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Agriculture: Significance in the Indian Economy, and Need for Sustainability

Dr Saptorshi Das

Dr Saptorshi Das, Professor Jagannath Gupta Institute of Medical Sciences and Hospital, Kolkata, India

***Abstract*— "Jai Jawaan, Jai Kisaan": The Former Prime Minister of India, Shri Lal Bahadur Shastri Ji, way back in 1965, had highlighted the significant role that agriculturists play in the development of this nation. With the India-Pakistan war raging on in the background, and a consequent, slowly growing note of despair and frustration in the soldiers battling it out in the north, and paucity of food, the Prime Minister's words were meant to raise the ebbing morale of the soldiers and the farmers, back then. However, even after almost 60 years, the importance of these words cannot be undermined.**

Agriculture is the backbone of the Indian economy. For centuries, it has been a major source of income for more than 70% population of the country. Contributing to a significant share of the nation's GDP, agriculture has always been a major imperative while implementation of varied schemes and policies by the government, in its support, growth, and sustainability. Subsidies for agricultural implements, harvest insurance, the most lucrative credit facilities, and steady development of infrastructure, are a few of the target factors behind these schemes and policies. Additionally, the government has also been working on the endorsement of the application of modern technology and the most beneficial practices in farming to help increase agricultural productivity across the nation.

Primarily agrarian, the nation's economy rests significantly and crucially on its contribution to its foreign exchange earnings, being one of the global leaders in producing and exporting a wide gamut of agricultural commodities, like, rice, wheat, cotton, and tea.

Therefore, to maintain a profitable socio-economic mosaic in the country, sustainability in agriculture is a major concern, that could help in the conservation of natural resources while promoting social equity and economic profitability, lower the detrimental, environmental impact of the age-old, orthodox farming systems, and bring in higher yields and healthier agricultural commodities for consumers. This paper endeavours to be a humble tribute to this very essence of the socio-economic-political canvas of this nation: Agriculture: India's pride, the World's necessity, while also focusing on its sustainability for better, safer, healthier tomorrow.

***Keywords*— India, Economy, Agriculture, Sustainability.**

I. INTRODUCTION

1. Introduction: Significance of Agriculture in the Indian Economy

"Cultivators of the earth are the most valuable citizens. They are the most vigorous, the most independent, the most virtuous, and they are tied to their country and wedded to its liberty and interests by the most lasting bonds."

- *Thomas Jefferson.*

The significance of these words spoken by the American statesman, diplomat, lawyer, architect, and philosopher, who had also been the 3rd Hon'ble US President, Thomas Jefferson, go beyond a nation, and beyond time. Since time immemorial, agriculture has been the backbone of the global economy, providing not just food but also livelihood to people across the world. In India, of course, the importance of agriculture cannot be highlighted in mere words. Owning land, tilling it, harvesting crops, and witnessing the first growth during the harvest season, is a matter of joy and pride to all farmers. The sweat and the grime, the injuries and the blood, all pour into one great emotion: A Successful Harvest. One cannot describe this in mundane words. In India, agriculture is an emotion. As the Hon'ble Prime Minister, Shri Narendra Modi Ji, has rightly said, "Farmers are the backbone of our society. They are the source of our food security." And as we all know, people who never sleep hungry, are happy people.

Agriculture, in India, has been playing, culturally, socially and historically a multidimensional and crucial role in the economy, contributing in myriad ways, to the financial stability of the nation, helping to reduce poverty. For centuries, agriculture has been a major source of income for more than 70% population of the country, including farmers, agricultural labourers, agricultural researchers, and those dealing with livestock and fisheries, Its share in GDP is significant, despite taking a beat because of the spurt in industrial and service sectors in the last few decades, and contributes around 17-18% directly to India's GDP.

