



## Challenges Faced in Modern Agriculture

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# **CHALLENGES FACED IN MODERN AGRICULTURE**

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## **Abstract**

India is one of the major players in the agriculture sector worldwide and it is the primary source of livelihood for about 58% of India's population. India has the world's largest cattle herd, largest area planted to wheat, rice, and cotton, and is the largest producer of milk, pulses, and spices in the world. Agriculture sector in India holds the record for second-largest agricultural land in the world generating employment for about half of the country's population. Thus, farmers become an integral part of the sector to provide us with means of sustenance. The agricultural sector is a significant part of the Indian economy in terms of its GDP contribution. It is a source of employment for the majority of the nation's population. This sector has tremendous growth opportunities at the moment, with India already being one of the largest agricultural producers globally. The agriculture sector in India is expected to generate better momentum in the next few years due to increased investment in agricultural infrastructure. India is expected to be self-sufficient in pulses in the coming few years due to concerted effort of scientists to get early maturing varieties of pulses and the increase in minimum support price. Farmers over-depend on unreliable rain and lack of irrigation facilities that leads to a decline in agricultural output. Poverty and illiteracy of the farmers prevent them from making large-scale capital investments and adopting scientific methods of cultivation. Small farmers in India often have difficulty accessing markets to sell their products, which limits their income and economic growth. One of the main handicaps with Indian agriculture is the lack of cheap and efficient means of transportation. Even at present there are lakhs of villages which are not well connected with main roads or with market centres. The objective of this research is to identify the problems present in Indian Agriculture and then find solutions to minimize them.

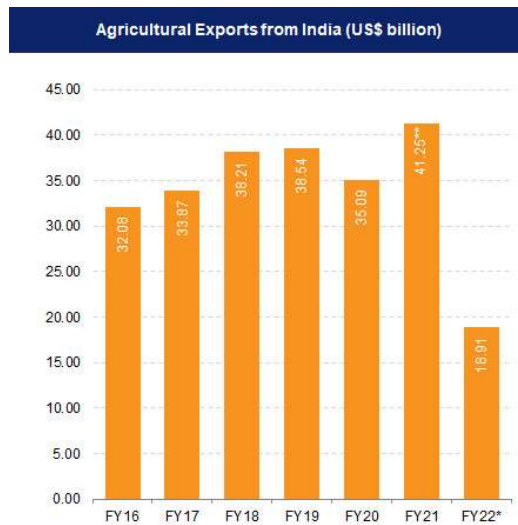
**Keywords:** Agricultural infrastructure, Agriculture, Fragmentation, GDP contribution, Large-scale capital investments

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## **1. Introduction**

India is one of the major players in the agriculture sector worldwide and it is the primary source of livelihood for 55% of India's population. India has the world's largest cattle herd (buffaloes), largest area planted to wheat, rice, and cotton, and is the largest producer of milk, pulses, and

spices in the world. It is the second-largest producer of fruit, vegetables, tea, farmed fish, cotton, sugarcane, wheat, rice, cotton, and sugar. Agriculture sector in India holds the record for second-largest agricultural land in the world generating employment for about half of the country's population. Thus, farmers become an integral part of the sector to provide us with means of sustenance. The Indian food industry is poised for huge growth, increasing its contribution to world food trade every year due to its immense potential for value addition, particularly within the food processing industry. The Indian food processing industry accounts for 32% of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. According to Inc42, the Indian agricultural sector is predicted to increase to US\$ 24 billion by 2025. Indian food and grocery market is the world's sixth largest, with retail contributing 70% of the sales.



[ source : <https://www.ibef.org/industry/agriculture-india> ]

Rapid population expansion in India is the main factor driving the industry. The rising income levels in rural and urban areas, which have contributed to an increase in the demand for agricultural products across the nation, provide additional support for this. The market is being stimulated by the growing adoption of cutting-edge techniques including blockchain, artificial intelligence (AI), geographic information systems (GIS), drones, and remote sensing technologies, as well as the release of various e-farming applications.

