Opportunities for Agripreneurship in AI Driven Environment for Sustainability

Dennis Edward Fernando

Assistant Professor of Commerce, St. Joseph's College (Autonomous), Tiruchirappalli, Tamil Nadu

Abstract

The farmers and agriculture labourers are found to be the most vulnerable sections in many parts of the global economy. Leaving out profit, the mere survival and sustainability are the biggest challenges they encounter in the daily lives. In order to cultivate the business scenario in the realm of agriculture; the term 'Agripreneurship' was coined. And now there is a requirement to further upgrade through the emerging and most vibrant 'Artificial Intelligence'. This article will be conceptual representations to cull out the opportunities for Agripreneurship in the environment that is operated by AI towards the attainment of sustainability.

Keywords: *Agripreneurship, Artificial Intelligence, Sustainability, Global Economy*

Introduction

Agripreneurship refers to the practice of entrepreneurship in the agricultural sector. It involves the application of innovative and entrepreneurial principles to agricultural production, processing, and marketing to yield profit through customised agriculture management.

The Primary Components of Agripreneurship

- *Innovative Approaches:* Agripreneurs introduce new ideas, products, or services that create value in the agricultural sector.
- *Risk-Taking Ability:* Agripreneurs take calculated risks to develop and market new products or services.
- *Entrepreneurial Attitude and Belief:* Agripreneurs demonstrate a passion for agriculture and a willingness to innovate and adapt to changing market conditions.
- *Business Skills:* Agripreneurs possess the skills and knowledge to manage a business, including finance, marketing, and operations.
- *Sustainability:* Agripreneurs prioritize sustainable agricultural practices that minimize environmental impact and promote social responsibility.

Types of Agripreneurship

- *Production-Oriented Agripreneurship:* Focuses on innovative production methods, such as precision agriculture or vertical farming.
- *Processing-Oriented Agripreneurship:* Focuses on value-added processing of agricultural products, such as food processing or biofuels.
- *Marketing-Oriented Agripreneurship:* Focuses on innovative marketing strategies, such as e-commerce platforms or farm-to-table initiatives.
- *Service-Oriented Agripreneurship:* Focuses on providing services, such as agricultural consulting, farm management, or equipment rental.

Benefits of Agripreneurship in India Economy

Agripreneurship plays a vital role in India's agricultural sector, contributing to the country's economic growth, food security, and rural development. Here are some key aspects of agripreneurship in India

- *Increased Income:* Agripreneurship can increase farmers' income through innovative production and marketing strategies.
- *Job Creation:* Agripreneurship can create employment opportunities in rural areas, reducing migration to urban centres.
- *Improved Food Security:* Agripreneurship can improve food security by increasing food production, improving food quality, and reducing food waste.
- *Environmental Sustainability:* Agripreneurship can promote sustainable agricultural practices, reducing environmental impact and promoting eco-friendly farming methods.

Challenges Faced by Agripreneurs in the Indian Sub-Continent

- *Limited Access to Finance:* Agripreneurs often face difficulties in accessing credit, hindering their ability to invest in their businesses.
- *Lack of Market Access:* Agripreneurs may struggle to access markets, making it difficult to sell their products at competitive prices.
- *Climate Change and Weather Risks:* Agripreneurs are vulnerable to climate change and weather-related risks, which can impact crop yields and quality.
- *Limited Technical Knowledge:* Agripreneurs may lack the technical knowledge and skills required to adopt new technologies and best practices.

Government Initiatives to Support Agripreneurship

- *Start-Up India:* The government's Start-Up India initiative aims to promote entrepreneurship, including agripreneurship.
- *National Innovation Foundation:* The National Innovation Foundation supports innovations in agriculture, including those developed by agripreneurs.
- *Agricultural Technology Management Agency (ATMA):* ATMA provides support to agripreneurs, including training, credit, and market access.
- *Rashtriya Krishi Vikas Yojana (RKVY):* RKVY is a government scheme that aims to improve agricultural productivity and promote agripreneurship.

Future Prospects

- *Increased Focus on Sustainable Agriculture:* Agripreneurship is expected to focus more on sustainable agriculture practices, reducing environmental impact and improving crop resilience.
- *Adoption of Digital Technologies:* Agripreneurship is likely to adopt digital technologies, such as precision agriculture, drones, and satellite imaging, to improve efficiency and productivity.
- *Growing Demand for Organic and Specialty Crops:* Agripreneurship is expected to cater to the growing demand for organic and specialty crops, both domestically and internationally.
- *Increased Emphasis on Value Chain Development:* Agripreneurship is likely to focus on developing the entire value chain, from production to marketing, to improve efficiency and profitability

Precision Farming

- *Crop Yield Prediction:* AI-powered predictive models can forecast crop yields, enabling farmers to make informed decisions.
- *Automated Crop Monitoring:* AI-powered drones and satellite imaging can monitor crop health, detect pests and diseases, and optimize irrigation.
- *Precision Irrigation:* AI-powered systems can optimize irrigation schedules, reducing water waste and improving crop yields.

Supply Chain Optimization

- *Predictive Logistics:* AI-powered predictive models can optimize logistics, reducing transportation costs and improving delivery times.
- *Automated Quality Control:* AI-powered systems can inspect produce quality, detecting defects and contaminants, and enabling real-time decision-making.
- *Dynamic Pricing:* AI-powered systems can analyze market trends, optimizing pricing strategies and improving revenue for farmers.

