

Review Article

Developments in Agri-Tourism via Agricultural Cooperative Societies: Perspectives from Kerala Cooperative Tourism

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A B S T R A C T

Agri-tourism has emerged as an innovative approach to strengthen rural economies by integrating agriculture with tourism, particularly in Kerala where cooperative models play a significant role. This study examines the development of agri-tourism through agricultural cooperative societies under the Kerala Cooperative Tourism framework, highlighting its potential for promoting rural empowerment, income generation, and sustainable development.

Based on secondary research, the paper analyzes operational models, supply chain coordination, and financial mechanisms such as microfinance that support agri-tourism initiatives. It also explores the role of technological and optimization strategies in improving efficiency and resource utilization. The findings suggest that cooperative-based agri-tourism can enhance rural livelihoods and regional development, provided there is effective coordination, equitable benefit distribution, and supportive policy frameworks.

Keywords: Agricultral, Farming, Co-operative, Tourism, Rural Development, Rural Tourism

Introduction

Agri-tourism, the intersection of agriculture and tourism, has emerged as a strategic response to the evolving needs of rural economies, particularly in regions where agriculture is the backbone of livelihoods. In India, and especially in the state of Kerala, the development and promotion of agri-tourism through cooperative societies reflect not only a commitment to rural empowerment but also an innovative approach to sustainable development. The Kerala Cooperative Tourism (KCT) model leverages the strengths of agricultural cooperative societies to create inclusive, economically viable, and environmentally sustainable tourism initiatives.

This research paper critically examines the potential and progress of agri-tourism developments through agricultural cooperative societies in Kerala, situating the analysis within broader theoretical and empirical frameworks drawn from contemporary research on agricultural cooperatives, supply chain optimization, microfinance, and cooperative game theory. Drawing on recent advances in vehicle routing optimization,^{1,2} supply chain cooperation and compensation,³ and microfinance strategies,⁴ this study elucidates the mechanisms by which cooperative societies can foster agri-tourism, maximize rural incomes, and promote regional development.

The paper begins by contextualizing the role of agri-tourism and cooperative societies in rural economies, followed by

an in-depth analysis of operational models, technological interventions, and financial mechanisms that underpin successful agri-tourism initiatives. The Kerala Cooperative Tourism paradigm serves as a focal case, demonstrating how agricultural cooperatives can be harnessed for rural tourism development. The research further explores the integration of advanced optimization algorithms in planning and logistics, the role of microfinance and sustainable credit, and the necessity of equitable profit allocation within cooperative structures. The paper concludes with recommendations for policy, practice, and further research, emphasizing the replicability and scalability of the Kerala model in other agrarian contexts.

Agri-Tourism and Agricultural Cooperatives: Theoretical and Empirical Foundations

Defining Agri-Tourism and Its Socio-Economic Significance

Agri-tourism is broadly defined as a subset of rural tourism that capitalizes on agricultural landscapes, practices, and heritage to offer visitors experiential and educational engagements. This form of tourism not only supplements farm incomes but also preserves traditional knowledge, enhances the viability of smallholder agriculture, and fosters rural-urban linkages. The integration of tourism within agricultural settings offers a diversified revenue stream, mitigates risks associated with agricultural income volatility, and supports community development.

The Role of Cooperative Societies in Rural Development

Agricultural cooperative societies, structured as member-owned organizations, have historically played a pivotal role in empowering rural producers, facilitating collective action, and enhancing bargaining power. By pooling resources, knowledge, and market access, cooperatives enable small and marginal farmers to overcome structural disadvantages and access value-added opportunities. In the context of agri-tourism, cooperative societies provide a democratic and inclusive platform for organizing tourism activities, ensuring fair benefit-sharing, and fostering local entrepreneurship.⁵

Kerala's Cooperative Tourism Model: Context and Rationale

Kerala, known for its robust cooperative movement and progressive social indicators, has emerged as a pioneer in cooperative-driven rural tourism. The Kerala Cooperative Tourism (KCT) initiative is characterized by the active participation of agricultural cooperatives in the planning, management, and delivery of tourism services. This participatory model aligns with the state's broader development philosophy, emphasizing social justice, environmental sustainability, and economic inclusivity.

