

Issues and Challenges Faced by Indian Agriculture Sector after Modern Revolution

Merabhai Kheemabhai Jamod

Department of Economics,

Veer Narmad South Gujarat University, Surat,

jamodmk1992@gmail.com

Yogesh N. Vansiya

Assistant Professor,

Department of Economics,

Veer Narmad South Gujarat University, Surat,

ynvansiya@vnsgu.ac.in

Manish R Patel

Assistant Professor,

Department of Economics,

Veer Narmad South Gujarat University, Surat,



Abstract:

Bharat's economic growth is accompanied by significant progress in the agriculture sector. Nevertheless, there are numerous issues now encountered in this sector. With this in consideration, the current study examines the nature of the contemporary issues in the agricultural sector within the context of Bharat. The current work relies on prior research as secondary data. The primary issues in the agricultural industry include water scarcity, soil pollution, soil erosion, food contamination, and climate change. In this paper, researchers try to examine current challenges in the agriculture sector. Research paper is divided into three parts. The first part covered research methodology; the second part covered the challenges facing the agriculture sector in Bharat; and the last part covered the conclusion of this paper. Sustainable agriculture faces challenges like market access, price volatility, pests, diseases, climate change, globalisation, and policy issues. Governments, farmers, academics, and industry must collaborate to develop cooperative measures, focusing on local yield, soil quality, water availability, and dietary preferences.

Introduction:

1. Overview:

Addressing hunger and poverty has consistently been a prominent objective in global development efforts. Numerous measures have been implemented to address these issues. The Sustainable Development Goals (SDGs) 2030, previously known as the Millennium Development Goals, are among the recent initiatives undertaken within that framework. The SDGs 2030 serve as significant standards for tackling concerns such as hunger, poverty, nutrition, sustainability, climate change, and inclusive development. The majority of these objectives are either directly or indirectly linked to agriculture.

Bharat has undergone substantial economic growth over the last 25 years, especially with regards to the implementation of economic reforms. Bharat's economy is among the world's fastest-growing economy. Nevertheless, government initiatives have not achieved complete success in addressing the issue of deprivation. The economic changes implemented in the past two decades have resulted in significant economic growth, increased foreign exchange, expanded exports, and a technological revolution. Nevertheless, there is still an unequal distribution of income, with specific segments of the population experiencing greater advantages from this widespread economic growth and affluence. Simply put, there is a scarcity of genuine advancements that have had a positive effect on every segment of society. Bharat is presently grappling with several domestic issues, such as poverty, unemployment, income

inequality, restricted healthcare and education accessibility, and underperformance in the agricultural sector.

There is a verse in the Akshasukta of the Rigveda that, while describing agriculture as a noble occupation, a gambler was asked to give up gambling and take up agriculture for the welfare of the family –

अक्षैर्मा दीव्यः कृषिमित्कृषस्व वित्ते रमस्व बहुमन्यमानः ।

तत्र गावः कितव ! तत्र जाया तन्मे विचष्टे सवितायमर्यः ॥

It means that, “Giving serious attention (to my advice), plural y not with dice; pursue agriculture; delight in wealth (so acquired); there, gambler, are cows; there is a wife; so has this (visible) sovereign Savita declared to me (ऋग्वेदः सूक्तं १०.३४ - विकिस्रोतः, 2024).”

Agriculture encounters numerous challenges, encompassing economic, social, and environmental dimensions. Climate change significantly influences weather patterns. The increasing global population exerts substantial pressure on food production, necessitating enhanced yields and improved efficiency. The situation is further complicated by land degradation (land infertility), water scarcity and loss of biodiversity.

In particular, Bharat's agricultural and allied industries face a wide range of intricate difficulties. The factors contributing to these issues encompass illiteracy, unfavourable socio-economic circumstances, limited technological expertise, small land ownership, environmental degradation, and natural disasters (Dwivedy, 2011). However, there are signs of change in these areas with the adoption of management practices and the emergence of agro-business (Hans, 2008). Although the agricultural industry has shown considerable growth, it is currently facing challenges related to food security, soil degradation, water scarcity, and land deterioration (Selvan et al., 2021). Addressing the challenge of ending hunger and poverty while ensuring the sustainability of agriculture and food systems is a formidable task. However, implementing solutions such as agricultural sector planning and agro-industrial development can contribute to resolving these concerns (Food and Agriculture Organization of the United Nations, 1970).

