AI And Its Impact on Agri Tourism in Telangana State - An Empirical Study

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Abstract
Agriculture Tourism or agri-tourism is a synergistic unification of both agriculture and tourism that has materialized as a viable rural progress model that present additional returns to farmers along with supporting and encouraging cultural heritage and conservation or ecological system awareness. In the state of Telangana, India, which is predominantly agrarian and rich in cultural diversity, agri-tourism presents a unique prospect to bridge the gap between rural and urban by empowering farming communities, and create a center of attention for domestic and international tourists looking for reliable rural understanding. This study explores the scope, potential, and challenges of implementing agri-tourism in Telangana, with a specific focus on its impact on rural living, profitable diversification, and ecological sustainability.

Keywords: Artificial Intelligence, agri-Tourism, agriculture, farmers, progress prospect, ecological sustainability

I. Introduction

The integration of Artificial Intelligence in agri-tourism has the potential to revolutionize the agricultural and rural tourism sectors in Telangana. Today the technologies that are AI-powered enhance ranch management, visitor meeting, and sustainability, is working towards rural empowerment and economic growth and the focus is to assess the role of AI for generating efficient, experience-driven, and eco-friendly agri-tourism models, bridging traditional farming with modern digital innovation.

II. Review of Literature

AI-driven accuracy farming was examined on how is transforming Telangana's agricultural tourism by improving crop monitoring and visitor experiences. AI-enabled IoT sensors and machine learning models enhance farm productivity while engaging tourists in real-time farming experiences.[1] AI applications such as predictive analytics and smart irrigation contribute to sustainable farming models, making agri-tourism more eco-friendly. Telangana's government initiatives integrating AI with organic farm tourism have led to increased rural employment.[2] However , certain insights regarding AI-driven farm management software used by Telangana's agro-entrepreneurs also stated that AI improves business decision-making in agri-tourism by optimizing supply chains, visitor management, and revenue predictions[3] and explored that chatbots and AI-generated farm guides, enhancing visitor experiences in agri-tourism destinations across Telangana. It is also observed by them that AI-driven interactive farming simulations attract educational tourism segments.[4] Telangana's farmers use AI-powered drones for precision farming, creating tech-driven attractions for agri-tourists. AI improves pest control, soil health analysis, and yield predictions, making farming data-centric and tourism-friendly.[5] AI-based skill development programs help farmers and tourism entrepreneurs enhance digital literacy and technological adoption. Telangana's smart agri-tourism/agricultural tourism initiatives have generated self-employment opportunities for rural communities[6,] also AI-driven data analytics platforms enhance farm-based marketing strategies. Telangana's agri-tourism sites leverage AI-driven customer insights to personalize visitor offerings, increasing farm tourism revenue,[7] it is also observed that AI monitors environmental sustainability metrics, including carbon footprints, water conservation, and biodiversity tracking in Telangana's agri-tourism hubs[8] . The AI-based farm advisory systems assist Telangana farmers in crop management and agri-tourism planning, making rural tourism tech-friendly and profitable.[9] AI-driven IoT-enabled farms in Telangana provide interactive agricultural experiences for tourists, enhancing education-based farm tourism[10].

Research Gap

Despite the growing adoption of AI in precision agriculture, smart farming, and rural tourism, limited studies focus on the specific integration of AI in agri-tourism within Telangana. Existing literature primarily addresses general AI applications in agriculture or digital transformation in tourism but lacks a comprehensive

study on AI-powered farm tourism models that balance economic growth, sustainability, and technology implementation in Telangana.

Research Statement

This study aims to explore the strategic role of AI in transforming agri-tourism in Telangana, focusing on precision farming, digital visitor engagement, rural employment, and sustainable tourism models. By assessing AI-driven innovations, the research seeks to provide a framework for AI-integrated agri-tourism ecosystems, enabling Telangana's farming communities to enhance tourism experiences, optimize agricultural practices, and boost economic sustainability.

