



## Impact of AI on Rural Women in Indian Society: A Sociological Study

**Dr. Manju S. Sanadi**

Guest Lecturer, Dept. of Sociology, SMYK GFGC, Telsang, Karnataka, manjussanadi15@gmail.com

DOI : <https://doi.org/10.5281/zenodo.20057219>

### ARTICLE DETAILS

#### Research Paper

Accepted: 05-04-2026

Published: 18-04-2026

#### Keywords:

*AI, rural women, gender inequality, agricultural technology, sociological study, Karnataka, empowerment*

### ABSTRACT

Artificial Intelligence (AI) is rapidly reshaping socio-economic structures in India, yet its impact on rural women remains uneven and deeply stratified. This sociological study examines how AI-driven technologies ranging from agricultural advisory apps and microfinance algorithms to digital literacy platforms mediate opportunities and barriers for rural women across caste, class, and geographic lines. Using a mixed-methods approach in Karnataka, India (n=450), findings reveal that while AI enhances access to markets, healthcare, and education, it simultaneously reinforces existing patriarchal norms, digital divides, and algorithmic biases. Rural women face barriers including limited smartphone ownership, language exclusion in AI interfaces, and surveillance through digital credit scoring. The study concludes that without targeted gender-intentional AI policies, technological progress risks exacerbating rural gender inequalities. Recommendations include vernacular AI training, community-based digital hubs, and inclusive algorithm design informed by sociological insight.

### Introduction

India's rural landscape is undergoing a quiet revolution driven by artificial intelligence (AI). From AI-powered crop disease detectors to microfinance platforms using alternative credit scoring, technology promises to leapfrog traditional barriers to development. Yet, for rural women who constitute



nearly 65% of India's agricultural workforce but own less than 13% of land (Ministry of Agriculture, 2024) the promise of AI is complicated by deep-seated sociological realities.

Sociologically, AI is not a neutral tool; it is embedded in social structures that reflect and reproduce power dynamics. In rural India, where gender roles, caste hierarchies, and limited digital infrastructure intersect, AI's impact is neither uniformly empowering nor universally disabling. Instead, it acts as a multiplier: amplifying existing advantages for some while deepening marginalization for others. This study asks: How does AI reshape the social position of rural Indian women? Does it democratize access to resources, or does it entrench patriarchal control through new digital mechanisms?

Grounded in feminist sociology and technology studies, this research focuses on three domains: (1) economic empowerment through AI-driven agriculture and finance, (2) access to health and education via AI platforms, and (3) the reinforcement of gendered digital divides. The study is situated in Karnataka, a state with contrasting urban-rural digital penetration (72% urban vs. 38% rural; TRAI, 2025), offering a microcosm of India's broader challenges. By centering rural women's lived experiences, this article contributes to debates on inclusive technological development and the sociology of gender in the digital age.

## Review of Literature

Scholarship on AI and gender in the Global South is emergent but fragmented. Early works on ICT4D (Information and Communication Technologies for Development) highlighted women's exclusion from digital spaces due to literacy gaps and resource. With AI's rise, research has shifted toward algorithmic bias and data feminism. D'Ignazio and Klein (2020) argue that AI systems often fail to account for marginalized genders, embedding biases in training data and design.

In the Indian context, studies reveal stark gender disparities in digital access. A NITI Aayog (2023) report found that rural women are 30% less likely to own smartphones than men, and 50% less likely to use the internet daily. This "gender digital divide" is not merely infrastructural but sociocultural: women's mobile use is often restricted by family norms, and content is rarely in regional languages or culturally relevant formats (Ghosh, 2022).

AI in agriculture has been touted as transformative. Platforms like *Digital Green* and *Netafarma* use AI to deliver crop advice via video. Yet, sociological analyses show these tools often target male "head of household" users, sidelining women who perform 60–80% of farm labor (FAO, 2021). In microfinance, AI credit scoring algorithms use non-traditional data (e.g., mobile usage patterns) to assess



creditworthiness. While this has expanded access for some women, it also introduces surveillance and debt risks, particularly when algorithms misclassify vulnerability as risk (Roy, 2023).

Health and education AI shows promise but faces similar gaps. AI-powered telemedicine apps like *Practo Rural* and *Aarogya Setu* have improved access to maternal care, yet language barriers and low digital literacy limit uptake among older rural women (Patel et al., 2024). Similarly, AI tutoring apps for girls often assume smartphone access and privacy, ignoring shared device dynamics in joint households (UNICEF, 2023).

Feminist sociologists emphasize that technology must be analyzed within patriarchal structures. Bhavnani (2021) argues that “digital empowerment” rhetoric often obscures how AI reinforces male control over women’s labor and mobility. In Karnataka, studies note that women’s participation in AI-led cooperatives remains low due to caste-based exclusion and lack of leadership training (Kumar & Rao, 2024).

Gaps remain in localized, intersectional analyses. Most studies focus on urban or pan-India trends, neglecting how caste, religion, and region mediate AI’s impact on rural women. This study addresses that gap by centering Karnataka’s rural women, integrating quantitative access data with qualitative narratives of lived experience.

## Research Methodology

This study employs a convergent parallel mixed-methods design, integrating quantitative surveys with qualitative interviews to capture both breadth and depth of AI’s impact. The research was conducted in three districts of Karnataka: Bengaluru Rural (semi-urban), Tumakuru (agricultural), and Uttara Kannada (tribal/rural), selected for varying digital infrastructure and caste compositions.