The agriculture sector in India is expected to generate better momentum in the next few years due to increased investment in agricultural infrastructure such as irrigation facilities, warehousing, and cold storage. Furthermore, the growing use of genetically modified crops

will likely improve the yield for Indian farmers. India is expected to be self-sufficient in pulses in the coming few years due to the concerted effort of scientists to get early maturing varieties of pulses and the increase in minimum support price.

Technology has a major role in farming and agriculture practices; and with the advent of digital technology, the scope has widened. Innovation in agriculture is leading an evolution in agricultural practices, thereby reducing losses and increasing efficiency. This is positively impacting farmers. The use of digital and analytic tools is driving continuous improvement in agriculture, and the trend is here to stay, resulting in improving crop yields and helping to increase the income of the farming community.

### Traditional farming Vs Modern farming

Traditional farming is defined as a primitive way of farming that involves the use of labour-intensive, traditional knowledge, tools, natural resources, organic fertilizer, and old customs and cultural beliefs of the farmers.

Modern farming methods refer to a type of agricultural production that involves a lot of money, manpower, and a lot of farm equipment like threshers, winnowing machines, and harvesters, as well as a lot of technology like selective breeding, insecticides, chemical fertilizers, and pesticides.

#### Uses of Modern Technology in India

- i. Improved productivity from the mechanization of agriculture
- ii. Climate/ weather prediction through artificial intelligence
- iii. Resilient crops developed via the use of biotechnology
- iv. Agriculture Sensors
- v. Improving farm yields and supply chain management use Big Data
- vi. Livestock monitoring
- vii. Monitor and Control Crop Irrigation Systems through Smartphones

## **2. Review of Literature**

There has been many works identifying the problems faced in agriculture. Population of the world is increasing at a very fast rate. The major growth of urban population is now taking place in low and middle-income nations such as India, China, and Brazil (Mondal, P., & Basu, M. (2009)). Due to rapid urbanization and growing world population, producing adequate food

is one of the main challenges faced by the agricultural sector (Devlet, A. (2021)). Dwivedy, N. (2011) lists the developmental challenges faced by the Indian agriculture sector in particular and developing nations in general like, illiteracy, poor socio economic conditions, lack of technical knowledge and awareness, small land holdings, modernization leading to barren land and disasters leading to rural poverty, weather-dependent farming systems, low per capita income, underdeveloped physical infrastructures and inefficient bureaucratic procedures associated with the comparatively high cost of agricultural production. From 2010 to 2014, different parts of the world were hit by drought, and agriculture, industry and commerce posed great challenges. Climate change may lead to more frequent and severe droughts (Devlet, A. (2021)).

Mahendra Dev, S. (2014) focussed on the issues of small farmers in India. 80% of Indian agriculture constitutes of small and marginal farmers. Land relations are extremely complicated, and this complexity has contributed significantly to the problems faced by the small farmers. Major productivity increases depend on adoption of new technologies, good land markets and access to land. Effective cooperation between private sector, public agencies and NGOs will be essential (Dethier, J. J., & Effenberger, A. (2012)). In sub-Saharan Africa there has been continued interest in the adoption of new technology (Takahashi, K., Muraoka, R., & Otsuka, K. (2020)).

### **3. Objectives of the study**

- i. To understand the current scenario of modern agriculture in India.
- ii. To identify the challenges faced in modern agriculture.
- iii. To find the solution to the challenges faced by the farmers.

### **4. Research Methodology**

The research Methodology is based on secondary data, which include compilation of research article of the experts in the field and reflection of the various journals on modern agriculture. The approach of the research is exploratory in nature. The research undertaken by researchers adequately substantiates the claim made in this paper to capture the challenges faced in the modern agriculture.