2. Subject Selection:

Examining the complexities of agriculture is crucial, as it encompasses more than just cultivating food; it pertains to the preservation of life itself. The agricultural sector is the basis of our food provision, and comprehending and tackling its difficulties guarantees the security of our food supply, stability in the economy, and sustainability in the environment. The

problems of climate change, resource depletion, population increase, and technology improvements compel us to adapt and innovate in order to develop more resilient and efficient agricultural systems. It invariably enhances the welfare of a nation and its residents. Thus, since agriculture is an important matter for human well-being and the country, it is necessary to know the existing problems; hence, the topic of current challenges in the agriculture sector has been selected here.

.3Significance of the Study:

In order to attain food security, economic stability, environmental sustainability, and social well-being, it is crucial to comprehend and tackle the existing difficulties in agriculture. A comprehensive and collaborative approach is necessary, involving stakeholders at the local, national, and global levels. By tackling these difficulties, we may strive to construct a more robust, environmentally friendly, and fair agricultural system. The problems arising in relation to food safety and quality in the present time are known.

.4Study Objectives:

The primary objective of this study is to comprehend the issues faced by the agricultural sector in Bharat. Nevertheless, the subsequent sub-objectives are encompassed within this overarching objective:

- .1To ascertain the issues related to the quality of food.
- .2To analyse the unique difficulties faced by the agricultural industry during the COVID-19 pandemic.
- 3 .To identify the challenges of agricultural producers.

.5Research Methodology:

The study utilises an evaluation-oriented research approach, relying on secondary data acquired from reliable sources. Current issues and challenges in agriculture are presented along with statistics from previous studies.

6. Major Issues in the Agricultural sector:

Typically, the agriculture sector faces the following primary challenges. As of my most recent knowledge update in January 2022, there are still numerous obstacles and issues that continue to exist in the agricultural business on a global scale. Please be aware that the circumstances may have changed since that time.

6.1 Low productivity and Inconsistent Agricultural growth rates:

A significant contributor to the economy, accounting for 17 percentage of the GDP, is agriculture. According to the Ashok Dalwai Committee Report on Doubling Farmers' Income, till 2022–2023, agricultural growth in agriculture will need to reach a rate of 10–11 percentage annually. Nevertheless, both the growth rate of farmers' income and the growth rate of agriculture have stagnated and are considerably below the needed pace of growth (Report of the Committee on Doubling Farmers' Income, 2018).

Bharat is the world's largest producer of several crops, but its agricultural yield—that is, the amount of a crop produced per unit of land—is lower than that of the world's top crop-producing nations, such as China, Brazil, and the United States. Bharat is the world's third-largest producer of rice, although its yield is less than that of Brazil, China, and the US; the similar trend applies to the production of pulses, of which Bharat is the world's second-largest producer (FAOSTAT, 2024).

Over the past few decades, Bharatiya agricultural growth has been very unsteady, varying from 5.8 percentage in 2005–06 to 0.4 percentage in 2009–10 and -0.2 percentage in 2014–15 (*Agricultural Statistics at a Glance 2015 | Official Website of Directorate of Economics and Statistics, Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India, 2024*).

6.2 Irrigation Related problems:

According to World Bank data, 36 percentage of all agricultural land is irrigated for agriculture. Reliance on seasonal rains inhibits output. Crop production can also be impacted by variations in the climate and unpredictable weather patterns like cyclones and droughts. Bharatiya agricultural growth has been erratic since it has been reliant on the monsoon season. Large and small irrigation systems have been developed to support agriculture beyond rainy seasons, but their misapplication has led to several issues. Gujarat has an abundance of subterranean water, but the equipment and capital required to extract it are out of the reach of the average farmer (Jamod & Vansiya, 2023).

