

Agricultural Sustainability for 21st Century

Abstract

Agriculture has been one of the most widely discussed topics in India. Yet, it remains the most neglected. Even today, agriculture is the largest employer in India despite its contribution falling down substantially over the last 50 years. The challenges to agriculture have also undergone a major transformation: from being an activity to feed the nation, it now needs to consider the environmental consequences into account along with technological innovations, since land is becoming a scarce commodity. All of it calls for an evergreen revolution, such that the needs of the present do not compromise the viability of the future.

Keywords: Sustainable Agriculture, Green Revolution, Agricultural Growth, Agricultural Marketing, Agricultural Holdings.

Introduction

'Jai Jawan Jai Kisan'(Hail the Soldier, Hail the Farmer) was the slogan chartered under the leadership of Prime Minister Shri Lal Bahadur Shastri in the 1960's owing to the importance of these two in sustaining the backbone of India (i.e., External Security and Food Security). In the next few decades, we have witnessed a secular decadence of the latter. Year after year, scores of farmers are staging multiple protests, in the hope that their voices will be heard.

It must be kept in mind that before independence, India faced recurring crop failures and famines. Realizing the insecurities arising due to improper supply of food-grains, the Government of Independent India took successive policy measures. The most important change introduced was the 'Green Revolution' of 1960's. Data from Food and Agriculture Organization (FAO) shows that the total food grain production in India has more than doubled, from 108.42 million tonnes in 1970-71 to 275 million tonnes in 2016-17¹. It is the world's largest producer of milk, pulses, and spices, and has the world's largest cattle herd (buffaloes), as well as the largest area under wheat, rice and cotton. It is the second largest producer of rice, wheat, cotton, sugarcane, farmed fish, sheep & goat meat, fruit, vegetables and tea². If history is a witness, this is an achievement in itself. However, the scenario has changed drastically in the last 50 years, which calls for another green revolution, and possibly one that balances the growing demand for food with socio-economic equity and environmental sustainability.

Let us look at the major issues plaguing the agriculture sector, followed by the strategy for future sustainable growth.

Aim of the Study

To review the sustainable growth of agriculture.

Review of Literature

Bagchi (2010)³ extensively examines the impact of colonialism in various aspects of Indian economy, including agriculture. To a certain extent, the seeds of current crisis in agriculture were sowed during this period. Dandekar (1994)⁴ gives an insight into the agricultural institutions of India beginning from the British administration. The disproportionately large burden of population which causes net capital consumption rather than capital creation in agriculture is identified as the basic problem of Indian agriculture.

Dr. YV Reddy (2001)⁵ has highlighted the concerns facing the Indian agriculture. Of particular interest is the analysis of middlemen, who according to Reddy are inevitable in the agriculture. The issue is how to foster competition and assure regulation of such middlemen keeping in view the interest of producers as well as consumers drawn Rajendran et al (2014)⁶ highlight problems of organized agricultural marketing in India. The various regulations have prevented the emergence of a domestic market in



Kalpalata Dimri

Associate Professor,
Dept. of Economics,
Vasant Kanya Mahavidyalaya,
Varanasi, U.P., India

which the whole country is effectively integrated into a single market and where prices are determined by free market processes.

AK Sen (1962)⁷, AM Khusro (1964)⁸, AP Rao (1967)⁹ and Hanumantha Rao (1966)¹⁰ have analysed deeply the inverse relationship between farm size and productivity.

Singh (2000)¹¹ shows that while the Green Revolution managed to achieve food sufficiency in Haryana, it resulted in continuous environmental degradation, particularly of soil, vegetation and water resources. This has posed challenges for future sustainability. Such assessment can be extended to other regions as well and calls for a strategy to promote evergreen revolution, such that future growth occurs without burdening the environment.

Regulatory and Infrastructure Bottlenecks

While agriculture's share in India's economy has progressively declined to less than 15% due to the high growth rates of the industrial and services sectors, the sector's importance in India's economic and social fabric goes well beyond this indicator. Nearly three-quarters of India's families depend on rural incomes.

Agriculture in India is neither fully Government regulated nor fully market driven. Despite pumping huge investments, agriculture is mostly dependent on the vagaries of nature. Moreover, farming has progressively become an unprofitable occupation on account of rising input costs on the one hand, and the inability of governments, on the other, to pay a lucrative support price for agricultural produce. Every year, the authorities announce a set of MSPs (Minimum Support Price) for agricultural commodities which provides a price-floor and allows farmers bargain better. The government through its subsidiary the Food Corporation of India (FCI) is also a major buyer of farm produce. Thus, it so happens that in scarcity years, farmers succeed in selling their produce at prices higher than the MSP to private buyers. But when a glut occurs, farmers look to the FCI to sell their output at the official price even if it is less than lucrative¹². Obviously, the FCI cannot buy beyond a certain point. On the other hand, the Agriculture Product Marketing Committee (APMC) restricts farmers to directly sell their produce to private/retail parties. Moreover, the middlemen charge commissions which create a divide between what the farmers get and what the consumers pay.