### **5. Discussions**

5.1 To understand the current scenarios of modern agriculture in India

Agriculture has been evolving since the age of prime humans. As fast-paced technology has overtaken the world by storm, the department of agriculture is too not left aside. In such scenarios, the startups, a.k.a. new businesses, are innovating and competing along the line to make the world a better place with the help of new technologies such as the Internet of Things (IoT), Artificial Intelligence, machine learning, etc.

### **Latest trends in Agriculture in India**

#### **i. Increase in production of food grains**

Due to the Green revolution in India, the production of food has significantly increased. This trend has left its impact in terms of better-yielding varieties of food grains, drought-resistant varieties of crops, etc. This was and is the latest trend in agriculture in India. On a yearly basis, due to research and development, new crop varieties are introduced.

#### **ii. Diversification in Agriculture**

The diversification in agriculture was a much-needed change to improve soil fertility and quality while there was a rush for crop production. Diversification of agriculture usually consists of the growth of horticultural crops, vegetables, oils, nitrogen-fixation plants, etc. This is one of the latest trends in agriculture in India. This is a much-needed change as this latest technology trend also needs a label.

#### **iii. Horticulture and its output in the present scenarios**

Due to India's wide variety of soil conditions and textures, horticulture is constantly growing. According to reports, India is the second largest producer of vegetable crops and the largest producer of fruits in the world. This latest trend in agriculture in India is growing with the flow. Therefore, constituting a large part of India's GDP.

#### **iv. Floriculture and its increasing effect on the Indian economy**

Floriculture is one of the latest trends in agriculture in India, with a contribution of INR 266 billion. As the technology relating to agriculture is improving day by day, flower production, a.k.a. floriculture, is improving day by day. As per reports, in floriculture around 31000 hectares of land in southern states of India involved.

### **Recent innovations in agricultural field in India**

#### **i. Internet of Things**

Conventional farming requires a large amount of labour and time to monitor crops. Hence, the Internet of things changes this whole scenario and makes it real-time by using the technology. A large amount of information is collected by the use of sensors like soil humidity and temperature sensors, plant and livestock tracking sensors, etc. These sensors provide real-time information to farmers on their mobile devices. Hence, this latest technology is the latest trend in agriculture in India

ii. Agricultural Robotics

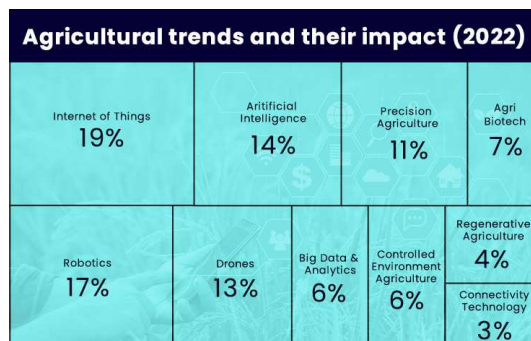
Agricultural robotics is taking shape in Indian agriculture. Although the concept has been roaming for a long period of time. The businesses involved in the technology are making serious efforts now. This latest trend in technology is use for seeding, fruit picking, harvesting, planting and much more applications.

iii. Artificial intelligence

Incorporating artificial intelligence in farming provides real-time data to farmers. Henceforth, this technology has only given the farmers the real-time information they need, like the weather data, crop yield and prices. This enables farmers to make informed decisions. Furthermore, with the help of this technology, timely correction and corrective response are possible.

iv. Drones

Drones are mainly use to monitor crops, spray fertilizers and pesticides, etc. They are called unmanned aerial vehicles, and they are as per their definition. This latest trend in agriculture and agricultural technology is revolutionizing the farming tech by reducing the amount of labour required to grow a crop.





[source : <https://www.tractorjunction.com/blog/the-latest-trends-in-agriculture-in-india/>]

Technology in agriculture affects many areas of agriculture, such as fertilizers, pesticides, seed technology, etc. Biotechnology and genetic engineering have resulted in pest resistance and increased crop yields. Mechanization has led to efficient tilling, harvesting, and a reduction in manual labour. Irrigation methods and transportation systems have improved, processing machinery has reduced wastage, etc., and the effect is visible in all areas. New-age technologies focus on robotics, precision agriculture, artificial intelligence, blockchain technology, and more.