It is claimed that one kilo gram of rice requires 5,000 litres, but one kilo gram of sugar is said to require 1,500–2,000 litres. In Uttar Pradesh, one kilogramme of sugar produced requires 1,044 litres of water; in Maharashtra, however, that amount is doubled, requiring 2,086 litres.

Though it only takes up 4 percentage of the cultivable area in Maharashtra, sugarcane needs up

to 70 percentage of the irrigation water. Due to its assured commercialization and high earnings when compared to other crop combinations, sugarcane has been cultivated on more land, even in locations with limited water resources. Sugar is produced on about 1.2 percentage of Punjab's total cultivated land. Irrigation-induced salinity occurs due to the use of saline water, saline soils, and rising ground water levels. Salts are carried into the root zone, and most water returns to the atmosphere through transpiration and evaporation. The amount of salt accumulated is influenced by water table depth, soil capillary characteristics, and management decisions.

While the government has declared the MSP for 23 commodities, only wheat and paddy (rice) are bought in bulk since they are required to meet the approximately 65 million metric tonnes of PDS that are required. In Punjab, imports accounted for 92.3 percentage of the rice harvest in 2019–20. Telangana received 102 percentage of its production, while Haryana received 89.2 percentage. This year, Punjab produced 72 percentage of its wheat, while MP and Haryana produced 62 percentage and 66 percentage of it, respectively.

Since 2015-16, the government has been purchasing more pulses through the Small Farmers' Agri-Business Consortium (SFAC) and the National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED) in order to maintain a 2 million tonne buffer stock of pulses on hand. The Cotton Corporation of Bharat purchases cotton, whereas some places, like Gujarat, are where groundnuts are sourced. Certain agricultural items are also obtained on an irregular basis; for example, apples are imported from J&K in 2019–20 and onions are sourced from Maharashtra virtually yearly.

Although sugar mills are required to pay farmers a fair and remunerative price (FRP), the government does not buy sugarcane. In certain jurisdictions, the government announces the state-advised price, which is higher than the FRP. Another crop that is not readily available but is under government protection is jute. The Jute Packaging Material (JPM) Act, 1987, mandates that 100 percentage of food grains and 20 percentage of sugar be packed in different types of jute bags, according to a government announcement.

Bharatiya farmers are granted assistance with inputs as well as output. Subsidies are provided to the typical Bharatiya farmer for inputs including electricity, seeds, machinery and equipment for agriculture, fertiliser, and transportation. The MSP regime supports nations that have robust procurement infrastructure on the output side. Only a limited percentage of these subsidies are available to small and marginal farmers, though. Numerous subsidies meant for agriculture

also pass via businesses; examples include financing for food processing facilities and cold chain initiatives.

Water supplies are declining, which is having an effect on India's agriculture industry. Regions are under water stress, and the nation may experience a water shortage in one to two decades if current trends continue. Enhancing regulations, promoting water-efficient production methods, and improving water usage efficiency can all help to avoid this problem (Kumar & Mittal, 2006).

6.3 Current condition of land holding in agriculture sector:

Despite a rise in operating holdings from 138.3 million to around 146 million, the area under agriculture has been declining, falling from 159.5 million hectares (mn ha) in 2010–11 to 157 million ha in 2015–16. This may be seen in the declining average size of farmers' landholdings, which has decreased from 1.2 ha to around 1.08 ha.

The number of landholdings is used as a stand-in for the estimated number of farmers in the nation. This indicates that there are around 146 million farmers in Bharat. They are known as Bharatiya small and marginal farmers (SMF) since 86 percentage of them have an average landholding size of less than 2 hectares. Approximately 47.35 percent of the entire agricultural area is under SMF operation. Across the five states of UP, Bihar, Maharashtra, MP, and Karnataka, live more than half of Bharatiya farmers.