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Not just in the development of the economy and GDP, agriculture hugely contributes to rural infrastructure developments, and thereby, the overall socio-economic growth in rural areas. Providing essential crops, and domestic necessities sourced from farms, agriculture helps, not only to ensure and sustain the food security of the ever increasing Indian population, but also substantially contributes to earning foreign exchange. Above all, most imperatively, agriculture is deeply ingrained into the cultural and traditional ethos of this nation, molding social identities, and giving reasons to celebrate together, in happiness and cheer, festivals and rituals, associated with agriculture and farming. From Thaipussam, in Tamil Nadu, commemorating the birth of Lord Murugan and invoking his blessings for fertility and prosperity, to Nuakhai in Odisha, offering the first crop to the divinities, from Poush Mela in West Bengal to celebrate the end of the harvest season, to Bihu in Assam, celebrating the harvest season, these festivals transcend barriers of regions, race, culture and religion, spreading warmth, laughter and love everywhere.

Agriculture also plays a crucial role in ensuring food security for India's vast and growing population. As emphasised by Narendra Modi, farmers form the foundation of national food security and social stability. Reliable agricultural production ensures the availability of staple food grains and agricultural commodities that sustain both domestic consumption and export markets. India remains one of the world's leading producers of rice, wheat, cotton, pulses, and tea, thereby contributing significantly to global agricultural supply chains (Singh).

Beyond economics, agriculture is deeply woven into the cultural and social fabric of India. Agricultural cycles shape festivals, traditions, and community celebrations across the country. Harvest festivals such as Bihu in Assam, Nuakhai in Odisha, and Poush Mela in West Bengal reflect the cultural significance of agricultural prosperity. These celebrations reinforce social cohesion while acknowledging the intimate relationship between human communities and the natural environment. Scholars such as M. S. Swaminathan have emphasised that agriculture in India should not be understood solely as an economic activity but also as a cultural institution that sustains rural identity and social continuity.

However, the agricultural sector faces a wide range of persistent challenges. Fragmented landholdings, uncertain land ownership patterns, limited mechanisation, and dependence on monsoon rainfall frequently hinder productivity.

In addition, access to modern technology, high-quality seeds, irrigation facilities, and institutional credit remains uneven across rural regions. The Organisation for Economic Co-operation and Development has noted that improving agricultural productivity in countries such as India requires sustained investments in innovation, research, and rural infrastructure.

Another pressing challenge involves the need to balance productivity with environmental sustainability. Historically, initiatives aimed at increasing agricultural output—particularly during the Green Revolution—transformed India from a food-deficient nation into a food-secure one. Scientists such as Norman E. Borlaug played a critical role in promoting high-yield crop varieties and advanced farming techniques that dramatically increased food production.

While the Green Revolution successfully expanded food availability, scholars including Vandana Shiva have pointed out that its long-term environmental consequences were significant. Intensive use of chemical fertilisers, pesticides, and irrigation systems led to soil degradation, groundwater depletion, declining biodiversity, and increased ecological vulnerability. These developments have sparked renewed discussions about the need for sustainable agricultural practices that protect natural resources while maintaining productivity.

II. Literature Review

Scholarly discussions surrounding agriculture in India span several interconnected themes, including agricultural productivity, rural development, food security, and environmental sustainability. The literature indicates that agriculture has played a decisive role in shaping India's economic trajectory since independence.

Economic analyses by scholars such as Indian Economy emphasise the sector's continuing contribution to national income and employment. Although the share of agriculture in India's Gross Domestic Product has gradually declined with the expansion of industry and services, the sector continues to provide livelihood support to a large portion of the population. This dual role—economic contributor and employment provider—makes agriculture a uniquely significant sector within the Indian economy.

Research on agricultural transformation frequently refers to the Green Revolution, a period marked by the widespread adoption of high-yield crop varieties, improved irrigation systems, and chemical fertilisers.

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Agricultural scientist Norman E. Borlaug is widely credited with advancing technologies that dramatically increased food production in developing countries. In India, these innovations helped overcome severe food shortages during the mid-twentieth century.

