



The Triad of Agricultural Development, Food Security, and Farmer Welfare: Evidence from India

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Abstract

India's agriculture sector is forming yet another multidimensional paradox in the nation's economy above all else. In contrast to attaining the highest-ever foodgrain production and self-sufficiency at the macro level, India is still confronted with the chronic problems of food insecurity and farmer distress at the micro level. This paper thus tries to adopt an empirical approach in unravelling the complex linkages existing among farm production, food security, and farmer welfare in India. Based on quantitative information from government reports, national surveys, and global indices, the analysis studies crop production trends, dissects the multi-dimensional nature of food security, and appraises the economic welfare of farmers, including incongruities in income inequality between various states. The findings strongly show that notwithstanding an all-time high production record of India with foodgrain production at 3322.98 LMT in the year 2023-24, this spontaneous production surge could not be converted to equitable farmer incomes or world food security. India secured 68th position by the Global Food Security Index, noting the lowest factors of affordability and sustainability, while farmers' income also shows huge regional disparity. The evaluation of such government interventions as PM-KISAN, PMF.

Keywords: agriculture, farmers, food security, AI

Introduction

Agriculture is the basic and the principal one with respect to contributing to the Gross Value Added (GVA) and with respect to employing a sizeable part of the labour force. From the Green Revolution till date, the journey has seen India transformed from a food-deficient country into one that produces food items in essential quantities. Growth in production needs hardly to be stressed and is the first pillar in the triad studied here. Food security is the second pillar, however, and concerns more than production: it concerns access, affordability, and nutrition for its enormous population. The third and perhaps most

important pillar is represented by the farmers themselves, as the economic stabilization and prosperity of the farmers is the primary essence of sustaining the whole agricultural structure. This study tries to dissect this triad and empirically investigate the linkages and the disconnects between agricultural growth, national food security, and farmer welfare at the field level.

Statement of the Problem

Despite its recognition as a major food-producing country with record production figures, a serious question still persists. The country has very serious



food insecurity levels, as shown by the Global Hunger Index (GHI) ranking, with most agricultural households being precarious in nature. On the one hand is the macro-level achievement of food self-sufficiency; on the other stand the realities of household food insecurity and low farmer income.

In 2019, agricultural households across India were earning an average monthly income of ₹10,218, with huge state-wise disparities. This scenario raises questions about the inclusivity or sustainability of the Indian growth model for agriculture. The central question arises: why has increased production never been transposed directly to increase the economic well-being of farmers and to ensure the food security of all citizens?

Objectives of the Study

1. To consider the recent agricultural trends of production and productivity in India with respect to major foodgrain crops and state-wise contributions.
2. To evaluate food security in India by analysing the indicators for availability, affordability, and quality, from a comparative perspective.
3. To assess the economic welfare of Indian farmers by way of incomes, regional disparities, and some important government welfare schemes.
4. To identify some critical gaps between policy, production, and welfare outcomes to suggest an evidence-based implication for a more integrated approach.

Review of Literature

There is vast literature available on Indian agriculture. Initial research centered on the revolutionizing role of the Green Revolution. Recent research, e.g., by NITI Aayog, has emphasized demand-supply projections and shifts in production costs, underlining the role of input prices and technology. Studies like "Demand & Supply Projections Towards 2033" offer a conceptual framework for anticipating the requirements of the future. Comparative studies of farm productivity with China have indicated that both countries have

experienced growth in output but have differed, with India tending to use more cropland expansion while China opted to increase yield potential.

Regarding food security, the discussion has shifted from production-oriented perceptions to a complex consideration of several dimensions. The World Food Programme (WFP) documents its own shift in India from food distribution to technical support as the country succeeds in cereal self-sufficiency. Systematic reviews of food insecurity measurement, however, have extensive differences based on data reported using different measures, like the Household Food Insecurity Access Scale (HFIAS). The Global Food Security Index (GFSI) offers a normative benchmark, which shows India's strengths and weaknesses.

Literature on farmer well-being is characterized by debate around income. The policy and academic discourse surrounding the government's proposal to double farmers' incomes has been a central topic of discussion. Evaluations of schemes such as the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) have concluded that it has had a positive, significant effect on farm income and input spending. On the other hand, analyses of the Pradhan Mantri Fasal Bima Yojana (PMFBY) crop insurance scheme, while noting its better risk coverage, identify problems such as long delays in settling claims and low farmer awareness.

Data Analysis and Discussion

Agricultural Production: A Story of Record Highs
India's farm output has been quite resilient and dynamic in growth. Total foodgrain production is estimated at a record 3322.98 Lakh Metric Tonnes (LMT) as per the Final Estimates for 2023-24 published by the Ministry of Agriculture & Farmers' Welfare. This comprises record production of rice (1378.25 LMT) as well as wheat (1132.92 LMT). This steadier growth at about 5% per annum from FY17 to FY23 speaks for the strength of the sector.