For the most of his career, the Expert Siraj Hussain (retired IAS), has worked with matters pertaining to Bharatiya agriculture. He held the positions of Chairman and Managing Director of FCI, Secretary of Agriculture, and Secretary of Food Processing Ministry. He has served as a visiting senior fellow at the Indian Council for Research on International Economic Relations since leaving the IAS. Smaller landholdings yield smaller pockets of product, which must be combined in order to move even a trolley-load to a neighbouring market or agricultural produce market committee (APMC) mandi. Small and marginal farmers are compelled to sell their produce at the farm gate itself because of the limited holdings brought about by fragmentation. This is particularly true in states where the APMC mandis network is not very strong.

6.4 Insufficient crop rotation:

The persistent lack of proper crop rotation in Bharat has resulted in imbalances in nutrients, infestations of pests, and degradation of the soil (Chauhan et al., 2012). In order to enhance agricultural production, it is imperative to utilize pulse-cereal rotation strategies. The primary goal of crop rotation is to optimize crop yield while simultaneously preserving soil fertility.

Utilizing rotation of pulses and grains can serve as a viable strategy for diversification. Legumes possess the capacity to augment the organic carbon content of soil and enhance the overall nutrient levels in the soil (*Soil Changes Following Long-Term Cultivation of Pulses / The Journal of Agricultural Science / Cambridge Core*, 2009).

6.5 Use of pesticides:

The excessive application of pesticides poses a significant issue for farmers. On the other hand, pesticides play a crucial role in safeguarding crops. Pesticides are essential in agricultural production. Farmers have utilized them for weed and insect management, resulting in significant boosts in agricultural yields. The exponential growth of the global population in the 20th century was only made feasible due to a corresponding surge in agricultural output. Approximately 33 percentage of agricultural products rely on the utilization of pesticides for their production. Eliminating the usage of pesticides would result in a significant decline in fruit production by 78 percentage, vegetable production by 54 percentage, and cereal production by 32 percentage (Tudi et al., 2021). The utilisation of pesticides in Bharat, akin to several other nations, entails various drawbacks and complexities. Global initiatives are underway to advance sustainable and integrated pest management strategies, decrease reliance on pesticides, and explore alternate approaches to pest control in order to address these drawbacks. Despite the fact that large manufacturers in India adhere to national regulations for spray equipment, numerous manufacturers nonetheless meet local demands with subpar products (Abhilash & Singh, 2009). Additionally, this has been a controversial issue.

6.6 Agricultural Markets and Cold storage:

In the absence of effective marketing channels, farmers are compelled to rely on local dealers and intermediaries to sell their agricultural products, resulting in financial losses. Typically, these farmers are compelled to sell their agricultural products as a result of socio-economic conditions. Commercialization necessitates cost-effective agricultural output and enhanced connections with agricultural markets.

The cultivation of nearly all arable land necessitates making productivity the primary impetus for agricultural expansion. In light of the scarcity of water resources, there is a pressing need for additional water supplies to cater to the growing demands of industry and urbanization. (Boretti & Rosa, 2019). NITI Aayog has also launched a poverty alleviation plan aimed at enhancing productivity. To achieve this, several alternatives need to be explored, such as the implementation of high-yielding seeds, cultivation of a diverse variety of high-value crops, and

decrease in marketing expenses. All farmers, even those with modest land holdings, should equally benefit from rural development initiatives, with particular attention given to addressing the needs of landless individuals, poor individuals, women, and those belonging to reserved castes. Moreover, a significant proportion of Bharat's impoverished population resides in areas characterized by either a lack of or inadequate precipitation. Presently, the agriculture industry is confronted with the significant problems of a growing population and a substantial growth in food consumption.

Cold storage is essential for preserving agricultural products, but challenges include inadequate infrastructure, accessibility, high costs, outdated technology, uneven distribution, perishable nature, climate change impact, post-harvest losses, operational challenges, storage duration and capacity, and regulatory compliance. Addressing these issues requires government policies, infrastructure investment, farmer education, and advanced technologies to make cold storage more efficient and accessible.

6.7 Financial and Subsidies related issue:

The Agriculture Finance approach seeks to institutionalise finance at the farmer level in marketing, trade, processing, and agribusiness in order to combat poverty, food insecurity, and unemployment in India (Barot & Patel, 2015).