A structured survey was administered to 450 rural women aged 18–55, stratified by caste (Scheduled Caste/Tribe: 40%, Other Backward Class: 35%, General: 25%), age, and education. Questions covered smartphone ownership, AI tool usage (agriculture, finance, health), perceived benefits/barriers, and experiences of bias. Data were collected via tablet-based ODK forms in Kannada and local dialects. Statistical analysis included chi-square tests for association and logistic regression to predict AI usage likelihood based on socioeconomic variables. In-depth semi-structured interviews were conducted with 40 women (12 per district), purposively sampled to include AI users, non-users, and community leaders. Interviews explored narratives of empowerment, exclusion, and gendered control. Additionally, 15 key informant interviews were held with NGO workers, tech developers, and panchayat



officials. All interviews were recorded (with consent), transcribed, and coded thematically using NVivo, guided by feminist sociology frameworks.

## Results and Findings

Only 38% of surveyed women owned smartphones, compared to 67% of men in the same households. AI tool usage was low: 22% used agricultural advisory apps, 18% used AI microfinance platforms, and 15% accessed AI health services. Logistic regression revealed that education (OR=2.4,  $p<0.01$ ) and caste (SC/ST women 45% less likely to use AI;  $p<0.05$ ) were significant predictors of AI adoption. Language emerged as a critical barrier: 71% of non-users cited “app not in Kannada or local dialect” as a reason. Surprisingly, 34% of AI users reported increased workload, as digital tasks were added to existing domestic burdens without redistribution.

**Table 1: AI Usage by Socioeconomic Category**

Category	Smartphone Ownership (%)	AI Agriculture Use (%)	AI Finance Use (%)
SC/ST	29	14	11
OBC	41	23	19
General	52	31	27
Primary Education	31	16	13
Secondary+	58	42	35

1. **Conditional Empowerment:** Women who accessed AI tools reported tangible benefits.g., Meera, a 34-year-old farmer in Tumakuru, used an AI app to detect leaf blight and increased maize yield by 20%. “The app told me exactly when to spray,” she said. Yet, her husband controlled the smartphone and decided how to spend the extra income. “My work increased, but my control didn’t,” she noted.
2. **Algorithmic Exclusion:** Many women faced bias in AI credit scoring. Lakshmi, a SC woman in Uttara Kannada, was denied a microloan despite consistent savings. “The app said my ‘digital footprint’ was too low,” she explained. She had shared a family phone, so her usage patterns appeared fragmented. Developers had not accounted for shared-device realities.
3. **Reinforced Patriarchy:** In 60% of households, men monitored women’s AI usage. “My husband checks my messages on the health app,” shared Priya, 29. Surveillance extended to location tracking



in agri-apps, which some women felt eroded privacy. Additionally, AI content often reinforced stereotypes: 45% of agricultural videos depicted men as primary farmers, marginalizing women's labor.

Caste and class intersected sharply. SC/ST women faced dual exclusion: limited access to devices and caste bias in community-led digital training. In one village, Dalit women were excluded from a government AI literacy program held in an upper-caste temple courtyard. Conversely, women from land-owning OBC families leveraged AI cooperatives to bypass middlemen, gaining economic autonomy. Health AI showed promise but gaps persisted. Maternal care apps were used by educated women, but older, illiterate women relied on ASHA workers' phone calls, bypassing AI entirely. "The app is for English-knowing ladies," said 52-year-old Savitri.

Overall, AI's impact was mediated by existing social structures: it empowered those with pre-existing resources while marginalizing the most vulnerable.

## Conclusion

AI holds transformative potential for rural Indian women, yet its sociological impact is deeply uneven. This study demonstrates that without deliberate intervention, AI risks becoming a new mechanism of exclusion, reinforcing patriarchal control, caste hierarchies, and the digital divide. While some women gain economic and informational advantages, many face increased surveillance, algorithmic bias, and augmented labor burdens. The findings challenge techno-optimistic narratives of "AI for all." Instead, they call for gender- and caste-intentional AI design: vernacular interfaces, community-owned digital hubs, and algorithms tested for shared-device contexts. Policymakers must mandate bias audits and include rural women in AI development, not just as users but as co-designers. For sociologists, this study underscores the need to analyze technology within power structures. AI does not operate in a vacuum; it reflects and reshapes the very inequalities it promises to dissolve. Future research should track longitudinal impacts of AI on women's decision-making power and community leadership. Until then, the promise of AI for rural Indian women remains conditional accessible to some, but out of reach for many.



## References

- Bhavnani, K. (2021). *Feminist technoscience and the politics of inclusion*. Cambridge University Press.
- D'Ignazio, C., & Klein, L. F. (2020). *Data feminism*. MIT Press.
- FAO. (2021). *The gender gap in agriculture: FAO's role in closing it*. Food and Agriculture Organization. <https://www.fao.org/3/cb4472en/cb4472en.pdf>
- Ghosh, J. (2022). Digital divides and gender in rural India. *Economic and Political Weekly*, 57(12), 34–42.
- Kumar, R., & Rao, P. (2024). Caste and digital inclusion in Karnataka's AI cooperatives. *Journal of Rural Studies*, 98, 112–124.
- Ministry of Agriculture. (2024). *Land ownership and gender in Indian agriculture*. Government of India. <https://agricoop.nic.in>
- NITI Aayog. (2023). *National strategy on artificial intelligence: Gender dimensions*. Government of India. <https://niti.gov.in>
- Patel, S., Reddy, K., & Joshi, M. (2024). AI telemedicine and maternal health in rural Karnataka. *Indian Journal of Medical Research*, 159(3), 287–295.
- Roy, A. (2023). Algorithmic credit scoring and rural women's debt. *Development and Change*, 54(4), 891–915.
- TRAI. (2025). *Telecom subscription data: Gender and rural-urban divide*. Telecom Regulatory Authority of India. <https://traai.gov.in>
- UNICEF. (2023). *Girls' digital education in rural India*. UNICEF India. <https://www.unicef.org/india>