However, several scholars have also examined the ecological consequences of intensive agricultural practices associated with the Green Revolution. Environmental researcher Vandana Shiva has argued that excessive dependence on chemical inputs and monoculture cropping systems contributed to soil degradation, water depletion, and biodiversity loss. These findings have stimulated growing interest in alternative agricultural models that emphasise sustainability and ecological resilience.

The concept of sustainable agriculture has been widely explored in global policy discourse. Reports from the United Nations Environment Programme and the International Food Policy Research Institute highlight the importance of integrating environmental conservation with agricultural productivity. According to these studies, sustainable agriculture involves farming systems that maintain soil fertility, conserve water resources, reduce greenhouse-gas emissions, and promote biodiversity.

In the Indian context, scholars such as M. S. Swaminathan have emphasised the transition from a "Green Revolution" to an "Evergreen Revolution." This concept advocates agricultural growth that is both environmentally sustainable and socially inclusive, ensuring long-term food security while protecting natural ecosystems.

Overall, the literature reveals a consensus among scholars that while agriculture remains essential to India's economic development, its future depends on adopting sustainable and environmentally responsible practices.

III. Research Objectives

The present study seeks to critically investigate the role of agriculture within the broader framework of the Indian economy while simultaneously examining the growing importance of sustainability in agricultural practices. In doing so, the research attempts to understand how agriculture continues to influence economic development, rural livelihoods, and environmental balance in contemporary India.

The specific objectives of the study are as follows:

1. To examine the historical evolution and enduring economic significance of agriculture in the development of the Indian economy.
2. To analyse the contribution of the agricultural sector to employment generation, national income, and the socio-economic advancement of rural communities.
3. To identify and assess the key structural and institutional challenges that affect agricultural productivity and efficiency in India.
4. To evaluate the ecological implications of intensive farming practices, particularly in relation to soil health, water resources, and biodiversity.
5. To explore sustainable agricultural approaches and policy interventions that can promote long-term economic viability while ensuring environmental conservation.

These objectives collectively aim to provide a comprehensive understanding of how agriculture can continue to sustain economic growth while adapting to the environmental and developmental challenges of the twenty-first century.

IV. Need for Sustainability

The Green Revolution in India might have resulted in increased food production, but the repercussions were huge and transcending time and region: reduction in soil fertility, soil contamination, soil erosion, water shortages, reduction in genetic diversity, greater vulnerability to pests, reduced availability for the local population of nutritious food crops, rural impoverishment, the displacement of small farmers and increased social conflict, were just some of the negative effects. Keeping this history in mind, and to ensure a better future where agriculture and fertility of land are concerned, the need for sustainability in agriculture is a matter of great concern, for:

- The most beneficial and efficient use of resources like soil and water, for great agricultural productivity, especially in India, where scarcity of water is a rising concern.
- Better soil quality, lesser water pollution, and increased biodiversity, reduced greenhouse emission, and better ecosystem health, through organic farming and reduced use of pesticides and insecticides.
- Enhancing resilience to climate change and the devastating ravages wrought by erratic and unpredictable weather patterns floods, droughts and resultant land degradation, through diversification of crops, sustainable farming techniques and proper irrigation management. Marked improvement in the incomes of farmers, by reducing input costs, improving soil fertility, and providing market access for organic and eco-friendly produce.

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V. Challenges Facing Indian Agriculture

Despite its importance, the agricultural sector faces several structural challenges.

- One major challenge involves fragmented landholdings. With successive generations dividing family land among heirs, farm sizes have steadily decreased, making large-scale mechanised farming difficult.
- Another challenge is the dependence on monsoon rainfall. Inadequate or irregular rainfall patterns can significantly reduce agricultural productivity, particularly in regions lacking reliable irrigation infrastructure.
- Agriculture also faces increasing pressure from climate change. Rising temperatures, unpredictable rainfall, and extreme weather events have made farming more vulnerable to environmental uncertainties.
- Additionally, many farmers struggle with limited access to credit, modern technology, and market infrastructure. These constraints often result in lower productivity and reduced income levels.

