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Organic Farming in India: Evolution, Current Status and Policy Perspectives

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Abstract

The performance of the agricultural sector is key for the development of the economy, especially for developing economies. It helps the economy in various ways, such as increased income for farmers, employment in rural areas, and, most importantly, food security. With the growing demand for food, farmers use extensive fertilisers and pesticides to increase productivity. This irrational use of fertilisers reduces soil fertility, pollutes rivers, kills plants and animals, and is linked to many human diseases. Thus, conventional farming raises many concerns related to the environment as well as human health. The emergence of organic farming is because of certain limitations of conventional farming. In our country, organic farming practices are taking a new shape. India has 1.59 million organic producers with 2.7 million hectares of agricultural land under organic agriculture. The current paper aims to describe the evolution and status of organic agriculture in India. It also seeks to probe the impact of organic agriculture on various aspects of farming and economy. The paper also aims to identify the constraints in the growth of organic agriculture. Further, based on the findings, the paper proposes new development models for the sustainable growth of the agriculture sector in India. Through this, a perspective is provided on the current state and policy alternatives with innovative organic farming models for the welfare of farmers and people at large.

Keywords: Organic Farming; Farmers; Agriculture; Production; Environment; India

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Introduction

Organic farming has emerged as an alternative to conventional agriculture that preserves soil health and provides nutritious food by abstaining from using fertilisers and pesticides. Organic farming uses biofertilisers, vermicomposting, and green manure to promote soil health and biodiversity and provide healthy food (Das et al., 2021; Reganold & Wachter, 2016). These qualities make organic farming a viable and sustainable option in the long run (Schoonbeek et al., 2013). Moreover, organic farming ensures sustainability (economic, environmental, and social) and supports sustainable development goals (Bandanaa et al., 2021; Šeremešić et al., 2021). The International Federation of Organic Agriculture Movements (IFOAM), General Assembly (2008) defined organic farming as:

> a production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity, and cyclical adaptation to local conditions rather than using inputs with adverse effects. Organic Agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and good quality of life for all involved.

In recent years, organic farming is gaining momentum worldwide, including in developed and developing countries. This can be observed by the significant increase in demand for organic products, and more agricultural land goes into account for organic farming (Willer et al., 2022). Globally, the organic food and drink sales market reached more than 120.6 billion euros in 2020 (Willer et al., 2022). With its enormous environmental and economic benefits, organic farming is taking new shapes, but simultaneously, farmers are facing multifaceted challenges in adopting this practice, such as transition periods, certification, productivity, markets, and extension services. These challenges are the key reasons for the slow development of organic agriculture.

The study is organised as follows. The next section analyses India's agricultural development and evaluates the current food production and population. Then, it discusses the research methodology. Following this, the section deals with the emergence of organic farming and the current status of organic farming in India. The final section examines the impact of organic farming and its constraints.

Agricultural Development Strategy in India and its Impact

The agricultural sector's contribution to India has been very significant since independence as its performance decides the country's development path. After independence, the Indian economy depended substantially on agriculture; around 72% of the workforce was engaged in agriculture, accounting for 50% of the national income share (Tripathi & Prasad, 2009). According to these two authors, Indian agricultural development can be divided into four phases. In the first phase after independence, the government took necessary actions to boost agriculture through land reforms. The second phase started after the severe drought in the mid-1960s; India adopted the new strategy of the green revolution in the late 1960s, which helped India to attain self-sufficiency in food grains. In the next phase, the agriculture sector was diversified, with a focus on milk, fishery, poultry, vegetables, and fruits. In the fourth phase, the impact of 1991 reforms on agriculture was studied, in which no immediate reforms were implemented (Tripathi & Prasad, 2009). However, the devaluation of the exchange rate, the opening of foreign trade, and the removal of protection of industries indirectly affected this sector. Besides providing domestic demand for food to 1.35 billion people in 2020-21, its contribution also contributes to industrial growth and international trade. The agriculture sector in 2020-21 accounted for 20%

and 9.2% of gross value added (GVA)[1] and gross capital formation (GFC)[2] at current prices, respectively (Agriculture Statistics at Glance, 2021).