Fluctuating income and poor price realization has led to a sharp increase in the number of farmer suicides. In order to break this vicious cycle, first and foremost, the Government must liberalize constraints to marketing, transport, export and processing that inhibit free movement of goods. The Government can also play a small regulatory role, taking due care that this does not become an impediment. Also India's supply chain is quite underdeveloped: there are few long-term storage facilities, inadequate number of *mandis* or market places to which agricultural produce needs to be brought, and the virtual absence of a cold chain to store perishable commodities such as vegetables.

In 2017, the Prime Minister Shri Narendra Modi launched an ambitious task to double the income of farmers by 2022-23. On its part, the Centre has rolled out many well-meaning schemes like Pradhan Mantri Krishi Sinchai Yojana, PM Kisan, and Pradhan Mantri Fasal Bima Yojana to ameliorate the lot of farmers. It is important for the Centre and States to coordinate for properly implementing and monitoring these schemes, for these are keys for bringing back the dignity to those people who ensure we have food on our plates.

Limited Landholdings

The total operated area in India is 159.59 million hectare. Out of this, as much as 85% is held by small and marginal farmers with less than two hectares of land, while those with 10 hectares and more account for just 0.70%. The average size of agriculture landholding declined to 1.15 hectare in 2010-11, and has shown a steady decline since 1970-71¹³. See Table 1.

Table 1: Agricultural Landholdings in India

Size-Group	Percentage of number of operational holdings to total	Percentage of area operated to total
Marginal (below 1.00 ha.)	67.10	22.50
Small (1.00 - 2.00 ha.)	17.91	22.08
Semi-medium (2.00 - 4.00 ha.)	10.04	23.63
Medium (4.00 - 10.00 ha.)	4.25	21.20
Large (10.00 ha. & above)	0.70	10.59
<i>Source: Agricultural Census, Government of India (2010-11)</i>		

Although, some economists argue that output per acre declines with the increase in the size of holding, small and marginal landholdings have low marketable surplus and profit. Moreover, they have limited access to technology, inputs, credit, capital and markets. In this regard, collectivization of farmers through the Farmer Producer Organization (FPO) route is the best way to strengthen aggregation. This will confer greater bargaining power, better access to credit and insurance and sharing of costs.

Given the trend of landholdings, it is expected that these will get even more fragmented in the future. In order to ensure livelihood security it is necessary to focus on diversification as well. In particular, encouraging farmers to diversify to higher value commodities will be a significant factor for higher agricultural growth, particularly in rain-fed areas where poverty is high. Moreover, considerable potential exists for expanding agro-processing and building competitive value chains from producers to urban centres and export markets. In addition, gainful employment in the non-farm sector would also give a level playing field to small holder farmers.

Increase Spending on Agriculture R&D

According to the Economic Survey 2017-18, India's spending on Research and Development (R&D) in terms of percentage of GDP has been

stagnant at 0.6 to 0.7 per cent in the last two decades - much lower than the US (2.8%), China (2.1%) , South Korea (4.2%) and Israel (4.3%)¹⁴. Moreover, private investments in R&D have lagged behind public investments. In fact, the government is not just the primary source of R&D funding but also a primary user of these funds.

About three-fifths of government's investment in R&D is spread over the key government science funding agencies like Atomic Energy, Space, Earth Sciences, Science and Technology and Biotechnology. Almost all the R&D is funded by the Central Government, with State/local governments having a minimal contribution.

It is important that we increase the agricultural research spending in India, in line with the Governments vision of doubling farmers' income by 2022. It is important to emphasize that these investments should not merely increase 'Quantity', but also increase the 'Quality' of research. This will have multiple benefits for the entire population of the country.

Need For Evergreen Revolution

Agriculture today is vastly different from what was in 1950's. First, today India is sufficient in food grain production. India's dependence on import for food grains was major during 1960's when two severe drought years led to the sharp rise in imports. The increase in agricultural outputs in the following years was achieved chiefly by adopting a strategy of concentrating public sector efforts and resources in regions with a high potential for quick and substantial productivity gains. This was achieved by increasing cropping intensity and yield in the areas favoured by agro climatic resource conditions and where irrigation facilities already existed or could be developed relatively rapidly¹⁵. Hence, it can be said that the first phase of green revolution focused on regions with high potential (such as Punjab and Haryana) and on rich farmers who had the capacity to adopt these technologies.

