *Climate change 2014: mitigation of climate change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 811-922). Cambridge University Press.

THEME III

RURAL LABOUR, LIVELIHOODS, AND STRUCTURAL TRANSFORMATION

Structural transformation refers to the long-term reallocation of labour and resources from agriculture to non-agricultural sectors, or within the agricultural sector, accompanied by productivity growth, income diversification, and rising living standards (McMillan et al., 2017; Timmer, 2009). In agrarian economies, structural transformation is accompanied by changes in rural labour markets, livelihood strategies, migration patterns, and the relationship between farm and non-farm economies. In India, where agriculture continues to employ a disproportionately large share of the workforce relative to its contribution to gross domestic product, the nature and speed of rural labour transition are determined by the nature of growth, poverty alleviation, and agrarian transformation.

From an agricultural economics perspective, rural labour is not simply an outcome of agricultural growth or growth in other sectors but a key transmission channel through which technological change, institutional arrangements, and public policy shape rural economic outcomes. India's experience of structural transformation has been marked by slow and uneven labour exit from agriculture, persistent informality, considerable regional variations, and a weak linkage between output growth and employment generation (Lewis, 1954; Pattayat, 2024). As a result, rural households increasingly depend on a complex portfolio of farming, non-farm work, migration, and public employment programmes to sustain livelihoods.

Major issues and strands in existing research

A substantial body of research has analysed changes in rural employment patterns and labour markets in India. Evidence from the National Sample Survey (NSS) and Periodic Labour Force Survey (PLFS) data shows a gradual decline in the share of agricultural employment over time, with the decline varying considerably across castes and states (Chand and Srivastava, 2014; Chand and Singh, 2022). A large proportion of agricultural workers remain engaged in low-productivity, seasonal, and informal employment, resulting in widespread underemployment rather than open unemployment.

The rural non-farm economy (RNFE) plays an important role in employment generation and contributes to the diversity of income sources in rural areas. Non-farm activities-including agro-processing, construction, trade, transport, services, and small-scale manufacturing-now account for a growing share of rural incomes. However, the RNFE remains highly heterogeneous and segmented. While some activities offer remunerative employment, many rural non-farm jobs are informal, low-paying, and insecure, limiting their ability to absorb surplus agricultural labour on a sustained basis (Carswell et al., 2023). Constraints related to marketing, skills, infrastructure development and finance continue to impede the growth of productive rural enterprises and MSMEs.

Migration (seasonal, circular, and long-term) has become a central livelihood strategy for rural households in many less-developed regions of India. Migration also affects income diversification, consumption smoothing, and risk management, with remittances influencing household investment in agriculture, education, and housing. At the same time, migrant workers face vulnerabilities related to informality, working conditions, social protection, and spatial exclusion, as starkly revealed during the COVID-19 pandemic (Keshri and Bhagat, 2013; Deshingkar and Akter, 2009; Sivakumar and Srinivasan, 2020). Migration thus reflects both opportunity and distress, underscoring the uneven nature of structural transformation.

Public employment and livelihood support programmes are other important areas of research on rural labour. The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) has been widely studied as a source of wage employment, a rural wage floor, and a counter-cyclical safety net (Sneha et al., 2024; Narayan, 2022). This has positively affected rural wages and income sustainability, though with considerable inter-state variation. More recently, the GRAM-G scheme, conceived as an expanded and updated framework built on the MGNREGS, has been rolled out, aiming to strengthen the link between employment generation and longer-term livelihood outcomes by emphasising durable asset creation, natural resource management, climate-resilient works, and convergence with agriculture, irrigation, and rural enterprise development. From an agricultural economics perspective, GRAM-G represents an attempt to reposition public employment as both an income stabiliser and a facilitator of structural transformation.

The gender dimensions of rural labour and livelihoods have also received growing attention. Women's participation in agriculture, non-farm work, and public employment has increased in several regions due to male outmigration, mechanisation, and changes in cropping patterns. Such feminisation of agricultural labour, however, has not necessarily translated into improved access to land, assets, skills, or decision-making power. Women remain disproportionately concentrated in unpaid or low-paid work and face persistent institutional and social barriers

(Agarwal, 2014; Afridi et al., 2023). Understanding gendered labour transitions is therefore necessary for inclusive rural transformation.