## **5.2 To identify the challenges faced in modern agriculture.**

Farmers were facing losses because the produce was getting wasted after being harvested due to lack of transportations and storage facilities. The small and the marginal farmers did not have economies of scale to opt for proper grading, sorting, packaging, and transportation. The producer had to often resort to distress sale due to lack of market channel, support, and information. Despite high quality of produce and high demand for the product in the industry, the price that the farmers were receiving was not at par with the quality.

### **5.2.1 Transportation Problems.**

In general, the farmers that produce the crops are in remote villages where proper road and connectivity is not there. Farming always happens in areas where the demand for urbanisation is not there. But conversely the demand of the produce is more in urban towns. As a result, it becomes difficult to transport the produce from villages to these urban towns. Cost increases, wastage increases, and involvement of middlemen increases and hence profit of farmers decreases.

### **5.2.2 Inefficient Supply Chain.**

There is a lack of an efficient supply chain for the farmed produce. Cold storage facilities are not adequate. Other infrastructures related to agriculture is also not that good in our country and gets very little investment from government and private sectors.

#### 5.2.3 Natural Factors.

Soil erosion, extreme temperatures, lack of water, flooding make it difficult for the farmers to do irrigation. On top of this, pests and other insects destroy crops. Farmers have to deal with these challenges mostly on their own.

#### 5.2.4 Lack of knowledge among farmers.

Mostly the farmers have very little educational background. For this reason, they are at mercy of the people who sells the crop. Also due to this they are not well versed with the modern farming equipment and technology.

#### 5.2.5 Land Issues.

The repeated division of land among generations of farmers and land acquisition for industrializations have left the farmers with very small piece of land owned by them. Farming on such small land is very difficult and does not scale out well.

### **5.3 To find the solution to the challenges faced by the farmers.**

Due to the above-mentioned issues faced by the farmers it becomes quite challenging for the farmers to produce good quality crops and earn a living at the same time. The life quality of the farmers also doesn't improve, and farming is not taken up by their next generation.

#### 5.3.1 Farmers Organizations.

There should be some organization whose focus should be only on farmer's problems. These organizations should bring in agricultural reforms and can fight for injustice on farmers. They should also educate farmers.

#### 5.3.2 Improve Storage Facilities and Infrastructure

Cold storage facilities should be created more and investments from government and private sector should be encouraged. Ample cold storage facilities will reduce wastages to a great extent. Other infrastructure related to agriculture should also be improved like road networks, transportation, distribution of high-quality seeds and fertilizers and proper marketplace.

### 5.3.3 Fund Allocation and Budgeting

Along with investment from government in improving the infrastructure, it should also bring in budgetary policies so that farmers can easily get capital with help of loans with low interest rates. The finance options for small scale farmers are very limited as of today.

### 5.3.4 Modern Farming Technology.

Today when technology is creating a positive impact in every sector, then why not agriculture. Modern equipment, drone surveillance, IT infrastructure, advanced R&D can truly benefit the agricultural sector and increase crop yield.

### 5.3.5 Land Reforms.

With repeated land divisions and urbanization, today farmers own very small lands on which farming is difficult. Government should dedicate lands for agriculture and restore lands also. These dedicated lands should not be acquired for urbanization and industrialization. Farmers community should oversee where groups of farmers can come together and share land to do farming.

## **6. Conclusion**

India is a developing country, and it will have its own problems of the supply chain. Agriculture sector is no exception and suffer from this problem too. To solve this all the intermediaries should come together and collaborate. All the issues faced by farmers as well as the solutions are connected. Government and local administration should help the farmers. As a country of more than a billion people agriculture is very important for our nation from the point of feeding our own people and exporting too. If enough attention is not given to this sector, it can cause a major disruption in our economy.

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