Table 1: GVA and GCF of Agriculture, Forestry & Fishing at Current Prices		
Year	**Gross Value Added (GVA)**	**Gross Capital Formation (GCF)[3]**
2011-12	**18.5**	**8.5**
2012-13	**18.2**	**7.7**
2013-14	**18.6**	**9.0**
2014-15	**18.2**	**8.2**
2015-16	**17.7**	**7.1**
2016-17	**18.0**	**7.8**
2017-18	**18.3**	**7.2**
2018-19	**17.6**	**7.0**
2019-20	**18.3**	**7.3**
2020-21	**20.0**	**9.2**
Source: Agriculture Statistics at a Glance, 2021		

It is a well establish fact that in the process of the structural transformation of the economy, the role of agricultural sector declines in terms of its contribution to GDP. However, the agriculture sector in India is unique in that it employs a large portion of the workforce and provides food to the world's most populous country (United Nations Department of Economic and Social Affairs [UN DESA], 2023). This can be observed from the data in Table 1. Data shows that gross value added and gross capital formation are consistent and growing on an average of 18% and 8% since 2011-12, respectively. The share of the agriculture sector in GDP is low, but its contribution is crucial for the nation's food security and self-reliance. Adding to the share of agriculture, it accounts for 14.3% of the national exports (Agricultural Statistics at a Glance, 2021).

The source of India's agricultural growth can be traced back to the Green Revolution. This new strategy transitioned from traditional agriculture to modern agriculture in India. With improved quality of high-yielding varieties of seeds and intensive use of fertilisers and pesticides, productivity in the agriculture sector (especially crops like wheat and paddy in the northern part of India) increased tremendously, which helped India become self-reliant and affirmed the country's food security. The rapid growth in agriculture is supported by the increasing yield of produce to its new level, as evident from the low level of 52 million tonnes *in 1951-52, and the production of food grain* increased to 308.60 million tonnes in 2020-21.

Food security is a major concern for any country, and it is crucial for India because of its massive population and its large number of poor people. United Nations Development Programme (UNDP) and Oxford Poverty & Human Initiative (OPHI) developed the Global Multidimensional Poverty Index [4] (2022), which revealed that India possessed 16.4 per cent multidimensional poor populations, that is, 228.9 million poor people[5] of the world are residing in India in 2020. The data represents the growth of production of foodgrains in India compared with the population growth. With the green revolution, India's production of food grains has expanded along with its population.

[1] "Gross Value Added is defined as the value of output minus the value of intermediate consumption and is measure of the contribution to GDP".

[2] "Gross Capital Formation is the value of acquisition of new or existing fixed assets by the agriculture sector & allied sector".

[3] Taken from table 1.7a (Share of GCF in agriculture & allied sector in GCF of Economy in percentage)

[4] MPI is an index which measure the incidence of multiple deprivation on three dimensions (education, health, and standard of living)

[5] See MPI Report 2022, p. 20

Moreover, it has become more of a concern for India as food grain production has stalled since 2011-12 while population growth has continuously increased. The trend of foodgrain production stood at 259.29 million tonnes in 2011-12, which grew to 308.60 million tonnes of production in 2020-21. On the same side, the population has shown a rising trend. The population in 2011-10 was 1.22 billion and grew to 1.35 billion in 2020-21 (Table 2). The stagnancy in foodgrain production can be attributed to uncontrolled factors like extreme weather and environmental degradation (Lesk et al., 2016; Rozelle et al., 1997).

Table 2: Growth of Area, Production, Yields, and Population

Year	Area (Million Hectares)	Production (Million Tonnes)	Yield (Kg. /Hectare)	Population Growth (in Billion)
2011-12	124.75	259.29	2078	1.220
2012-13	120.78	257.13	2129	1.235
2013-14	125.05	265.05	2120	1.251
2014-15	124.30	252.03	2028	1.267
2015-16	123.22	251.54	2041	1.283
2016-17	129.23	275.11	2129	1.299
2017-18	127.52	285.01	2235	1.314
2018-19	124.78	285.28	2286	1.327
2019-20	126.99	296.65	2343	1.341
2020-21	129.34	308.60	2386	1.355

Source: Agriculture Statistics at a Glance, 2021

This achievement of high production and productivity comes with the help of the intensive use of fertilisers and pesticides in the fields. The consumption of fertilisers increased exceptionally high from 70,000 tonnes in 1950-51 to 2.17 million tonnes in 1970-71, 12.54 million tonnes in 1990-91, and 19.14 million tonnes in 1999-2000 (Tripathi & Prasad, 2009). This growth stood at 28.12 million in 2010-11, rising to 32.53 million tonnes in 2020-21 (Agriculture Statistics at Glance, 2021). Our observations suggest that farmers use more fertilisers and pesticides to increase productivity in the field, which results in more income.