Technological change and mechanisation further complicate rural labour dynamics. Mechanisation can reduce labour demand for some agricultural activities, and may raise demand for service providers, skilled operators, and repair services. In contexts where non-farm employment growth is weak, mechanisation may exacerbate underemployment and inequality. The interaction between mechanisation, migration, and public employment programmes such as GRAMG has important implications for rural wage formation, labour availability, and farm production decisions (Binswanger, 1986; Biggs et al., 2011; Takeshima, 2024).

Key gaps and unresolved questions

While a significant amount of literature exists on this theme, there are multiple gaps that need to be filled. First, there is limited evidence on the quality of labour transition, particularly regarding whether movement out of agriculture leads to stable, productive, and dignified employment. Second, the linkages between agricultural growth, labour exit, and non-farm employment creation remain insufficiently explored at disaggregated regional and district levels. Third, the long-term role of public employment frameworks such as GRAMG in facilitating genuine livelihood transitions, beyond short-term income support, -requires systematic evaluation. Fourth, the intersection of migration, gender, caste, and informal employment in shaping labour outcomes remains under-analysed in mainstream agricultural economics. Finally, comparative analyses of alternative pathways of rural structural transformation across Indian states and developing economies remain limited.

Indicative areas for paper submission

Scholars are invited to submit papers addressing, but not limited to, the following areas:

- 1. Structural transformation, labour reallocation, and rural productivity growth:** Studies analysing long-term shifts in labour from agriculture to non-agricultural sectors, changes in sectoral productivity, and implications for income growth, inequality, and rural economic sustainability, using macro-, meso-, or micro-level data.
- 2. Changing rural labour markets, wages, and employment relations:** Empirical analyses of trends in rural employment, real wages, seasonality, informality, and labour contracts, drawing on NSS, PLFS, or primary survey data, with special focus on regional and social heterogeneity. This theme also includes studies on labour bondage, the interlocking of credit and labour

markets, the role of labour contractors, and the emergence of outsourced and mediated labour arrangements in agriculture.

- 3. Rural non-farm employment, MSMEs, and livelihood diversification:** Research on the growth, pattern, and challenges of the rural non-farm economy, with a focus on entrepreneurship, credit access, infrastructure, and market integration, as well as household labour strategies for livelihood diversification across farm and non-farm sectors.
- 4. Migration, remittances, and rural–urban labour linkages:** Studies examining seasonal, circular, and long-term migration, the effect of rural infrastructure like rural roads on labour mobility, the role of remittances in household livelihoods and agricultural investment, and implications for rural labour availability, labour intermediation, and demographic change.
- 5. Gender dimensions of labour transition and feminisation of agriculture:** Analyses of changing gender roles in agriculture, non-farm employment, and public works, including issues of unpaid labour, wage gaps, asset ownership, decision-making power, access to skills and institutions, and the implications of labour market restructuring for women workers.
- 6. Public employment programmes and social protection for rural workers (MGNREGA and GRAMG):** Evaluations of public employment schemes and broader social protection systems with respect to income security, wage effects, asset creation, labour allocation, and their potential role in enabling structural transformation, reducing vulnerability, and preventing distress migration.
- 7. Public works, infrastructure creation, and convergence with agriculture and irrigation:** Research assessing how employment programmes contribute to rural infrastructure, soil and water conservation, and their productivity and livelihood impacts through convergence with agriculture, irrigation, and natural resource management initiatives.
- 8. Technological change, mechanisation, and labour demand interactions:** Studies examining how mechanisation, digital tools, and farm service markets affect labour demand, skill requirements, wages, and rural employment, including the changing organisation of labour through outsourcing and service provision models.
- 9. Finance, skills, and rural enterprise development:** Analyses of financing constraints, skill development, and institutional support to rural enterprises and MSMEs, particularly for youth, women, and marginalised groups, and their role in shaping labour mobility and employment transitions.

10. Regional variations and comparative experiences of rural transformation: Studies from Indian states or regions, selective international comparisons, examining divergent pathways of rural labour transition, employment structures, institutional arrangements, and effective policy interventions.