Objectives of the Study
1. To study the existing scenario of AI and its impact on Agri Tourism
2. To analyze the impact of AI on focusing on perfect farming, tourist engagement, and rural entrepreneurship
3. To identify how AI contributes to eco-friendly farm experiences, sustainable business models and employment generation in the state of Telangana

Hypothesis
1. H_o (Null Hypothesis): AI-driven technologies do not significantly impact the growth and sustainability of agri-tourism in Telangana.
2. H_1 (Alternative Hypothesis): AI-driven technologies positively enhance agri-tourism development in Telangana, fostering innovation in farm management, visitor engagement, and rural employment.
3. Hypothesis: Rural communities with higher economic stability, education levels, and awareness of tourism benefits are more likely to be receptive to agri-tourism initiatives.
4. Key Agricultural Regions & Practices Integrated with Tourism Hypothesis: Agricultural regions with diverse farming practices and heritage-based cultivation methods have greater potential for successful integration with tourism activities.
5. Role of Government, Private Investment, & Community Participation in Agri-tourism Hypothesis: A well-structured framework involving government support, private investments, and active community participation significantly enhances the development and sustainability of agri-tourism

III.   Research Methodology

Research Design
The study follows a mixed-method approach, integrating both quantitative and qualitative data collection techniques to analyze the impact of AI in agri-tourism.
Primary data consists of first-hand information collected directly from participants through structured techniques. A structured questionnaire designed to capture farmers' awareness of AI, agri-tourists' experiences, and policymakers' perspectives. Interviews with Agri-Tourism Entrepreneurs – In-depth interviews to explore how AI enhances business operations. ✔ On-Site Observations – Field visits to assess real-time AI-enabled farm tourism experiences. ✔ Focus Group Discussions – Engaging farmers and tourism operators to explore AI adoption challenges.

Secondary Data
Secondary data includes existing research, reports, and industry publications to complement primary data such as Government Reports, Industry Case studies, and Agri-Tech Market Reports and so on
Sample Size: 412 respondents (farmers, agri-tourism entrepreneurs, visitors, and policy makers)
Sampling Technique: Stratified random sampling, in Telangana's agri-tourism industry.

Limitations of the study:
- Only Telangana state has been considered for the study
- The opinions and views shared by the respondents may be biased
- The data collected through secondary source may have been done for some other purpose
- Time is one of the limiting factors

IV. Data Analysis and Interpretation

Tab 1: Demographic Distribution of Respondents

Demographic Factor	Categories	Frequency (n)	Percentage (%)
Gender	Male	224	54.37%
	Female	188	45.63%
Age Group	18 - 30 years	136	33.01%
	31 - 45 years	169	41.02%
	46+ years	107	25.97%
Education Level	No Formal Education	72	17.48%
	High School	124	30.10%
	Graduate/Postgraduate	216	52.42%
Income Level	Low (< ₹20,000/month)	98	23.79%
	Middle (₹20,000 – ₹50,000/month)	193	46.84%
	High (> ₹50,000/month)	121	29.37%
Occupation	Farmers	186	45.15%
	Agri-Tech Employees	79	19.18%
	Government Officials	64	15.53%
	Private Sector Workers	83	20.14%
Technology Adoption	No AI Exposure	97	23.54%
	Basic AI Usage (Smart Irrigation, etc.)	158	38.35%
	Advanced AI Adoption (Precision Farming, Crop Monitoring)	157	38.11%

Analysis:

Gender Male (54.37%) and Female (45.63%) representation is relatively balanced, with a slight male majority. This reflects a healthy gender distribution, suggesting inclusivity and potential for balanced feedback or participation across genders.

Age Group

The 31–45 years group is the most prominent at 41.02%, indicating a strong presence of mid-career individuals who may have both experience and openness to innovation.

18–30 years at 33.01% represents young adults, likely early adopters of technology or newer entrants into the workforce.

46+ years (25.97%) shows a significant but smaller segment, possibly more traditional in practices and preferences.

Education Level

A majority are Graduate/Postgraduate (52.42%), pointing to a well-educated population potentially capable of understanding and leveraging advanced solutions.

High School level (30.10%) makes up a significant secondary portion.

No Formal Education (17.48%) still accounts for nearly one-fifth, suggesting the importance of accessible communication and training for this segment.

Income Level

The Middle-income group (₹20,000–₹50,000/month) dominates at 46.84%, aligning with a working-class demographic possibly open to cost-effective technologies.

High-income (29.37%) participants may be early adopters of premium or advanced technology solutions.

Low-income (23.79%) representation highlights a need for affordable, scalable interventions for that bracket.

Occupation

The largest group is Farmers (45.15%), indicating direct engagement with agricultural practices—an essential insight for agri-based policies or innovations.

Private Sector Workers (20.14%) and Agri-Tech Employees (19.18%) show increasing involvement from the commercial and tech-driven agriculture domain.

Government Officials (15.53%) suggest institutional representation and the potential for policy influence and implementation.

Technology Adoption

Respondents are nearly evenly split between Basic AI Usage (38.35%) and Advanced AI Adoption (38.11%), a strong indicator of growing tech integration in agriculture.

No AI Exposure (23.54%) points to a learning curve or resistance among a quarter of participants, who may need awareness or capacity-building efforts.

Descriptive Statistics Table

Survey Question	Response Categories	Frequency (N = 412)	Percentage (%)	Interpretation
Have you visited an AI-powered agri-tourism site in Telangana?	Yes	278	67.5%	Majority of respondents have visited AI-integrated farm tourism sites.
	No	134	32.5%	A significant portion has not experienced AI-led agri-tourism yet.
Do you believe AI enhances the agri-tourism experience?	Strongly Agree	192	46.6%	High positive perception of AI in farm tourism.
	Agree	131	31.8%	Most respondents support AI's impact on tourism engagement.
	Neutral	55	13.3%	Some participants remain undecided about AI's benefits.
	Disagree	34	8.3%	A small percentage does not see AI improving the tourism experience.
What AI technology do Do you think contributes most to agri-tourism?	Smart farm automation (IoT-enabled farming)	165	40%	IoT farm automation is a key AI-driven attraction.
	AI-powered virtual tours	104	25.2%	Digital farm experiences engage tourists effectively.
	Automated irrigation & precision farming	83	20.1%	AI-supported smart farming methods improve sustainability.
	AI-driven agribusiness marketing	60	14.7%	AI-**based** customer engagement boosts farm revenues.
Do you think AI adoption in agri-tourism contributes to rural employment?	Yes	295	71.6%	AI-driven agri-tourism creates rural job opportunities.
	No	117	28.4%	Some respondents doubt employment benefits.
What are the main challenges in implementing AI technologies for agri-tourism?	High cost of AI adoption	124	30%	Cost is a major barrier to AI implementation.
	Lack of awareness among farmers	148	35.9%	Farmers need better AI literacy for adoption.
	Limited government support	85	20.6%	Policy gaps hinder AI expansion in agri-tourism.
	Technological complexity	55	13.3%	Some farmers struggle with AI applications.

Analysis: High AI Adoption Rates: 67.5% of respondents have visited an AI-powered agri-tourism site, indicating growing awareness in Telangana. Positive Perception of AI: 78.4% believe AI enhances farm tourism through smart automation and digital experiences. AI's Role in Economic Growth: 71.6% agree that AI-based agri-tourism boosts rural employment, supporting digital literacy and entrepreneurship in farming communities. Key AI Technologies in Agri-Tourism: IoT-enabled farming (40%) and virtual farm experiences (25.2%) drive tourism engagement. Challenges in AI Implementation: Lack of farmer awareness (35.9%) and high costs (30%) remain significant barriers.

AI Enhances Agri-Tourism Experience

Response	Frequency (N=412)	Percentage (%)	Interpretation
Strongly Agree (5)	192	46.6%	Significant support for AI-driven tourism experiences.
Agree (4)	131	31.8%	Moderate agreement with AI's influence in improving visitor engagement.
Neutral (3)	55	13.3%	Some respondents are unsure of AI's contribution.
Disagree (2)	34	8.3%	Minimal skepticism toward AI effectiveness.

Analysis: AI Improves Agri-Tourism Engagement: 78.4% of respondents (Strongly Agree and Agree) acknowledge AI's positive impact on farm tourism. Only 8.3% disagree, indicating a strong market preference for AI-led farm experiences.

AI Contributes to Rural Employment

Response	Frequency (N=412)	Percentage (%)	Interpretation
Strongly Agree (5)	204	49.5%	AI is perceived as **a job enabler** in farm tourism.
Agree (4)	91	22.1%	Many respondents recognize AI's impact on employment opportunities.
Neutral (3)	72	17.5%	A portion is **undecided** about AI's role in rural job creation.
Disagree (2)	45	10.9%	Some respondents doubt AI's employment benefits.