There is little financial support for agriculture as a result of small and marginal farmers' dire financial circumstances. So, he purchase the remaining funds as high interest.

The introduction of agricultural subsidies was intended to encourage farmers to embrace the green revolution. In addition, subsidies are meant to safeguard consumers, control food price inflation, and lower farmers' production costs. But as of late, it has become clear that subsidies are seriously harming a number of economic sectors. Due to the widespread usage of nitrogenous fertilisers brought on by subsidised urea, local water sources have become contaminated, and soils have been degraded.

Similarly, electricity subsidies have seriously harmed the health of power distribution firms in addition to causing an alarming abuse of groundwater. Due to a rise in non-performing assets (NPAs), credit subsidies like loan waivers have damaged the Bharatiya banking sector and had a detrimental impact on the whole economy. Minimum support prices (MSPs), which are output price supports, primarily cover a small number of crops—wheat and rice, in particular—that the government purchases in a small number of states.

6.8 Government Policy:

To safeguard Bharatiya consumers, the government places export limits on every increase in the price of an agricultural item. It makes it more difficult for farmers to profit from high prices in overseas markets.

A significant departure from conventional agriculture is implied by conservation agriculture. To comprehend how conservation agricultural technologies interact with other technologies and how institutional arrangements and policy tools support or undermine conservation agriculture, policy analysis is necessary (Raina et al., 2005).

This has resulted in less private investment in export infrastructure, such as cold storage facilities and warehouses, when combined with the Essential Commodities Act (ECA). Farmers are forced to participate in distress auctions due to a shortage of storage facilities.

Bharatiya farmers may only sell their goods at Farmgate or the local market (haat) to village aggregators, APMC mandis, and the government at the minimum support price (MSP) due to limitations imposed by Agricultural goods Market Committee Acts issued by various states.

A positive step has been taken with the launch of the electronic national agriculture market (e-NAM), an online marketplace for selling agricultural commodities in Bharat. However, because of three main obstacles, its benefits have been minimal: 1. Transactional time costs, 2. Quality assessment challenges and 3. Logistics of transportation.

7. Challenges faced by Bharat's Agriculture after the Green Revolution:

The objective of the Green Revolution was to attain food grain self-sufficiency, which was effectively accomplished through the implementation of high-yielding crop varieties, irrigation systems, enhanced fertilizer usage, and adoption of modern agricultural techniques. The presence of agricultural externalities has led to a substantial deterioration in soil quality and raised environmental concerns (Goswami et al., 2017).

7.1 The Green Revolution Advancing Technological Capabilities:

The development of Green Revolution technology was not resource-neutral and exhibited substantial geographical disparities and variety.

A. Groundwater level

The rain-fed regions did not experience the advantages of enhanced agricultural output and development. The food system successfully attained self-sufficiency, but this came at the cost of insufficient supply of micronutrients. The increasing disparity in production incentives has led to the widespread adoption of intercropping in the irrigated areas across Bharat (Gómez y Paloma et al., 2020). The environmental consequences of activities associated with the Green Revolution were also distinct. The overuse of agricultural products has caused a rise in environmental pollution, resulting in land degradation and water depletion (Pingali, 2012). Bharat has the most elevated rate of water depletion globally (Aeschbach-Hertig & Gleeson, 2012). Approximately 54 percentage of Bharat's whole land area is experiencing notable water scarcity, primarily concentrated in the northwestern and eastern coastal regions.

B. Climate change and Food quality

These areas have seen the greatest success in implementing technology associated with the Green Revolution (Shiao et al., 2015). Around 64percent of land degradation in Bharat can be attributed to human and natural causes such as deforestation, pollution, inadequate agricultural methods, overgrazing, wind and river erosion, and other factors (Nkonya et al., 2016) .The escalation of climate change is directly attributed to the heightened release of greenhouse gases, which are intricately linked to agricultural activities. Agriculture is greatly affected by climate change. The process generates greenhouse gases (GHGs) including CO₂ and nonCO₂ gases such as methane (CH₄) and nitrous oxide (N₂O), which contribute to the phenomenon of global warming. Agriculture in Bharat contributes about 18percent of the total greenhouse gas emissions in the country (Vetter et al., 2017).