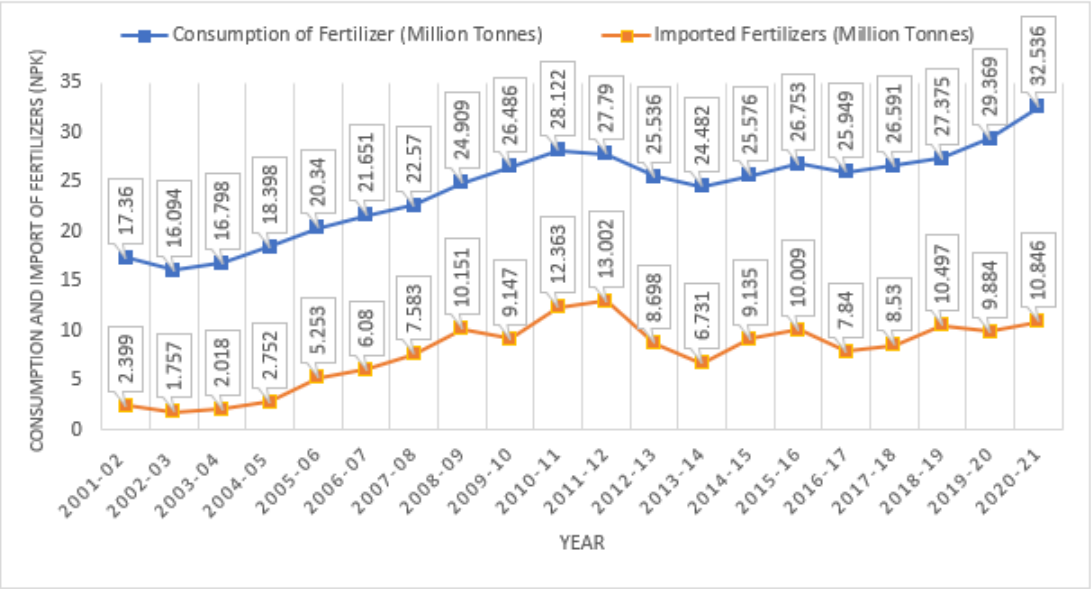

Figure 1: Consumption and Import of Fertilisers in the Agriculture sector from 2001-02 to 2020-21

Source: Agriculture Statistics at a Glance, 2021

Figure 1 shows the rising trend of fertiliser consumption in the agriculture sector and the import to meet the demand of the largest employed sector of India. The data shows the rising trend of chemical fertilisers consumption in agriculture. In 2001-02, consumption of fertilisers stood at 17.36 million tonnes which rose to 28.12 million tonnes in 2010-11. After that, it showed a decline in the demand and follow a constant path till 2017-18. However, the trend escalated again, reaching 32.53 million tonnes in 2020-21. A similar trend was noticed in case of the import of fertilisers. In 2020-21, fertiliser import was recorded at 10.84 million tonnes which was 33.3 % of total consumption—this infers that one-third of total fertilisers were imported, leading to a trade imbalance.

The agriculture sector ensures food security and contributes significantly to trade, but this does not portray a whole picture of it. The rising literature suggests that current agriculture production has negative impact on environment. Not limited to environment, the agriculture also has negative impacts on farmers and consumers as well. The irrational use of fertilisers in the field reduces soil fertility, disturbs soil pH and health hazards, and causes groundwater contamination (Randive *et al*., 2021). Pimentel (1996) critically analysed the cost of using pesticides and fertilisers during the green revolution. The overconsumption of pesticides in agriculture caused severe public health issues and environmental issues like domestic animals being poisoned by pesticides, depredation of natural predators and parasites, further reducing the pollination of vegetables, fruits, and other crops, and ground and surface water contamination. Pimentel (1996) and Randive *et al*. (2021) described that the incorrect use of fertilisers also caused soil degradation, further promoting less land productivity. The less productivity on land forces farmers to use more expensive fertilisers to maintain the productivity of the field. This costs farmers more from their income and raises the inequality between rich and poor farmers (Narayanan, 2005). India is among the countries where the farmer's suicide rate is high because of low returns from cultivation, higher input costs, drought, and climate change (Mariappan & Zhou, 2019), which has created various socio-economic problems. The situation was further aggravated when farmers unintentionally ingested these chemicals and harmed themselves. In 2021, Donthi examined the National Crime Record Bureau (NCRB) data for 2020, 7,437 deaths (up from 6,962 deaths in 2019) were ascribed to "accidental consumption of pesticides/insecticides (p.1)."

