ijamrsd.com
ISSN: 2583-6404
Journal of Advanced Multidisciplinary Research Studies and Development
Peer Reviewed Referred Journal
Bi-monthly
Open Access

ARTIFICIAL INTELLIGENCE AND DIGITAL FARMER APPS: TRANSFORMING INDIAN AGRICULTURE TOWARD SMART AND CLIMATE-RESILIENT FARMING

Geeta Patil
Department of Botany, Arts, Commerce and Science College, Bodwad, Dist. Jalgaon 425 310, M.S., India.
Email: geetadarange@gmail.com

Abstract
Indian agriculture is experiencing a technological transition through the integration of Artificial Intelligence (AI) and digital advisory platforms. AI-driven technologies, combined with mobile-based farmer applications, are supporting precision farming, crop monitoring, smart irrigation, yield prediction, and market intelligence. This paper reviews the conceptual foundations and applications of AI in Indian agriculture, with special emphasis on AI-enabled farmer apps that provide real-time advisory services, weather updates, pest alerts, and price forecasting. While these technologies enhance productivity, climate resilience, and income stability, challenges such as digital literacy, infrastructure gaps, and affordability persist. The study highlights the importance of inclusive policies and digital capacity building for sustainable AI adoption in Indian agriculture.
Keywords: Artificial Intelligence, Farmer Apps, Digital Agriculture, Precision Farming, Climate-Smart Agriculture, IoT, Sustainable Development.

► *Corresponding Author: Geeta Patil*

Introduction
Agriculture plays a vital role in India's socio-economic structure. However, small landholdings, unpredictable climate conditions, and market volatility limit productivity and profitability. Artificial Intelligence (AI) offers data-driven solutions to optimize agricultural practices. With increasing smartphone penetration in rural India, AI-powered farmer applications are becoming an important medium for delivering agricultural advisories and decision-support systems directly to farmers.

AI Technologies in Agriculture
Machine Learning and Predictive Analytics
Machine learning models analyze historical crop, soil, and weather data to forecast yield, pest outbreaks, and input requirements. These predictive insights support timely farm management decisions.
Computer Vision and Remote Sensing
AI-enabled image recognition systems identify crop diseases and nutrient deficiencies using smartphone images and drone-based surveillance.

IoT and Smart Irrigation

IoT-based soil moisture sensors automate irrigation scheduling, improving water-use efficiency and reducing resource wastage.

Agricultural Robotics

AI-driven automation supports precision spraying, harvesting, and weed control, reducing labor dependency.

AI-Based Farmer Applications in India

Mobile-based farmer applications represent one of the most practical implementations of AI in Indian agriculture. These apps integrate machine learning algorithms, satellite data, and localized weather forecasting to provide personalized advisories.

Some widely used platforms include:

Kisan Suvidha – Provides weather updates, market prices, and advisory services.

Plantix – Uses AI-based image recognition to diagnose crop diseases.

IFFCO Kisan – Offers expert advice, weather alerts, and Agri-input guidance.

AgriApp – Provides crop-specific advisory and nutrient management guidance.

These applications improve farmers' access to scientific knowledge, reduce dependency on intermediaries, and support data-driven decision-making. AI-enabled apps are particularly beneficial for small and marginal farmers who lack access to traditional extension services.

Opportunities and Challenges

Opportunities

- Real-time decision support
- Improved productivity and income
- Climate risk mitigation
- Enhanced market transparency

Challenges

- Digital divide in rural areas
- Limited smartphone literacy
- Data privacy and governance concerns
- Language and regional adaptability issues

Addressing these barriers requires government support, public–private partnerships, and farmer training initiatives.

Conclusion

Artificial Intelligence, combined with mobile-based farmer applications, is transforming Indian agriculture into a more data-driven and climate-resilient system. While AI-based apps provide accessible and cost-effective advisory services, their widespread adoption depends on digital infrastructure development, farmer awareness, and inclusive technological policies. Strategic implementation can significantly contribute to sustainable agricultural development and national food security.

References

1. Basso, B., & Antle, J. (2020). Digital agriculture to design sustainable agricultural systems. *Nature Sustainability, 3*(4), 254–256. https://doi.org/10.1038/s41893-020-0510-0

2. Chandra Vinod, V. (2023). Role of artificial intelligence in Indian agriculture: A review. *Agricultural Reviews, 44*(4), 558–562. https://doi.org/10.18805/ag.R-2296
3. Government of India. (2022). *National strategy for artificial intelligence: AI for all*. NITI Aayog.
4. Kamilaris, A., & Prenafeta-Boldú, F. X. (2018). Deep learning in agriculture: A survey. *Computers and Electronics in Agriculture, 147*, 70–90. https://doi.org/10.1016/j.compag.2018.02.016
5. Liakos, K. G., Busato, P., Moshou, D., Pearson, S., & Bochtis, D. (2018). Machine learning in agriculture: A review. *Sensors, 18*(8), 2674. https://doi.org/10.3390/s18082674
6. Madrewar, S. S., Khadkikar, N. R., Suryawanshi, O. V., Mulani, J. S., & Sagar, A. R. (2024). Digital agriculture: Impact of IoT and AI on Indian agribusiness. *International Journal of Applied Economics, Accounting and Management, 2*(4), 323–344. https://doi.org/10.59890/ijaeam.v2i4.2346
7. Mane, S., Badgire, S., Agarwal, P., & Kadam, R. (2024). Review on applications of artificial intelligence in Indian agriculture: Future and challenges. *Advanced Natural Sciences: Life and Health Sciences, 1*(1), 40–49.
8. Mukherjee, A., & Tyagi, A. K. (2023). A review of artificial intelligence applications and their impact on agricultural production and marketing in India. *Journal for ReAttach Therapy and Developmental Diversities, 6*(7s), 1364–1370.
9. Pokhariyal, S., Patel, N. R., & Govind, A. (2023). Machine learning-driven remote sensing applications for agriculture in India—A systematic review. *Agronomy, 13*(9), 2302. https://doi.org/10.3390/agronomy13092302
10. Singh, N. L., Vishwas, B. R., Singh, S., Bhati, J., Tripathi, S. K., Kumar, D., & Saini, P. K. (2024). Applications of artificial intelligence (AI) in the field of agriculture: A review. *Journal of Scientific Research and Reports, 30*(12), 612–620. https://doi.org/10.9734/jsrr/2024/v30i122705
11. Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M. J. (2017). Big data in smart farming: A review. *Agricultural Systems, 153*, 69–80. https://doi.org/10.1016/j.agsy.2017.01.023
12. Yadav, A., & Singh, R. (2025). ICT and AI platforms for farmers: A review. *Journal of Scientific Research and Reports, 31*(12), 1238–1246. https://doi.org/10.9734/jsrr/2025/v31i123858
13. Zhang, Y., Wang, S., & Ji, G. (2019). Artificial intelligence in agriculture: A review. *Computers and Electronics in Agriculture, 167*, 105–119. https://doi.org/10.1016/j.compag.2019.105119