Market Access and Trade

- *Digital Marketplaces:* AI-powered digital marketplaces can connect farmers directly with buyers, improving market access and reducing transaction costs.
- *Predictive Market Analysis:* **AI**-powered predictive models can analyze market trends, enabling farmers to make informed decisions about pricing, production, and marketing.
- *Automated Trade Finance:* AI-powered systems can automate trade finance, reducing paperwork, and improving access to credit for farmers.

Extended Opportunities

- *AI-powered Advisory Services:* AI-powered advisory services can provide personalized advice to farmers on crop management, soil health, and pest control.
- *Farm Robotics:* AI-powered farm robots can automate tasks such as planting, pruning, and harvesting, improving efficiency and reducing labor costs.
- *Vertical Farming:* AI-powered vertical farming systems can optimize growing conditions, improving crop yields and reducing water and land usage.

Challenges and Limitations

- *Data Quality and Availability:* AI requires high-quality and relevant data to make accurate predictions and decisions.
- *Infrastructure and Connectivity:* AI-powered solutions require reliable internet connectivity and infrastructure, which can be a challenge in rural areas.
- *Regulatory Frameworks:* Regulatory frameworks may need to be adapted to accommodate AI-powered solutions in agriculture.

Future Outlook

- *Increased Adoption:* AI adoption in agriculture is expected to increase, driven by advances in technology and growing demand for sustainable and efficient farming practices.
- *Improved Efficiency:* AI-powered solutions can improve efficiency, reduce waste, and enhance decision-making in agriculture.
- *New Business Models:* AI-powered solutions can enable new business models, such as precision farming as a service, and digital marketplaces for agricultural produce.
- *Emerging Business Start-Ups:* North America has accounted for 53% of the revenue share in 2023, driven by advanced technological infrastructure and a robust research ecosystem. Asia Pacific is expected to grow rapidly, driven by increasing adoption of precision agriculture and government initiatives supporting agritech innovation.

Agripreneurship as the Key Drivers of Growth

- *Increasing crop production losses:* Climate change, pests, and diseases are leading to significant crop losses, making AI-powered solutions attractive to farmers.
- *Adoption of precision agriculture:* AI technologies like drones, sensors, and machine learning algorithms enable precise monitoring, analysis, and management of agricultural operations.
- *Proliferation of agritech solutions:* Companies are developing innovative solutions focused on crop nutrition, soil health, and weather forecasting.

Key Players at Global Scenario

- **Microsoft:** Offers AI-powered solutions for precision agriculture, crop monitoring, and livestock health management.
- **IBM:** Provides AI-powered solutions for weather forecasting, soil analysis, and crop yield prediction.
- **Corteva:** Offers AI-powered solutions for precision agriculture, crop protection, and seed production.

Conclusion

The market potential for AI enabled agriculture is significant, driven by the need for precision agriculture, crop and soil monitoring, and livestock health management. As the market continues to grow, one can expect to see more innovative solutions and collaborations between companies, research

institutions, and governments. The start-ups ideas in alignment with AI driven Agripreneurship are to be encouraged by the government. The phenomena will impact greatly on the nation's economy. The opportunities are unlimited with only condition is to tune with the technology.

References

1) **Chlingaryan, A., Sukkarieh, S., & Whelan, B. (2018).** "Machine learning approaches for crop yield prediction and nitrogen status estimation in precision agriculture: A review." *Computers and Electronics in Agriculture*, **151**, 61-69.
2) **Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M. J. (2017).** "Big data in smart farming – A review." *Agricultural Systems*, **153**, 69-80.
3) **Kamilaris, A., Kartakoullis, A., & Prenafeta-Boldú, F. X. (2017).** "A review on the practice of big data analysis in agriculture." *Computers and Electronics in Agriculture*, **143**, 23-37.
4) **Chandrasekaran, R., & Ranganathan, V. (2020).** "Role of AI and IoT in enabling sustainable agribusiness: An Indian perspective." *Emerging Technologies in Agriculture*, Springer, 87-104.
5) **Wang, G., Weller, C., & Aparicio, J. (2021).** "Agricultural robotics and AI for improving productivity and sustainability in agriculture." *Annual Review of Robotics and AI*, **4**, 37-65.
6) https://www.gminsights.com/industry-analysis/ai-in-agriculture-market
7) https://intellias.com/artificial-intelligence-in-agriculture/
8) https://www.basic.ai/blog-post/7-applications-of-ai-in-agriculture
9) https://sageuniversity.edu.in/blogs/role-of-artificial-intelligence-in-agriculture
10) https://www.growag.com/highlights/article/how-exactly-is-ai-used-in-agriculture-1#:~:text=AI%20in%20agriculture%20automates%20tasks,historical%20data%20and%20weather%20patterns.
11) https://www.n-ix.com/ai-in-agriculture/
12) https://www.weforum.org/stories/2024/01/how-indias-ai-agriculture-boom-could-inspire-the-world/
13) https://easternpeak.com/blog/ai-solutions-in-agriculture/
14) https://www.bpm.com/insights/ai-in-agriculture/