As suggested by the literature, the rising negative externalities of the current agriculture model are an indicator of overhauling the entire food production system. In this direction, organic farming has emerged as alternative farming that has a potential to achieve the targets of sustainable development. The progress of organic farming in India is significant and thus requires urgent attention to review its performance in India. Thus, the present study attempts to analyse India's organic farming production, area, and export. Further, as organic farming is in the developing stage, it faces multifaceted challenges.

Data and Methodology

The study examines the prospect of organic farming in India. For this purpose, numerous literature and reports published by international institutes and experts were reviewed. In addition, the area of organic farming, the number of organic farmers, the production of organic goods, and organic export may all be used to examine developing trends in organic farming in India. Secondary data was collected from published sources like the International Federation of Organic Farming Movement (IFOAM), Research Institute of Organic Agriculture (FiBL) Statistics – European and global organic farming statistics, and the Agricultural Processed Food Products & Export Development Authority (APEDA). Considering this information, the status of organic farming in India is discussed in the next section.

Status of Organic Farming in India

India is among the countries where the number of producers of organic products and areas of organic farming are increasing significantly. The

total cultivable area for organic agriculture in Asia accounted for more than 6.1 million hectares in 2020. In one year, India added 3,58,667 hectares of organic agricultural land under it, which accounts for 15.6% growth in 2020. However, the development of organic agriculture in India is encouraging, but it accounts for only 1.5% of agricultural land in organic farming. To promote organic farming in India, the government initiated the "*National Programme for Organic Production (NPOP)*" in 2001 under the Agriculture and Processed Food Products Export Development Authority (APEDA) and laid the foundation for the systematic development of organic farming in India. Since then, organic farming has grown almost 42 times, touching a figure of 1.78 million ha during 2017-18 and covering all types of agriculture, horticulture, and non-food crops[6] like cotton being grown under the umbrella of the organic certification process. Realising the benefits of the organic farming consumer paying premium prices for the products also promotes farmers to shift to organic farming.

In 2020, regarding organic agriculture, India ranked eighth in the world, whereas, concerning the number of producers, India ranked first (Willer, 2022). According to APEDA 2021, India has 4.3 million hectares of land under organic farming, a composite of wild harvest (1.6 million hectares) and cultivable land (2.6 million hectares). Moreover, Sikkim is the state in India that has converted its entire cultivable land into organic farming and is called the organic state of India. In terms of certified organic farms, Madhya Pradesh tops among all the states in India, followed by Rajasthan, Maharashtra, and Chhattisgarh. In 2020-21, the production of certified organic products accounted for 3.4 million metric tonnes in India. These organic products include all food products like fibre, oilseeds, sugarcane cereals and millets, tea, coffee, and fruits.

Zone Wise Organic Production (Cultivated Plus in Conversion)

To analyse organic farming production across Indian states, the organic production state-wise (cultivated plus in-conversion) was divided into six zones, that is Northern, Southern, Eastern, North-Eastern, Western, and Central (Heena et al., 2021a). The Northern zone embraced Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh, and Uttarakhand. The North-eastern[7] zone includes Tripura, Sikkim, Meghalaya, Manipur, Nagaland, Assam, and Arunachal Pradesh. The Eastern zone is comprised of Bihar, Jharkhand, Odisha, and West Bengal. The Western zone includes Rajasthan, Maharashtra, Goa, and Gujarat. The Southern zone comprises Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, and Telangana. The Central zone includes Madhya Pradesh and Chhattisgarh.

The trend of organic production in India was analysed and represented in Figure 2 (see also the Annexure). The calculation is the aggregate of the organic production from 2012-13 to 2021-22 and allotted to six zones. The higher the production, the darker the colour in the zone. The figure above revealed that the Central and Western zones have the most prominent organic production, followed by the southern zone. The North-Eastern zone shows the lowest production compared to all the zones. However, the coverage area of organic farming in states of the north-eastern zone comparatively better than other states. The difference in production among different zones can be attributed to the area under organic practices. The central and western states are India's largest states compared to other states. The Northern zone, which comprises states, shows less organic production. The reason can be the high usage of chemical fertilisers in agriculture production in these states, which may lead to less adoption of organic farming practices.