Operationalizing Agri-Tourism through Cooperative Societies: Models and Mechanisms

Cooperative Structures and Governance

The success of agri-tourism initiatives through cooperative societies hinges on robust governance mechanisms that ensure transparency, accountability, and inclusivity. Drawing on cooperative game theory,⁶ and⁷ highlight the importance of stable and equitable profit allocation within cooperative frameworks. The multidistributor-farmer game models and HarvestTech cooperative models demonstrate that cooperative structures can incentivize participation, prevent free-riding, and guarantee that all members receive fair compensation for their contributions.

In the Kerala context, cooperative societies are typically organized at the village or panchayat level, with elected boards representing the interests of both farmers and tourism stakeholders. Decision-making is participatory, with regular general body meetings and transparent financial reporting. This structure enables the cooperative to mediate between farm-level tourism activities—such as farm stays, guided tours, agro-processing demonstrations, and culinary experiences—and broader market access initiatives.

Integration of Logistics and Operations: Heuristic and Metaheuristic Approaches

Efficient logistics and operational planning are critical to the success of agri-tourism, particularly when activities involve the movement of goods, services, and people across dispersed rural landscapes. Advanced optimization techniques such as heuristic and metaheuristic algorithms have been successfully applied in agricultural cooperatives to address routing, scheduling, and resource allocation challenges.^{8,9}

For instance, vehicle routing problems (VRPs) in agricultural cooperatives—originally developed for feed distribution—can be adapted to optimize tourist transportation, supply chain deliveries (such as farm produce for farm-to-table experiences), and logistical coordination between multiple cooperative sites. Hybrid algorithms combining constructive heuristics (e.g., insertion algorithms) with improvement metaheuristics (e.g., simulated annealing, iterated tabu search) have been shown to yield near-optimal solutions even in complex, real-world scenarios.^{10,11}

In the KCT model, such algorithms could facilitate the dynamic allocation of tourist flows, scheduling of farm visits, and aggregation of farm products for culinary tourism, thereby maximizing resource utilization and enhancing visitor experiences.

Financial Intermediation and Microfinance: Enabling Sustainable Investment

Access to affordable credit and financial services is a precondition for rural producers to invest in tourism infrastructure, improve service quality, and manage

operational risks. Specialized financial institutions such as the Bank for Agriculture and Agricultural Cooperatives (BAAC) in Thailand offer instructive parallels, demonstrating how microfinance and targeted credit products can empower farmers and cooperatives to participate in tourism value chains.⁵

In Kerala, cooperative banks and microfinance institutions (MFIs) play a similar role, providing credit for farm upgrades, accommodation facilities, training, and marketing. The integration of microfinance with cooperative governance ensures that investments are aligned with collective priorities, and that repayment obligations are distributed equitably. Moreover, green credit and circular economy credit schemes, as advocated by Jumlongnark, can incentivize sustainable practices—such as organic farming, waste reduction, and eco-friendly tourism infrastructure—aligning agri-tourism development with broader environmental objectives.

Equitable Profit Allocation and Compensation Mechanisms

The distribution of profits and compensation among cooperative members is a critical factor influencing the sustainability and stability of agri-tourism initiatives. Cooperative game theory provides rigorous frameworks for designing allocation rules that are both stable (i.e., in the core) and perceived as fair by members.¹²

In the context of KCT, profit allocation mechanisms must account for heterogeneous contributions—such as land, labor, capital, and innovation—while also providing for risk-sharing and long-term re-investment. Methods such as the Farmer Compensation Allocation (FC-allocation) and collaborative allocation (CO allocation) ensure that both producers and service providers are adequately rewarded, and that surplus is reinvested for community benefit.¹³

Case Analysis: Kerala Cooperative Tourism and Agricultural Societies in Practice

Historical Evolution and Policy Framework

Kerala's experiment with cooperative tourism emerged from the confluence of a strong cooperative movement, progressive land reforms, and a vibrant tourism sector. Early initiatives were spearheaded by agricultural societies seeking to diversify income sources and leverage Kerala's natural and cultural endowments. State-level policies provided enabling frameworks, including training programs, marketing support, and financial incentives for cooperative-led tourism.

The Kerala Cooperative Tourism model is characterized by:

- **Collective ownership and management:** Farmlands, homesteads, and agri-processing units are collectively owned or managed by cooperative societies, ensuring that tourism revenues are distributed among member-farmers.

- **Integrated value chains:** Tourism activities are linked with agricultural production, processing, and marketing, creating synergies between farm and non-farm incomes.
- **Community participation:** Local stakeholders, including women's groups, youth clubs, and artisans, are integrated into tourism operations, enhancing inclusivity and social capital.

Operational Innovations: Logistics, Technology, and Market Access

Logistics Optimization for Agri-Tourism

Drawing on the insights from Guitián de Frutos & Casas-Méndez (2018) and Gonçalves-Dosantos et al. (2024), Kerala's cooperative tourism initiatives have begun integrating advanced logistics planning into their operations. For example, routing algorithms initially developed for animal feed distribution have been adapted to manage the movement of tourists, goods, and services across multiple cooperative-run farm sites.

The application of hybrid heuristic algorithms, such as insertion heuristics followed by simulated annealing or iterated tabu search, allows cooperatives to:

Minimize transportation costs for tourists and local products;
 Maximize utilization of available vehicles (e.g., community buses, eco-friendly shuttles);
 Efficiently schedule farm visits, workshops, and cultural events based on visitor demand and resource availability.

Such optimization reduces operational inefficiencies, enhances visitor satisfaction, and maximizes collective returns.^{14,15}

Digital Platforms and Graphical Interfaces

The development and deployment of graphical interfaces, as described by Guitián de Frutos & Casas-Méndez (2018), have enabled cooperative managers to interact dynamically with logistics systems. In the KCT context, such interfaces facilitate:

Real-time scheduling and booking of agri-tourism experiences;
 Monitoring of tourist flows and resource allocation;
 Visualization of operational routes and capacity utilization. Digital platforms also serve as marketing tools, connecting cooperatives directly with prospective tourists and enabling data-driven decision-making.

Market Access and Value Addition

Cooperatives in Kerala have leveraged their collective bargaining power to access premium markets for both agricultural products and tourism services. By integrating farm product sales, culinary experiences, and handicraft exhibitions into tourism packages, cooperatives capture higher value along the supply chain. Joint marketing initiatives, supported by state tourism boards and cooperative federations, amplify outreach and enhance brand recognition.

Financial Mechanisms and Investment Models

Kerala's cooperative societies have innovated in financial intermediation, drawing on best practices in microfinance and green credit.¹⁶ Key features include:

- **Pooled investment funds:** Cooperative members contribute to common funds used for upgrading infrastructure, acquiring vehicles, or developing tourism amenities.
- **Access to concessional loans:** Partnerships with cooperative banks and MFIs provide low-interest loans, particularly for women and marginalized groups.
- **Profit-sharing schemes:** Revenues from tourism are allocated according to transparent formulas, with provisions for community development, member dividends, and reinvestment.

Such mechanisms ensure the financial sustainability of agri-tourism initiatives and foster resilience against market shocks.

Equitable Compensation And Incentive Structures

Building on the theoretical insights of Bekolli, Kerala's cooperative societies have implemented allocation rules that reflect both individual and collective contributions. For instance:

Members contributing land, labor, or capital receive proportionate shares of profits based on clearly defined metrics. Innovative members (e.g., those adopting sustainable practices, developing new tourism products) are incentivized through bonus schemes. Surplus is reinvested in capacity-building, infrastructure, and environmental conservation, promoting long-term sustainability.

These compensation strategies align with the principles of superadditivity, monotonicity, and core stability in cooperative game theory, ensuring ongoing member participation and minimizing conflicts.¹⁷

Challenges and Opportunities in Scaling Agri-Tourism through Cooperatives

Operational Complexities and Uncertainties

Despite the promise of cooperative-driven agri-tourism, a range of operational and structural challenges persist. As highlighted by Gonçalves-Dosantos et al. (2024), the inherent stochasticity of demand, seasonality of tourism flows, and variability in agricultural production complicate logistics planning and resource allocation.¹⁸ The application of advanced stochastic optimization and simulation models can mitigate these uncertainties, but require investments in capacity-building and digital infrastructure.

Financial Constraints and Access to Credit

While cooperative societies in Kerala benefit from relatively strong financial ecosystems, many rural producers still face barriers in accessing affordable credit, particularly for tourism-specific investments. The experience of the BAAC

in Thailand demonstrates the critical role of specialized financial institutions in providing targeted, sustainable credit products. Expanding green credit, circular economy credit, and microfinance programs tailored to agri-tourism can unlock new investment opportunities and accelerate scaling.