VI. Government Initiatives

Recognising the importance of sustainability, the Government of India has launched several initiatives aimed at promoting environmentally responsible agriculture. One important programme is implemented through the National Mission for Sustainable Agriculture, which focuses on improving soil health, conserving water resources, and promoting climate-resilient agricultural practices.

Other initiatives encourage organic farming, provide financial assistance for irrigation technologies, and promote agricultural research through institutions such as the Indian Council of Agricultural Research.

These policies aim to improve farmer incomes while ensuring long-term sustainability of agricultural resources.

VII. Sustainable Agriculture As A Solution

There are various methods to ensure sustainability in agriculture, that reaps good harvest without compromising on the quality of the soil and the natural environment around. Majorly, growing different types of crops accordingly to a particular sequence leads to lesser compaction and different root systems, providing nitrogen through nitrogen fixing plants, while also helping in control the dangerous risks of pests, reduction in soil depletion, addition of organic matter and stimulation of the soil biota's activity.

Sustainable use of water in agriculture through the plantation of less-water-consuming crop species and implementing a diverse range of smarter irrigation techniques, like the drip vs furrow (flood) irrigation that requires 20-40% less water while helping grow 20-50% more crops, helps in better soil health management. Sowing right into the crop residue with the least soil and biota disturbance, prevents soil compaction, minimizes operation time and fossil emissions, contributing to economic and ecological stability. Pest control and integrated pest management (IPM) cause minimal harm to humans as well as nature in general. Finally, "permaculture" or permanent agriculture contributes to sustainable agriculture by reducing waste, using replenishable sources, reducing pollution, and contributing to soil fertility in nature-friendly ways.

Incidentally, the Indian government has launched a number of innovative initiatives, such as, the National Mission for Sustainable Agriculture (NMSA) to promote awareness and bring about sustainable agriculture, incentives for adopting eco-friendly practices, and regulatory frameworks for water and soil conservation, all of which lead to increased farmers' income.

Finally, by spreading awareness about the need for sustainability in agriculture, and doing all that is necessary to make it the prevalent and predominant practice, India can march steadily and prosperously towards a better tomorrow for her farmers, while ensuring food for all, and conserving its natural resources for generations to come: A better tomorrow for India, as a whole, where no one sleeps hungry, and wakes up to a better, more fruitful day, satiated and happy..

REFERENCES

[1] Food and Agriculture Organization of the United Nations. The State of Food and Agriculture 2023: Revealing the True Cost of Food to Transform Agrifood Systems. FAO, 2023.

[2] Government of India Ministry of Agriculture and Farmers Welfare. Agricultural Statistics at a Glance 2023. Government of India, 2023.

[3] NITI Aayog. Strategy for New India @75: Agriculture. Government of India, 2018.

[4] Reserve Bank of India. Handbook of Statistics on the Indian Economy. RBI Publications, 2023.

[5] Indian Council of Agricultural Research. Sustainable Agriculture in India: Strategies and Initiatives. ICAR, 2021.

[6] International Food Policy Research Institute. Global Food Policy Report 2023. IFPRI, 2023.

[7] United Nations Environment Programme. Sustainable Food Systems and Agriculture. UNEP, 2021.

[8] Indian Economy. Singh, Ramesh. Indian Economy. 15th ed., McGraw Hill Education, 2023.

[9] Vandana Shiva. Shiva, Vandana. The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics. University Press of Kentucky, 1991.

[10] Organisation for Economic Co operation and Development. Innovation, Agricultural Productivity and Sustainability in India. OECD Publishing, 2018.

[11] International Fund for Agricultural Development. Rural Development Report: Fostering Inclusive Rural Transformation. IFAD, 2016.

[12] Agriculture and Food Security. Swaminathan, M. S. From Green to Evergreen Revolution: Indian Agriculture—Performance and Challenges. Academic Foundation, 2010.

[13] National Mission for Sustainable Agriculture. Operational Guidelines for National Mission for Sustainable Agriculture. Government of India, 2020.

[14] United Nations. Transforming Our World: The 2030 Agenda for Sustainable Development. United Nations, 2015.