[6] Non-food crops are considered as which are grown especially for industrial uses. For example: cotton is used as a raw material in the textile industry.

[7] Mizoram is not included in North-eastern region due to data unavailability.

Figure 2: Zone-Wise Organic Production in India from 2012-13 to 2021-22
Source: APEDA, 2022
Note: Data includes 28 states. The Map is Based on Authors' Own Calculation, Data was Sourced from APEDA.

Since the inception of the National Programme for Organic Production (NPOP) in 2001, it has constantly added areas under organic farming practices. However, the data is only available from 2012-13. Figure 3 shows the growth of the certified area under organic farming in India. The figure clearly shows a cyclic trend area of organic cultivation in India. In 2012-13, the organic farming area was a mere 7.23 lakh hectares, which increased to 57.10 lakh hectares in 2015-16 and started declining. This decline can be ascribed to the Participatory Guarantee System (PGS)[8], introduced under '*Paramparagat Krishi Vikas Yojana'* (PKVY) in 2015. Since then, the certified area under NPOP has been declining. However, it started rising in 2020-21 and peaked at 91.20 lakhs hectares in 2021-22. The encouraging growth indicates that more farmers are adopting organic farming practices. The

[8] It is a cost domestic organic certificate for the promotion of organic farming. This helps small and marginal farmers to obtain an organic certificate at low/no cost and helps small farmers to sell organic produce in the market.

increase in organic producers can observe the popularity of organic farming practices.

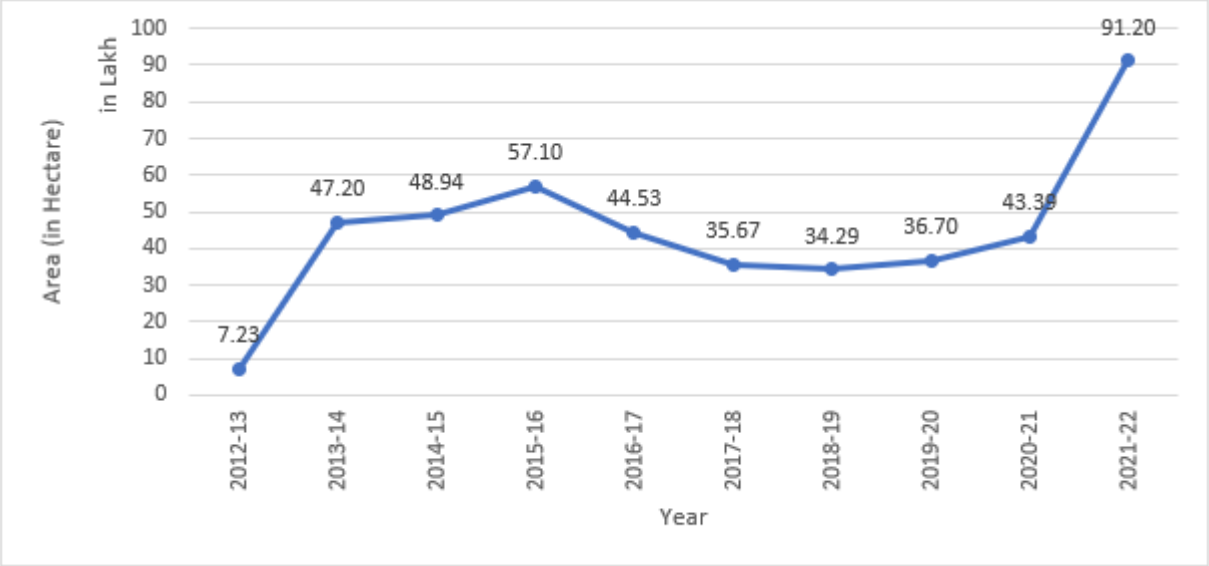

Figure 3: Growth of Organic Farming Areas (in Hectares) from 2012-13 to 2021-22
Source: APEDA, 2022