A state-wise comparison is shown to pinpoint concentration of production. The highest three producing states for wheat during 2023-24 were Uttar Pradesh (35.34 Mt), Madhya Pradesh (22.58



Mt), and Punjab (17.74 Mt). For rice, the highest three states were Telangana (166.31 LMT), Uttar Pradesh (157.22 LMT), and West Bengal (151.18 LMT). But the productivity, in terms of yield per hectare, paints a different picture. In wheat, Punjab is at the forefront with the highest yield of 5045 Kg/Ha, well above the all-India average. This indicates inequality in agricultural management and technology adoption across states.

The advent of AgriTech provides a way to fill this gap. New technologies such as precision agriculture, AI tools, and drones are taking shape. Estimates project that AI tools have the potential to raise crop yields by as much as 20% by the year 2025 through greater precision. The growing penetration of smartphones in rural India is driving this ecosystem, providing the basis for a digital agricultural revolution.

Food Security: A Tale of Two Indias

While India is self-sufficient in foodgrain production, it does not necessarily mean that it is food-secure for its whole population. The 2022 Global Food Security Index (GFSI) places India at a moderate 68th among 113 nations. The index offers a more nuanced image: India ranks well on the 'Availability' pillar (42nd in the world), attributed to its high production and policy engagement. Yet, it is weak on 'Affordability' (80th internationally), due to poverty and inequality of income. Its lowest score is for 'Sustainability and Adaptation', which reflects high exposure to the risks of climate change.

The government's Public Distribution System (PDS) is the pillar of its food security plan, with the government distributing subsidized food grains to approximately 800 million individuals. The World Food Programme is actively cooperating with the government to make the huge system more efficient, accountable, and transparent. Even with these efforts, however, the issue of affordability persists, as seen by way of the GFSI score and the high percentage of the population living below the poverty line and thus dependent on such safety-net programmes.

Farmer Welfare: The Income Disparity Challenge

Farmers' economic well-being continues to be a top issue. The Economic Survey 2024-25 mentions that farm incomes have grown at 5.23% each year in the last decade. But the absolute numbers tell the harsh truth. According to a 2019 survey, the average monthly farm household income was only ₹10,218. Far more revealing is the huge spread across states. Statistics placed before the Rajya Sabha indicate that a Punjab farmer had made an average of ₹26,701 per month, whereas his Jharkhand counterpart had made just ₹4,895—a difference of over five times. This illustrates the fact that national averages conceal entrenched regional disparities fueled by factors such as access to irrigation, diversification of crops, market connections, and policies at the state level.

To counter this, the government has launched various schemes. PM-KISAN scheme gives direct income support of ₹6,000 a year to farming households. Research indicates this has eased the credit constraint and boosted investment in farm inputs. A study in Uttar Pradesh revealed that the scheme contributed importantly to increasing production and crop income on farms of beneficiaries.

The Pradhan Mantri Fasal Bima Yojana (PMFBY) seeks to offer insurance protection and financial compensation to farmers in case of crop loss. It represents a bold change in the risk management approach of the country towards agriculture. But its rolling out is not without challenges. The major challenges are the low level of awareness among small and marginal farmers and settlement delays, which dilute its role as an effective timely safety net.

Implications

The analysis has a number of critical policy and practice implications:

- 1. Policy Integration:** The time has come to shift from siloed to integrated policy thinking. Policies cannot be solely preoccupied with production enhancement. They should enhance farmer profitability through improved price realization and access to markets at the same



time, and improve consumer affordability through efficient and targeted safety nets.

2. **State-Specific Strategies:** The enormous income inequalities call for customized, state-specific farm development strategies. A national policy of one size will not do. Low farmer incomes in certain states need concentrated efforts at irrigation, infrastructure, credit availability, and diversification into high-value crops.
3. **Risk Management Strengthening:** Despite schemes such as PMFBY being thought-provoking, their effectiveness relies on implementation. Simplifying claim procedures, using technology for precise and timely loss estimation, and enhancing farmer knowledge are indispensable to enhance resistance to market and climate shocks.
4. **AgriTech and Sustainability Investment:** In order to drive productivity in a sustainable manner, investment in R&D and AgriTech adoption is unavoidable. This has to be accompanied by attention to climate-resilient agriculture, as indicated by India's low ranking on the GFSI's 'Sustainability and Adaptation' pillar.

Conclusion

India's triad of farm production, food security, and farmer well-being is marked by an intermingling of stunning success and abiding problems. The country has been able to guarantee its food security at the national level with steady records of foodgrain production. Yet this success tale is yet to entirely pay dividends in terms of economic well-being for the majority of its farmers or nutritional well-being for all households. The evidence suggests a system in which productivity gains are not evenly shared, and in which growth benefits are watered down by structural problems of income disparities, market imperfections, and gaps in implementing welfare schemes. For India to establish a genuinely sustainable agricultural future, the farmer's welfare must become central to its policy agenda. The way forward demands a comprehensive strategy that not

only increases yields but also improves profitability, reduces risk, and makes sure that the benefits of agricultural advancement are reaped by everyone.

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