REFERENCES

- Afridi, F., Bishnu, M., & Mahajan, K. (2023). Gender and mechanization: Evidence from Indian agriculture. *American Journal of Agricultural Economics*, 105(1), 52-75.
- Agarwal, B., & Herring, R. (2015). Food security, productivity, and gender inequality. *The Oxford handbook of food, politics, and society*, 861, 273-301.
- Biggs, S., Justice, S., & Lewis, D. (2011). Patterns of rural mechanisation, energy and employment in South Asia: reopening the debate. *Economic and Political Weekly*, vol. and issue no? 78-82.
- Binswanger, H. (1986). Agricultural mechanization: a comparative historical perspective. *The World Bank Research Observer*, 1(1), 27-56.
- Carswell, G., De Neve, G., & Subramanyam, N. (2022). Getting home during lockdown: migration disruption, labour control and linked lives in India at the time of Covid-19. *Journal of Ethnic and Migration Studies*, 48(19), 4603-4621.
- Chand, R., & Singh, J. (2022). Workforce changes and employment some findings from PLFS data series. *Manpower Journal*, 56.
- Chand, R., & Srivastava, S. K. (2014). Changes in the rural labour market and their implications for agriculture. *Economic and Political Weekly*, vol and issue no.? 47-54.
- Deshingkar, P., & Akter, S. (2009). Human development in India. *Migration*, 13, 1-86.
- Keshri, K., & Bhagat, R. B. (2010). Temporary and seasonal migration in India. *Genus*, 66(3), 25-45.
- Lewis, W. A. (2016). Economic development with unlimited supplies of labour. In *Paradigms in economic development* (pp. 59-97). Routledge.
- McMillan, M., Rodrik, D., & Sepulveda, C. (2017). Structural change, fundamentals and growth: A framework and case studies (No. w23378). National Bureau of Economic Research.
- Mehrotra, S., & Parida, J. K. (2021). Stalled structural change brings an employment crisis in India. *The Indian Journal of Labour Economics*, 64(2), 281-308.
- Narayan, S. (2022). Fifteen years of India's NREGA: Employer of the last resort?, *Indian Journal of Labour Economics*, 65, 779-799.
- Pattayat, S. S., & Parida, J. K. (2024). Drivers of rural non-farm sector employment in India, 1983–2019. *South Asia Economic Journal*, 25(1), 45-73.
- Sivakumar, P., & Srinivasan, A. (2020). The COVID-19 Pandemic and Internal Labour Migration in India: A'Crisis of Mobility'. *The Indian Journal of Labour Economics: the Quarterly Journal of the Indian Society of Labour Economics*, 63(4), 1021-1039.
- Sneha, S. B., Srivastava, S. K., Ray, M., Praveen, K. V., & Singh, A. (2024). Agricultural wages in India: Trends and structural changes. *Agricultural Economics Research Review*, 37(1), 1–11.
- Takeshima, H. (2024). Agricultural mechanisation and gendered labour activities across sectors: Micro-evidence from multi-country farm household data. *Journal of Agricultural Economics*, 75(1), 425-456.
- Timmer, C. P. (2009). A world without agriculture: The structural transformation in historical perspective (p. 96). Washington, DC: Aei Press.

THEME IV

MARKET ACCESS, LOCAL INSTITUTIONS, AND PATHWAYS TO SUSTAINABLE AGRICULTURAL DEVELOPMENT IN NORTH-EAST INDIA

North-East India is a distinctive agrarian region characterised by fragile mountain ecosystems, rich biodiversity, diverse agro-climatic conditions, and a predominance of smallholder farming systems. Agricultural production in the region is deeply embedded in customary land tenure arrangements and community-based governance structures, which continue to shape patterns of land use, resource management, and economic decision-making (Baruah, 2003). Unlike much of mainland India, where private land ownership dominates, several states in the North-East operate under clan-based or community-controlled land systems. These institutional characteristics significantly influence credit access, investment incentives, adoption of the latest agricultural technologies, agricultural commercialisation, and market participation.