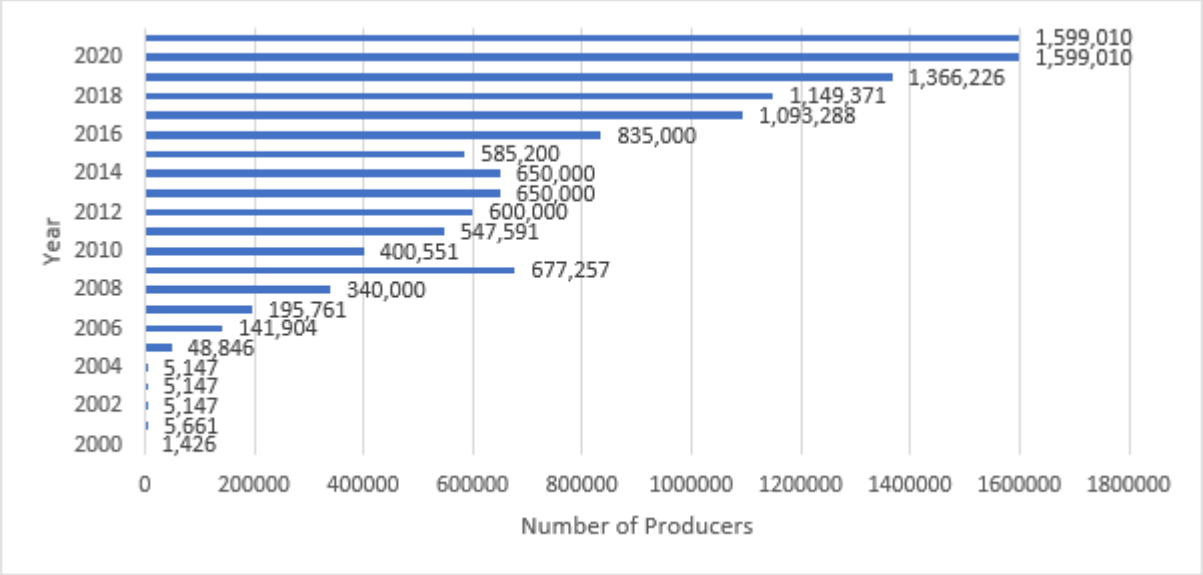

Figure 4: Growth of Organic Producers from 2000 to 2021
Source: FiBL Statistics, 2022

Figure 4 represents the number of organic producers in India. The numbers reveal the exponential rise in organic producers in India. In 2000, the number of organic producers stood at 1,426, which grew to 0.67 million in 2009 and 1.59 million in 2021. The reason for the exponential growth of organic producers can be reasoned with India's huge population. Since India is the most populous country in the world, it also consists of 85 % of small and marginal farmers who holds land less than 2 hectares (Agriculture Statistics at Glance, 2021). Furthermore, organic farming is most popular among small and marginal farmers due to its lower cost and higher profitability. These factors contribute to farmers' faster adoption rate of organic farming.