C. Backward-Forward linked Marketing:

Cold Strong ties to farmer organisations, farmer producer associations, self-help groups, and farmers are necessary for food processing facilities. Additionally, in order to market its processed food, it must have robust forward connections with exporters, retailers, wholesalers, and others. Bharatiya inadequate rural roads make it difficult to move agriculture products from fields on time and to deliver inputs on time. In other regions, over 30 percentage of farmers' produce is wasted due to regional floods, subpar seed, ineffective farming methods, a lack of cold storage, and harvest spoilage. These factors, along with a lack of organised retail and rival buyers, make it more difficult for Bharatiya farmers to sell surplus and commercial crops.

Based on the preceding discussion, it is evident that issues such as water scarcity, soil pollution, soil erosion, food contamination, and climate change have emerged. Currently, the

technologies associated with the green revolution are being employed to address these issues in agricultural output. The technology must be elevated to a more advanced level in order to solve these challenges.

7.2 The COVID-19 pandemic and its repercussions on the Bharat's agriculture sector:

Following the conclusion of the COVID-19 pandemic, numerous projects were launched in the agricultural sector in Bharat. The government launched a range of agricultural initiatives to assist those in need. The state-led procurement efforts ensured that farmers purchased the highest-priced seeds and pulses at the government's lowest fixed pricing (OCED, 2018). Commencing in April 2021, industries and farmers will be permitted to recommence their operations, provided that they are situated in areas unaffected by the virus. As per the Pradhan Mantri Garib Kalyan Yojana, the government has declared that from April to June, 800 million impoverished individuals will receive a monthly allocation of 1 kg of lentils, as well as 5 kg of rice and wheat. Additionally, another 80 million individuals will have access to cooking facilities. In order to maintain their survival (Sustaining and Shielding Business from Disasters: Assessing Indian Experiences of COVID-19 Pandemic Disaster Management | SpringerLink, 2022). Amidst the lockdown, farmers saw numerous challenges in acquiring fertilisers, resulting in a direct repercussion on agricultural output. Throughout this period, farmers faced a shortage of skilled and productive agricultural workers, which posed a challenge throughout the harvest season (Impact of COVID-19 on the Food Supply Chain | Food Quality and Safety | Oxford Academic, 2020). Amidst the COVID-19 pandemic, three agricultural legislations were enacted and subsequently faced opposition. The concern of the spread of the coronavirus led to a significant loss of lives during the farmers' protest. A significant proportion of the protesting farmers consisted of the elderly demographic, who were particularly vulnerable to the impact of the virus. Subsequently, the Union Government repealed these laws.

8. Conclusion:

The agriculture sector faces numerous challenges, including climate change, limited resources, population growth, and the need for environmentally friendly methods. Climate change affects crop productivity, pest dynamics, and water availability. The increasing global population demands more efficient farming methods. Technological advancements like precision farming and automation face challenges, including high costs and limited availability. Biodiversity depletion is a concern due to intensive farming practices. Globalization and climate change

also increase pests and diseases, posing threats to crops and livestock. Farmers face market access, price instability, and trade barriers. Rural development issues, particularly in emerging nations, hinder sustainable agricultural practices. Policy and regulatory issues hinder sustainable farming practices. Consumer awareness of ethical food production is growing, necessitating a cooperative strategy involving governments, farmers, researchers, industry players, and international organizations.

We may conclude that crops should be grown in accordance with the appropriateness of the soil quality based on the issues and obstacles mentioned above. It is much more important to choose crops in that location based on water availability. Eating habits appear to need to be altered. Crop rotation needs to be done based on a number of other considerations in addition to MSP. Deciding on agricultural policy while keeping farmers in mind. The establishment of cold storage and food processing facilities has to be based on the local agricultural yield. Reducing the role of middlemen in the agriculture sector is crucial.

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