The intensification of agriculture over the years has led to overall degradation of the fragile agro-ecosystem. Various scientific studies and surveys conducted on fertilizer and pesticide residues during last 45 years indicate the presence of residues of fertilizers and pesticides like nitrates at higher level than permissible in food products. Apart from that, it led to a loss of soil fertility, erosion of soil, soil toxicity, diminishing water resources, pollution of underground water and salinity of underground water¹⁶.

Conclusion

Given these realities, it is important for policymakers to realign strategies for agriculture improvement. Critical reforms in pricing, trade and infrastructure are required. Father of the Green Revolution in India and renowned farm scientist M S Swaminathan has given the call for 'evergreen revolution', "which implies productivity improvement in perpetuity without ecological and social harm. The evergreen revolution involves the integration of ecological principles in technology development and dissemination"¹⁷.

Endnotes

1. Food and Agriculture Organization of the United Nations. <http://www.fao.org/india/fao-india/india-at-a-glance/en/>
2. The World Bank (2012). *India: Issues and Priorities for Agriculture*. The World Bank. 17th May 2012. <https://www.worldbank.org/en/news/feature/2012/05/17/india-agriculture-issues-priorities>
3. Bagchi, Amiya (2010). *Colonialism and Indian Economy*. Oxford University Press.
4. Dandekar, V. M. (1994). *The Indian economy 1947-92. Vol. 1. Agriculture. The Indian economy 1947-92. Vol. 1. Agriculture 1994 pp.405 pp.*
5. Reddy YV (2001). *Indian Agriculture and Reform: Concerns, Issues and Agenda*. Address by Dr. Y.V. Reddy, Deputy Governor, Reserve Bank of India, at Conference of Indian Society of Agriculture Marketing at Vizag on February 3, 2001. https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/2092_5.pdf
6. Rajendran, G and P. Karthikeshan (2014). *Agricultural Marketing in India: An Overview*, Asia Pacific Journal of Research, Vol: I Issue XVII, September 2014. <https://pdfs.semanticscholar.org/9903/e85c734ea2ff4fe8d2a875a4e188ea4d7a2a.pdf>
7. Sen, Amartya (1962). *An Aspect of Indian Agriculture*. *Economic Weekly*. 14, Pg-243-46
8. Khurso, A M (1964). *Returns to Scale in Indian Agriculture*. *Indian Journal of Agricultural Economics*, 1964, vol. 19, issue 3-4, 33
9. Rao, A. P. (1967). *Size of Holding and Productivity*. *Economic and Political Weekly*, Nov. 1967, pp.1724
10. Hanumantha, Rao C H (1966): *Alternative Explanations of the Inverse Relationship between Farm Size and Output Per Acre in India*, *Indian Economic Review*, Vol 1(2).
11. Singh RB (2000). *Environmental consequences of agricultural development: a case study from the Green Revolution state of Haryana, India*, *Agriculture, Ecosystems & Environment Volume 82, Issues 1-3, December 2000, Pages 97-103*.
12. Mitra, Chandan (2017). *Why The Farmer In Madhya Pradesh, Maharashtra Is So Angry*. NDTV. 8th June 2017. <https://www.ndtv.com/opinion/why-the-farmer-in-madhya-pradesh-maharashtra-is-so-angry-1709655>
13. Press Information Bureau, Government of India, Ministry of Agriculture & Farmers Welfare, *Highlights of Agriculture Census 2010-11*, 9th December 2011. <https://pib.gov.in/newsite/PrintRelease.aspx?relid=132799>
14. *The Economic Times* (2018). *India's R&D spend stagnant for 20 years at 0.7% of GDP*. 29th January 2018. <https://economictimes.indiatimes.com/news/economy/finance/indias-rd-spend-stagnant-for-20-years-at-0-7-of-gdp/articleshow/62697271.cms?from=mdr>

15. Abrol, I.P and SunitaSangar (2006). *Sustaining Indian agriculture – conservation agriculture the way forward*. *Current Science*. Vol. 91, No. 8 (25 October 2006), pp. 1020-1025
16. Rahman, Saidur (2015). *Green Revolution in India: Environmental Degradation and Impact on Livestock*. *Asian Journal of Water, Environment and Pollution*, vol. 12, no. 1, pp. 75-80, 2015. <https://content.iospress.com/articles/asian-journal-of-water-environment-and-pollution/ajw12-1-11>
17. *The Times of India* (2017). *Father of Green Revolution gives call for 'evergreen revolution*. *The Times of India*. 16th April 2017. http://timesofindia.indiatimes.com/articleshow/58200698.cms?from=mdr&utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst