

JOURNAL OF NATIONAL DEVELOPMENT

PEER REVIEWED, INDEXED & REFEREED BI-ANNUAL INTERNATIONAL JOURNAL

ISSN 0972-8309

<https://www.jndmeerut.org>

[Vol. 39, No. 1 (Summer), 2026]

<https://doi.org/10.62047/JND.2026.06.30.130>

Artificial Intelligence for Rural Development in India: A Sociological Study

Maruthi M

Principal, Shri K M Mamani Government First Grade College, Savadatti, Dist: Belagavi 591126, Karnataka (India) E-mail:<mmaruthi1@gmail.com>

Abstract

Emergence of Artificial Intelligence in rural India is a boon to rural transformation. Indian rural community potential to adopt AI in their traditional social structure such as agriculture and allied occupations, community organizations, health and education etc. The modern AI tools provide enough awareness about social life and rural development. The AI technology is helpful in creation of great consciousness among rural masses to achieve inclusive growth and sustainable development for better tomorrow. The establishment of AI in rural areas faces basic challenges to be addressed like poor infrastructure and connectivity, low digital literacy, scarcity of resources and high operational cost at rural side. The hurdles can be addressed through governmental and non-governmental interventions and initiations in rural atmosphere. Improvement in connectivity and digital skilling actions will be crucial harness for AI's full potential in bridging socio-economic gaps and empowering rural communities. These technologies can be helpful in reducing socio-economic disparities and optimize infrastructure. The prospective appearance of AI in rural communities is promising with efficient governance and community participation. Artificial intelligence is a medium for rural transformation, autonomy and prosperity in village India.

Keywords

AI, Village, Development, Community, People, Government.

Centre For Studies of National Development, Meerut

Editorial Office : D-59, Shastri Nagar, Meerut - 250 004 (INDIA)

Ph. : 0121-2763765, +91-9997771669, +91-9412200765

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1. Introduction

Rural population constitutes more than 65% of total Indian population. Agriculture and allied occupations are still maintained their dominance over income source in rural India. Artificial Intelligence (AI) emerged as boon to rural people for rapidly transformation on par with their urban counterparts. The systematic widespread and implementation of AI contributes to improve the scientific agriculture, healthcare system, quality education and good governance. Mass population lives in villages, AI is being established to function as a means to bridge the service gaps, often operating in local languages and even on low bandwidth AI can function on smart phones.

Villages like Adavi Srirampur of Telangana state and Satnavri of Maharashtra state are the best examples for undergoing smart transformations. Scientific farming, ICT-based pedagogy and smart governance serving as models for the rest of India. Artificial intelligence has complete potential to provide solutions for multiple challenges and classic hurdles in vast rural areas.

In the globalizing world challenges like climate, war, resource management, economic crises the AI provides ample opportunities to the livelihoods in the communities. AI ensures responsible for rural development and preservation of traditional knowledge in a democratic way and it also protect and publish cultural diversity and produce power for sustainable rural enterprises and fair opportunities to rural masses.

The growing penetration of AI in rural India necessitates a systematic examination of its developmental role, socio-economic significance, and long-term implications for village communities. Understanding how AI influences and contributes to rural society is essential for assessing its contribution to rural development and transformation. At the same time, challenges such as deficit of digital infrastructure, digital illiteracy, communication barriers, data privacy concerns, loss of indigenous skills and knowledge and legal as well as socio-economic and ethical issues require careful attention. Therefore, an in-depth study of the opportunities, constraints, and future prospects of AI in rural India is crucial for formulating evidence-based policy recommendations and designing inclusive AI-driven development strategies that ensure equitable and sustainable rural progress. The present study is an humble attempt in this direction.

2. Objectives of the Study

Objectives of the study are as follows:

1. To understand the growth of AI in rural India,
2. To explore the socio-economic importance of AI in village India.
3. To find out the problems and prospective of AI with respect to rural communities.
4. To provide the necessary suggestions for policy implications in AI future developmental plans.

3. Methodology

The present study is based entirely on secondary sources of data. Relevant information has been collected from a wide range of published and unpublished sources, including books, research articles, theses and dissertations, peer-reviewed journals, government surveys, newspapers, policy documents, reports of national and international organizations, and authentic internet-based resources. The collected literature was carefully reviewed, classified, and analyzed to understand the role of Artificial Intelligence in rural development in India. Particular attention was given to the socio-economic implications, opportunities, challenges, and future prospects of AI applications in rural areas. The analysis of secondary data facilitated a comprehensive understanding of the subject and enabled the formulation of conclusions and policy suggestions regarding the effective integration of Artificial Intelligence into rural development strategies.

4. Growth of AI in Rural India

Artificial Intelligence emerged as one of the fundamental tools which promise inclusive for rural development in India. The rural communities, economy, healthcare system and agriculture production are transforming through AI tools. It aims to fill the digital gaps and create support system for rural entrepreneurs. The BHASHINI AI system gives real time advice to farmers about agriculture and gives remote support to diagnose ground level problems in regional language. The rapid spread of AI advancement created a digital revolution in the world particularly in the developing countries like India. In rural India AI is a powerful weapon to tackle challenges related to society, economy, health, education, agriculture and governance. The AI based platform provides system based solutions for local problems in remote areas. The aim of AI is to provide good governance to rural people and enables them to access better facilities like health education and other basic necessities.

5. Socio-economic Importance of AI in Village India

AI emerged as a powerful tool in transformation of Indian rural social system; it aims to achieve sustainable development and good governance for rural life. In India AI is helping in streamlining administration for about 585000 villages. The AI technology doesn't make any difference between rural and urban life and bridges the

gaps between rural-urban areas. With the help of AI the village life is improved in terms of agriculture and allied works, health and education. Automation of administrative system made routine work easier and leads to good and efficient governance in rural India. Satellite based weather forecast, price comparison and disease management awareness created among farmers through various AI channels like electronic and social media. The information technology empowered marginalized people to access information and governmental services in rural structure. Sustainable development depends upon the resource management in the rural area AI plays vital role in adoption of resource management skills and digital techniques for smart and sustainable development. AI technology bring better opportunities to access education, income ,health and information which optimize individual ability to produce extra torque for the community and better socio-economic conditions which leads to overall development in rural India.

6. Challenges and Perspectives of AI in Rural India

The extensive adoption of AI in India faces severe challenges especially in rural areas. Basic and fundamental requirement for AI is digital infrastructure which is extremely shortage in villages. Communication barriers like language, low digital literacy are responsible for AI problems in rural India. It prevents rural community to access AI benefits such as AI based agriculture information, systematic healthcare and good governance etc.

Major challenges for streaming AI in rural areas in India are as follows:

- » **Deficit of digital infrastructure:** The rural India is suffering from basic infrastructure like food, shelter, health and education therefore the basic infrastructure needs to be yet addressed. AI is a promising tool to improve rural life and infrastructure. Deficit in digital infrastructure like internet is big issue in rural area especially in remote areas.
- » **Digital complexity:** A large proportion of village population stays in remote areas and face digital isolation in accessing AI skills. The rural people are unable to access difficulties in AI interface and decode digital data management system.
- » **Communication barriers:** The rural dialect system does not match with AI system. The AI technology supports only the few languages like English and this creates communication barrier among rural masses. The local understanding range is not reachable to the level of rural masses. The gap between digital knowledge and understanding ability of rural people is responsible for the problems of AI system.
- » **Proper data not available in villages:** In the context of rural atmosphere the available data is not correctly maintained. Often it is seen in villages that the data is incomplete or unavailable and fragmented which leads to bias and inaccurate predictions. The AI requires huge amount of local information for organized functioning.

