



Agricultural Economics and Food Security in Developing Countries

**Deepak Meena¹,
Sanjeeta Dhaka²,
Kashish Choudhary³,
Girija Sankar Khadanga⁴**

¹Ph.D. Scholar, Department of
Agricultural Economics and
Management Rajasthan
College of Agriculture,
MPUAT, Udaipur

²Ph.D. Scholar, Department of
Food Science and Nutrition,
MDS University, Ajmer

³Ph.D. Scholar, Department of
Agricultural Economics and
Management Rajasthan
College of Agriculture,
MPUAT, Udaipur

⁴Manager (Gujarat Gramin Bank),
College of Agriculture,
Bhubaneswar



Open Access

*Corresponding Author

Deepak Meena*

Article History

Received: 15.07.2026

Revised: 20.07.2026

Accepted: 25.07.2026

This article is published under the
terms of the [Creative Commons
Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/).

INTRODUCTION

Agriculture forms the backbone of most developing economies. More than half of the population in many Asian and African countries depends directly or indirectly on agriculture for employment and income. Besides producing food, agriculture supplies raw materials for industries, generates export earnings, supports rural livelihoods, and contributes significantly to Gross Domestic Product (GDP).

Despite remarkable progress in agricultural technology, nearly 700 million people continue to experience chronic hunger, while millions suffer from malnutrition and micronutrient deficiencies. Rapid population growth, climate variability, natural resource degradation, market imperfections, and rising production costs have intensified food insecurity.

Agricultural economics provides scientific approaches for managing scarce resources efficiently. It helps policymakers, researchers, farmers, and agribusiness firms make informed decisions regarding production, pricing, investment, marketing, and resource conservation.

2. Concept of Agricultural Economics

Agricultural economics is the application of economic principles to agricultural production, marketing, resource management, and rural development. It examines how farmers, consumers, governments, and markets interact to maximize agricultural productivity and welfare.

Major Areas

- Farm management
- Agricultural marketing
- Agricultural finance
- Resource economics
- International trade
- Agricultural policy
- Rural development
- Food economics
- Environmental economics

Table 1. Scope of Agricultural Economics

Area	Importance
Farm Management	Efficient use of land, labour and capital
Agricultural Marketing	Better price realization
Agricultural Finance	Access to credit and investment
Agricultural Policy	Government planning and support
International Trade	Export promotion
Resource Economics	Sustainable resource utilization
Rural Development	Employment generation
Food Economics	Food accessibility and nutrition

3. Understanding Food Security

Table 2. The Four Pillars of Food Security

Pillar	Description	Key Components
Food Availability	Ensuring sufficient quantities of food are physically available through production, imports, and reserves.	Agricultural production, food imports, food stocks, storage, distribution
Food Access	Ensuring individuals have the economic and physical means to obtain adequate food.	Income, purchasing power, employment, market accessibility, food prices
Food Utilization	Ensuring proper use of food for adequate nutrition and health.	Balanced nutrition, food quality and safety, clean drinking water, sanitation, healthcare services
Food Stability	Ensuring continuous access to adequate food despite economic, environmental, or social shocks.	Climate resilience, price stability, disaster preparedness, food reserves, risk management

4. Relationship between Agricultural Economics and Food Security

Agricultural economics and food security are closely interconnected, as economic principles guide the efficient production, distribution, and consumption of food resources. Agricultural economics focuses on the optimal allocation of land, labor, capital, water, and other agricultural inputs to maximize productivity and profitability while ensuring

the sustainable use of natural resources. By improving the efficiency of agricultural systems, it contributes significantly to enhancing food availability, accessibility, affordability, and long-term stability. In developing countries, where agriculture remains a major source of employment and income, sound agricultural economic policies play a critical role in achieving food security and reducing poverty.

Table 3. Efficient Resource Allocation

Resource	Economic Strategy	Expected Outcome
Land	Crop planning	Higher productivity
Water	Precision irrigation	Water conservation
Labour	Mechanization	Reduced labour cost
Fertilizer	Site-specific application	Higher nutrient efficiency
Capital	Farm budgeting	Better investment decisions

6. Agricultural Finance and Food Security

Agricultural finance plays a pivotal role in improving agricultural productivity and ensuring food security by providing farmers with the financial resources needed for production and investment. Access to timely and affordable credit enables farmers to purchase quality seeds, fertilizers, pesticides, irrigation equipment, farm machinery, and other essential inputs that improve productivity and profitability. Financial support also encourages the adoption of modern technologies, climate-resilient farming practices, and diversification into high-value agricultural enterprises. In developing countries, limited access to institutional credit often forces farmers to rely on informal lenders charging high interest rates, which restricts investment and perpetuates poverty.

7. Agricultural Policies Supporting Food Security

Agricultural policies provide the institutional framework necessary for promoting agricultural development, improving rural livelihoods, and ensuring national food security. Governments formulate policies that support farmers through price incentives, financial assistance, research investments, infrastructure development, and risk management programs. Effective policies not only stimulate agricultural production but also improve food accessibility, affordability, and nutritional security for vulnerable populations.

Key policy interventions include the Minimum Support Price (MSP) system, which guarantees remunerative prices for selected crops and protects farmers from market fluctuations. The Public Distribution System (PDS) enhances food access among economically weaker sections by supplying essential food grains at subsidized prices. Crop insurance schemes reduce production risks arising from droughts, floods, pests, and diseases, thereby stabilizing farm income. Input subsidies lower the cost of fertilizers, seeds, irrigation, and electricity, encouraging farmers to adopt improved production technologies. Investments in agricultural

research and extension services facilitate the dissemination of innovative technologies, while irrigation development enhances water availability and increases cropping intensity. Together, these policy measures contribute significantly to agricultural growth, rural development, and long-term food security.

8. Challenges in Developing Countries

Developing countries face numerous challenges that hinder agricultural development and threaten food security. These constraints are multidimensional, encompassing economic, technical, environmental, institutional, and social factors. Persistent poverty, unstable food prices, and inadequate access to institutional credit limit farmers' capacity to invest in productive technologies. Technical limitations such as low mechanization, poor-quality seed, inadequate irrigation facilities, and weak agricultural extension systems reduce farm productivity and efficiency.

Environmental challenges, including climate change, soil degradation, declining water resources, and increasing frequency of extreme weather events, significantly affect agricultural production. Weak market institutions, poor governance, inadequate policy implementation, and limited rural infrastructure further restrict market access and agricultural investment. Social issues such as fragmented landholdings, low literacy levels, gender inequality, and migration of rural youth reduce the effectiveness of agricultural development programs. Overcoming these challenges requires integrated policy interventions, technological innovations, institutional strengthening, and sustainable resource management strategies.

10. Role of Technology

Technological innovation has transformed modern agriculture by improving productivity, efficiency, sustainability, and food security. Digital technologies enable farmers to make informed decisions regarding crop management, resource allocation, and risk reduction. Precision agriculture integrates data-driven technologies that optimize the use

of inputs while minimizing environmental impacts. In developing countries, technology adoption has become increasingly important for addressing labour shortages, climate variability, and resource constraints.

Emerging technologies include Artificial Intelligence (AI), Remote Sensing, Geographic Information Systems (GIS), the Internet of Things (IoT), drones, big data analytics, mobile advisory services, and blockchain technology. AI supports yield prediction, disease diagnosis, and decision

support systems. GIS and remote sensing facilitate land-use planning, crop monitoring, and resource mapping. IoT enables real-time monitoring of soil moisture, irrigation, and environmental conditions. Drones improve crop surveillance and precision input application, while mobile applications provide weather forecasts, market prices, and extension advisories. Blockchain enhances transparency, traceability, and trust across agricultural supply chains.

Table 4. Digital Technologies in Agriculture

Technology	Application	Major Benefit
Artificial Intelligence (AI)	Yield prediction and decision support	Improved planning and productivity
Geographic Information System (GIS)	Land mapping and resource planning	Precision farming
Internet of Things (IoT)	Smart irrigation and sensor-based monitoring	Efficient water use
Drones	Crop monitoring and input application	Early detection of pests and diseases
Mobile advisory applications	Weather and market information	Faster decision-making
Blockchain	Supply chain management and traceability	Improved food safety and transparency

11. Food Security Indicators

Food security is measured using a range of indicators that evaluate food availability, access, utilization, and stability at household, regional, and national levels. These indicators assist governments, researchers, and international organizations in monitoring progress toward food security goals and identifying vulnerable populations. Production indicators measure the capacity of agricultural systems, while nutritional and economic indicators assess food accessibility and utilization.

12. Future Prospects

The future of agricultural economics and food security will depend on integrating technological innovation, sustainable resource management, institutional reforms, and inclusive economic growth. Climate-resilient

crop varieties, digital agriculture, artificial intelligence-based decision support systems, precision resource management, and sustainable agricultural value chains are expected to play increasingly important roles in improving productivity and resilience. Strengthening Farmer Producer Organizations (FPOs), promoting women and youth participation in agriculture, increasing investment in agricultural research and innovation, fostering public–private partnerships, and expanding regional and global trade cooperation will further contribute to resilient and sustainable food systems. Future agricultural policies should emphasize climate adaptation, digital transformation, nutrition-sensitive agriculture, and equitable access to markets, finance, and technology to achieve the Sustainable Development Goal of Zero Hunger.

CONCLUSION

Agricultural economics provides the foundation for achieving food security by promoting efficient production, optimal resource allocation, well-functioning markets, and evidence-based policy formulation. In developing countries, where agriculture remains the primary source of livelihood for millions of people, strengthening agricultural economics is essential for increasing productivity, improving farmers' incomes, reducing poverty, and ensuring equitable access to nutritious food. Sustainable food security requires an integrated approach that combines technological innovation, supportive

government policies, resilient infrastructure, inclusive financial systems, efficient agricultural marketing, and environmentally sustainable farming practices. Addressing challenges such as climate change, fragmented landholdings, weak market linkages, resource degradation, and post-harvest losses will be critical for building resilient agricultural systems. Continued investment in agricultural research, digital technologies, institutional capacity, and rural development will enable developing countries to establish sustainable, inclusive, and climate-resilient food systems capable of meeting the nutritional needs of present and future generations.