The region possesses considerable comparative advantages in horticulture, plantation crops, spices, bamboo, fisheries, livestock, and organic farming systems. Historically lower chemical input intensity has positioned parts of the North-East favourably for organic branding and niche product development (Singh et al., 2021). Despite this production potential, farm incomes remain constrained by weak integration into national markets due to high transportation costs, fragmented value chains, limited aggregation, and inadequate post-harvest infrastructure (North Eastern Council, 2008). Agricultural transformation in the region, therefore, depends not merely on production enhancement but also on harnessing available agroclimatic diversity and niches, including time-tested human adaptation mechanisms/practices, strengthening market access, improving price realisation, fostering collective institutions, and ensuring ecological sustainability.

From an agricultural economics perspective, this theme requires a systematic examination of how local institutions interact with market structures to shape agricultural development trajectories and raise farmers' incomes. Market access in the North-East is influenced by geographical remoteness, terrain-related connectivity constraints, seasonality, and infrastructural constraints. High transaction costs often erode farm-gate prices and weaken incentives for commercialisation. At the same time, institutional innovations such as Farmer Producer Companies (FPCs), cooperatives, and cluster-based value chain approaches are being promoted to enhance aggregation, access to cheap, easy inputs, and bargaining power. However, the effectiveness of these initiatives depends on institutional capacity, the quality of governance, and alignment with customary tenurial and land-use systems (Trebbin and Hassler, 2012).

Another equally important dimension concerns ensuring a balance between ongoing commercialisation and ecological sustainability. Agricultural systems in the North-East are closely linked to forest ecosystems, prevailing cultural and time-tested agricultural practices such as shifting cultivation (*jhum*), and biodiversity-rich landscapes. While commercialisation and crop diversification and integration with wider markets and value chains can enhance incomes, it may also generate land-use pressures and ecological stress if not carefully managed. Sustainable agricultural development in the region thus requires policies that reconcile the commercialisation of agriculture with environmental considerations, including biodiversity conservation, and prevailing socio-cultural practices.

Major issues

Research on agricultural development in the North-East highlights both structural constraints and emerging opportunities, given the myriad agroclimatic niches. Studies have documented the region's potential in high-value horticulture, spices, and plantation crops, emphasising that diversification into these crops may offer higher income prospects than staple cereals (BIRTHAL et al., 2015). However, the lack of modern market infrastructure facilities, such as grading facilities, cold chains, warehousing, and efficient logistics, constrains primary producers from benefiting from value addition and the high demand for niche crops.

Customary land tenure and community governance have been widely discussed in sociological and political literature, but their economic implications remain underexplored. Community-managed systems often promote equitable access to resources and social cohesion; yet, ambiguities in formal land titles can restrict collateral-based borrowing and large-scale investment in orchards, irrigation, and processing infrastructure. There is limited empirical evidence assessing how such tenure systems influence productivity growth, technology adoption, and commercialisation pathways.

Market access constraints have been identified as a central bottleneck. Poor connectivity and dependence on intermediaries reduce farm-gate price realisation. Price transmission from terminal markets to producers remains weak for many commodities. The promotion of FPOs and cooperative models aims to address aggregation challenges, but institutional performance varies significantly with managerial competence, leadership, and market orientation (TREBBIN and HASSLER, 2012).

Value chain research has emphasised opportunities in branding, geographical indication (GI) tagging, and export-oriented niche commodities such as Assam tea, Lakadong turmeric, and Naga chillies. Yet, certification costs, compliance with quality standards, limited financial literacy, and regulatory barriers often prevent

smallholders from fully participating in higher-value markets (Dev and Sharma, 2010).

Infrastructure and regional connectivity initiatives are expected to reduce transaction costs and expand market integration. However, systematic quantitative evaluation of the income effects of such investments remains understudied. Similarly, trade potential with neighbouring countries is frequently discussed in policy dialogue and discourse but inadequately examined through rigorous economic analysis.