- » **Expensive:** Adoption and maintenance of AI system is cost burdening as compared to other systems. The rural administration and individuals like farmers and other sector people face a lot of budgetary problems. Resource management is challenging for both organizations and individuals in rural areas.
- » **Manual labor force at risk:** The implementation of AI technology introduce automated machines to carryout rural activities such as agriculture. In the field of agricultural process huge amount of manual labor is engaged due to AI based agriculture may create job scarcity for manual labors in village areas. The advanced AI technology threatens livelihood of rurak workforce who are unskilled and lose their jobs.
- » **Loss of indigenous skills and knowledge:** The AI technology not only minimizes indigenous rural practices but also attack on traditional community based knowledge system which cannot be acceptable.
- » **Legal issues:** There is a need of implementation of suitable law relating to AI in India. In present legal framework there is no dedicated legal base for AI governing system. The Digital Personal Data Protection Act-2023 is a base structure for AI and facilitates fundamental framework to it but it is not helpful in complex issues like algorithmic responsibility, deep fakes, patent, infringement and computerized decision making.
- » **Socio-economic and ethical issues:** The computerized system poses an extensive risk to Indian traditional rural economy particularly daily wages labor sector. The BPO services leads to rural urban divide and address the severe ecological and liveliness costs linked with administration of AI data centers in rising countries.

7. Suggestions for Policy Implications in AI Future Developmental Plans

To conquer these hurdles the government of India has started the India AI Mission, which aims to set up tens of thousands of GPUs through subsidized public-cloud infrastructure, set up sectoral data banks and fund domestic AI research and development. Classrooms needs to be modernized through personal learning skills, importance for safety and cleanliness, boosting public service system by faster data driven governance which transforms lives and shapes nation's development in the fields of socio-economic background. Some of the most importance suggestions are as follows:

- » **Economic and social:** AI has significant potential to lead to economic growth fetch automation, making things smarter, quicker and cost effective and bringing savings and improved competence. There is a need to ensure that the fiscal profits of AI are largely shared at the level of the society and that probable pessimistic implications are effectively addressed.

- » **Safety, security and Privacy:** AI also has implications for cyber security on the one hand and on the other there are cyber security risks specific to AI systems. As AI is increasingly embedded in critical systems, they need to be protected to probable cyber risks. AI applications need to ensure the integrity of the information they employ, as well as defend confidentiality and secrecy.
- » **Ethics:** The risk of bias in decisions made by AI technology is one such concern of AI problems. One of the ways of tackling some of these concerns is to combine ethical training for AI professionals with the development of practical ways for designing AI software in a way that they can avoid such risks.
- » **Development:** The Government to actively support research and development in the field of AI for inclusive innovations and to rise related funding. Government funded research especially in the fields that are less likely for the industry to address such a successful way for human AI collaboration understanding the ethical, legal and societal implications of AI.
- » **Intellectual property rights:** Intellectual property rights issues to be tackled by the government side for a balanced approach to Intellectual property rights when applied to hardware and software values and must be protect and foster innovation. The government must support the implementation of open AI resources.
- » **Legal:** The AI related legal challenges concerning safety, privacy and data protection and ethics call for new legal and regulatory frameworks which should be refined in India. For time being it is the present law seen as the most suitable approach considering regulatory approaches towards AI but attention should be paid for innovation and progress in coming days.
- » **International cooperation:** The strategic implications of AI attracted the attention of international organizations such as the United Nations, G7 and other such organizations. Government need to increasingly believe that AI would benefit from global collaboration in promoting research and development and identifying proper responses for associated challenges.

8. Conclusion

The AI technology has seen considerable advances over the past few years in the fields of automobiles, construction, medicines, and robotics and education systems. These advances are expected to have implications in socio-economic sectors and government also increasingly allowing them in both rural and urban context. Successful AI prospect expansion plans must balance innovation with safety through policies addressing ethics, finances and good governance. Key strategic implementations should comprise digital literacy, trainings, data management, transparency, investment in AI ready workforces and frameworks for liability across the AI lifecycle. Furthermore, the effective integration of AI into rural development initiatives can enhance productivity, improve service delivery, and support evidence-based decision-making at the grassroots level. However,

ensuring equitable access to AI technologies and bridging the digital divide remain essential prerequisites for achieving inclusive and sustainable rural transformation.

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