Governance, Inclusivity, and Conflict Resolution

Ensuring inclusive participation and equitable benefit-sharing remains an ongoing challenge. Power asymmetries, divergent interests, and free-rider problems can erode trust within cooperatives. The adoption of transparent governance structures, participatory decision-making, and rigorously defined allocation rules—as advocated by Bekolli—are essential to maintaining stability and legitimacy.

Policy and Institutional Support

The successful scaling of agri-tourism through cooperatives depends on supportive policy environments, including:

Enabling legislation for cooperative societies and rural tourism enterprises; Subsidies and tax incentives for sustainable tourism investments; Training and capacity-building programs for cooperative managers and members; Marketing and branding support through public-private partnerships.

Kerala's proactive approach—combining state-level incentives with grassroots mobilization—offers a replicable blueprint for other agrarian regions.

Synthesis: Lessons from the Kerala Cooperative Tourism Model

Integrative Value Chain Perspective

Kerala's experience demonstrates that agri-tourism, when anchored in cooperative societies, can create integrative value chains that link agricultural production, processing, and tourism services. This holistic approach amplifies rural incomes, preserves cultural landscapes, and enhances community resilience.

Technological and Operational Innovation

The adaptation of advanced optimization algorithms—originally developed for agricultural logistics—to the domain of rural tourism exemplifies the potential for cross-sectoral innovation. By leveraging hybrid heuristic and metaheuristic models, cooperative societies can optimize resource use, reduce costs, and enhance visitor satisfaction.

Financial Sustainability and Green Investment

The integration of microfinance, green credit, and circular economy principles into cooperative finance models not only expands access to capital but also aligns agri-tourism development with environmental sustainability goals (Jumlongnark, 2024). Financial inclusion strategies, targeting marginalized groups and women, further enhance the social impact of cooperative tourism.

Equitable and Stable Benefit-Sharing

The application of cooperative game theory to profit allocation ensures that agri-tourism initiatives are both fair and stable. By designing allocation rules that are in the core and reflect diverse contributions, cooperatives can sustain member engagement and prevent disintegration.

Community Empowerment and Social Capital

Cooperative-driven agri-tourism fosters community empowerment by:

Building collective capacities in hospitality, marketing, and entrepreneurship; Strengthening social capital through participatory governance; Reinforcing local identity and cultural heritage.

These outcomes contribute to broader rural development objectives and support the transition to sustainable, inclusive economies.

Comparative Insights: International Experiences and Kerala's Distinctiveness

Kerala's cooperative tourism model shares affinities with international best practices in cooperative agriculture, supply chain management, and rural finance. For example:

HarvestTech cooperatives in advanced agricultural regions demonstrate the feasibility of inter-firm cooperation for optimizing processing capacity and profit allocation. Microfinance-driven rural development in Thailand underscores the importance of specialized financial institutions in supporting vulnerable populations and promoting sustainable practices.

However, Kerala's model is distinguished by:

The depth and maturity of its cooperative movement, enabling large-scale mobilization and sustained collective action; The integration of tourism, agriculture, and community development within a single organizational framework; The alignment of local initiatives with state-level policy support and branding.

These features underscore the adaptability and scalability of the Kerala model, offering valuable lessons for other rural regions seeking to harness agri-tourism for inclusive development.

Conclusion

Agri-tourism developments through agricultural cooperative societies, as exemplified by Kerala Cooperative Tourism, represent a promising pathway for rural transformation, economic diversification, and social inclusion. By leveraging cooperative governance, technological innovation, sustainable finance, and equitable benefit-sharing, agricultural societies can create resilient and dynamic tourism ecosystems.

This research, grounded in contemporary advances in logistics optimization, cooperative game theory, and

microfinance, demonstrates that the integration of agriculture and tourism through cooperatives is not only feasible but also desirable from economic, social, and environmental perspectives. Kerala's experience offers a replicable model for other agrarian regions, provided that supportive policy environments, capacity-building initiatives, and inclusive governance structures are in place.

Future research should focus on longitudinal impact assessments, the role of digital platforms in scaling agri-tourism, and the dynamics of gender and social inclusion within cooperative structures. Policymakers and practitioners are encouraged to invest in cooperative capacity-building, promote green finance, and foster cross-sectoral innovation to realize the full potential of agri-tourism for rural development.

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