Key gaps

Given the above background, several analytical gaps persist. First, there is limited micro-level causal evidence linking improved connectivity and market access to income enhancement. Second, the economic implications of customary land institutions for credit access and long-term capital formation require deeper empirical investigation. Third, the long-term sustainability of prevailing community land tenure systems, access to land resources and their effects on crop productivity. Fourth, examination of FPO performance and factors therein in the North-East context remains insufficient. Fifth, cross-border trade, border haats, and regional integration have not been comprehensively analysed from an agricultural economics perspective. Sixth, the distributional consequences of the commercialisation of agriculture—particularly across different tribal communities, women farmers, and marginal producers—remain underexplored. Seventh, comparative research across the North-East states to identify divergent institutional and policy pathways is limited. Eighth, lack of rigorous empirical studies on the economics of organic farming, including infrastructural, technological, and marketing constraints, and lessons from Sikkim's experience for other north-eastern states/regions.

Indicative areas for paper submission:

- 1. Market integration, transaction costs, and price realisation:** Empirical analyses examining marketing channels, farm-to-market price spreads, logistics constraints, and price transmission mechanisms across commodities. Studies may evaluate how improved connectivity and aggregation affect income and producer margins.
- 2. Customary land tenure and institutional arrangements:** Research assessing how community-based land governance influences investment incentives, access to institutional credit, land markets, including land lease markets, and productivity outcomes. Papers may compare states within the N-E region with varying tenure systems.
- 3. Collective action, FPOs, and cooperatives:** Evaluations of producer organisations in terms of governance quality, scale efficiencies, market

linkages, financial sustainability, impact on member producers, and inclusiveness. Studies may explore success factors and institutional bottlenecks.

4. **Infrastructure, logistics, and connectivity impacts:** Analyses of rural roads, cold chains, storage facilities, digital platforms, and regional corridors in reducing transaction costs and enhancing market integration/participation.
5. **Niche commodities, branding, and value addition:** Studies on GI tagging, organic certification, export promotion, natural farming, and enterprise development in horticulture, spices, plantation crops, bamboo, and allied sectors.
6. **Cross-border trade and regional integration:** Research examining border haats, informal trade flows, export competitiveness, and policy frameworks governing agricultural trade with neighbouring countries.
7. **Sustainability and ecological trade-offs:** Papers can analyse the interaction between commercialisation, biodiversity conservation, shifting cultivation, transition to settled cultivation and long-term resource governance.
8. **Inclusion and distributional dimensions:** Studies can focus on gender, tribal communities, youth, and marginal producers, assessing who benefits and who may be excluded in evolving market systems.
9. **Comparative inter-state analyses:** Research studies comparing development trajectories across North-East states to identify institutional innovations and policy lessons.
10. **Ongoing process of commercialisation and crop diversification:** The paper writers may document the ongoing process of agricultural commercialisation, including diversification into high-value crops, the export potential of these crops, institutional constraints, and their effects on farmers' income, food security, and ecological sustainability.
11. **Comparative studies of agricultural development in different North-Eastern states:** The paper writers may examine the comparative experience of agricultural development across these states in terms of changes in cropping patterns, production and productivity of different crops, sources of agricultural growth, use of inputs, and so on.
12. **Policy design and institutional innovation:** Conceptual and empirical papers proposing frameworks to strengthen sustainable, inclusive, and market-oriented agricultural development tailored to the North-East region.

REFERENCES

- Baruah, S. (2003). Citizens and denizens: Ethnicity, homelands, and the crisis of displacement in Northeast India. *Journal of Refugee Studies*, 16(1), 44–66.
- Birthal, P. S., Roy, D., & Negi, D. S. (2015). Assessing the impact of crop diversification on farm poverty in India. *World Development*, 72, 70–92.
- Singh, R., Babu, S., Avasthe, R.K., Das, A., Prahara, C.S., Layek, J., Kumar, A., Rathore, S.S., Kancheti, M., Kumar, S., Yadav, S.K., & Pasthe, V. (2021). Organic farming in North-East India: Status and strategies. *Indian Journal of Agronomy*, 66, S163-S179.
- Dev, S. M., & Sharma, A. N. (2010). Food security in India: Performance, challenges and policies. Oxfam India Working Paper.
- North Eastern Council. (2008). *North Eastern Region Vision 2020* (Vol. I–IV). Ministry of Development of North Eastern Region, Government of India.
- Trebbin, A., & Hassler, M. (2012). Farmers' producer companies in India: A new concept for collective action? *Environment and Planning A*, 44(2), 411–427.