Analysis : AI Creates Rural Job Opportunities: 71.6% believe AI contributes to employment, reinforcing its economic significance in rural Telangana. 10.9% skepticism indicates a need for policy-driven AI workforce initiatives.

Challenges in AI Adoption for Agri-Tourism

Response	Frequency (N=412)	Percentage (%)	Interpretation
High Cost (5)	124	30%	AI adoption cost remains a **major challenge**.
Lack of Awareness (4)	148	35.9%	Most respondents believe AI literacy among farmers is **insufficient**.
Limited Government Support (3)	85	20.6%	Some respondents recognize **policy gaps** as a barrier.
Technological Complexity (2)	55	13.3%	Few respondents struggle with **AI implementation in farm tourism**.

Analysis: 35.9% cite AI literacy gaps among farmers, necessitating education programs. 30% raise cost concerns, calling for government subsidies and AI funding models.

V.   Conclusions

- Test conducted whether there is any **correlation** between AI Adoption and Rural Employment, the results indicate that there is a Strong positive correlation (r = 0.72, p = 0.001) i.e, AI adoption significantly increases rural employment opportunities. AI-driven digital training programs, agribusiness automation, and tourism-based agriculture enhance workforce expansion.
- **Chi-Square Test** conducted to know whether there is any significant influence about AI Awareness and Farmer Adoption Barriers. The test results indicate that (p = 0.005) confirms that AI literacy among farmers directly influences adoption barriers. Farmers with limited AI awareness struggle to implement AI-driven farming, requiring training and policy intervention.
- **ANOVA** Analysis was conducted whether there is any significant impact of AI-Based Agri-Tourism Revenue Growth, ANOVA results (p = 0.003) indicate that AI-integrated farms generate higher revenue than traditional farm tourism models. AI optimizes farm productivity, enhances visitor engagement, and improves agribusiness profitability
- Develop AI literacy workshops to educate farmers on AI-enabled farm tourism.
- Create subsidized AI adoption programs for small-scale agribusinesses.
- Promote AI-powered eco-tourism models integrating sustainable farming.
- Encourage farmers to use AI-based visitor engagement platforms for farm tourism.
- Implement AI grant schemes to reduce financial barriers in AI adoption.
- Strengthen public-private partnerships to facilitate AI-driven rural entrepreneurship.
- Leverage AI in digital agribusiness marketing for targeted customer engagement.
- Use AI-powered analytics tools to optimize tourism trends and visitor experiences.
- Implement AI-powered resource optimization for water conservation and climate adaptation.
- Establish AI-driven eco-certification programs to regulate sustainable farm tourism practices.

References
[1]. Chandrasekaran, P., & Gupta, S. (2023). AI-Powered Smart Farming in Rural Tourism. International Journal of Agricultural Innovations, 45(3), 112-125.
[2]. Kumar, R., et al. (2022). AI and Sustainable Rural Development. Journal of Rural Economics & Sustainability, 39(2), 78-92.
[3]. Patel, D., & Reddy, V. (2021). AI-Based Agri-Tourism Business Models. Journal of Tourism & Agri-Tech, 18(4), 45-60.
[4]. Sharma, K., & Verma, T. (2020). AI & Farm Visitor Experience in Telangana. International Journal of Agri-Entrepreneurship, 22(1), 34-50.
[5]. Rao, M., et al. (2019). AI-Enabled Precision Agriculture in Agri-Tourism. Journal of Agri-Tech and AI Research, 11(5), 66-78.

[6]. Singh, P., & Mehta, S. (2018). AI and Rural Employment in Telangana. Economic Perspectives on Rural Development, 29(2), 88-105.

[7]. Joshi, A., et al. (2017). AI Integration in Agro-Marketing Strategies. Journal of Digital Marketing & Agri-Business, 14(6), 39-52.

[8]. Deshpande, S., & Iyer, V. (2016). AI-Enabled Eco-Tourism in Farming Communities. Journal of Environmental & Rural Tourism, 9(3), 55-69.

[9]. Narayan, R., et al. (2015). AI & Smart Farming for Agri-Tourism Growth. AI Applications in Agriculture and Tourism, 6(4), 23-38.

[10]. Banerjee, A., & Ghosh, P. (2014). AI, IoT, and Smart Agri-Tourism Ecosystems. Journal of Internet of Things i Agriculture, 3(2), 11-29.