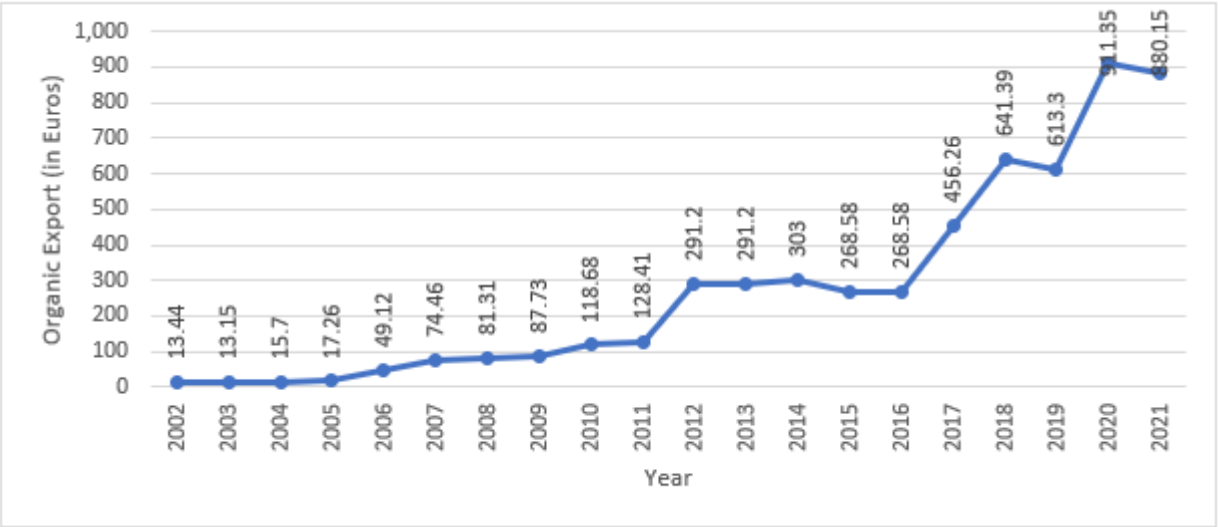

Figure 5: Organic Export (in Million Euros) from 2002 to 2021
Source: FiBL Statistics, 2022

For India, export-import plays a significant role in the economy. In this aspect, organic farming showed a significant trend. Figure 5 shows the trend of exports of organic products. The trend shows the exponential growth of organic exports in India since 2002. The data was taken from FiBL, which recorded the sales of organic products in Euros. From 2002, India exported organic products worth €13.44 million, which rose to €291.2 million in 2012 and then showed a steady path till 2016. After 2016, organic exports rose expeditiously and reached €641.39 million in 2018. This growth further rose in 2021, which grew up to €880.15 million. The trend of organic export shows surging demand for organic products, especially from developed nations, and India is continuously attempting to meet this demand.

Impact of Organic Farming

The potential of organic farming is enormous as it plays a significant role in protecting the environment. As organic farming abstains from chemical pesticides, there is a negligible risk of surface and groundwater chemical pollution (Reganold & Wachter, 2016). Excluding chemical fertilisers in organic farming, it grows safe and healthy food. Durbul et al. (2021) compared organic and conventional food and revealed that organic food was safe and nutritious for human consumption and environmentally friendly. Further, consuming organically produced food intake was associated with reduced incidents of various diseases (Vigar *et al*., 2020). Another aspect in which organic farming is superior to conventional is that it fosters biodiversity. Besides, scholars have reported that there has been an increase in biodiversity while practising organic farming (Das *et al.*, 2021; Jouzi *et al*., 2017; Tscharntke *et al*., 2021).

Further, conventional farming is water-intensive and requires more water, which infers an inefficient technique in rain-fed areas. However, organic agriculture can increase yields even in rain-fed areas (Ramesh *et al*., 2005). These positive environmental externalities attached to organic farming were significant factors in its popularity.

The studies show that when we compare conventional farming with organic farming, it provides more economic benefits. The economic performance of organic farming is more favourable compared to conventional (Brožová & Beranová, 2017; Krause & Machek, 2018). The cost and benefits analysis of organic and conventional farming revealed that organic farming is less costly, and its premium price provides farmers with more income. Using conventional farming is also economically unviable; farmers have to pay very high prices for fertilisers and pesticides, increasing the cost to farmers' pockets and soil fertility of the land (Singh & Grover, 2011). In the case of organic

farming, fertilisers like vermicomposting cost very little compared to chemical fertilisers. Studies like Manjunatha & Puttaswamaiah (2021), Watcher *et al*. (2019), Sihi *et al*. (2012), and Forster *et al.* (2013) confirmed that the input cost was lower in respect of organic farming.

Similarly, the benefit-cost ratio of organic farming as more benefits than costs (Heena *et al*., 2021b; Manjunatha & Puttaswamaiah, 2021; Shehrawat *et al*., 2016). A meta-analysis by Crowder and Reganold (2015), Durham and Mizik (2021), and Smith *et al.* (2019) analysed the profitability of organic farming. The meta-analysis study revealed that economics favour organic farming more than conventional farming. Further, if externality and ecosystem services are included in the analysis, organic farming is more profitable due to its advantages in an environment-friendly approach (Crowder & Reganold, 2015). Small and marginal farmers also reap these advantages. Organic farming uses less costly inputs and better produce prices, which help small and marginal farmers earn extra income. The studies (Altenbuchner *et al*., 2018; Eyhorn *et al*., 2018; Jouzi *et al*., 2017) reported that organic farming is overall profitable for small and marginal farmers.

Another importance of agricultural products is that it provides raw material to the industries. Cotton is among the agricultural products that are used in textile industries and is in high demand all over the world. For example, in the apparel market, the demand for organically produced clothes is high in developed countries and has a rapidly increasing share in the apparel market. Rieple and Singh (2010) analysed the value chain of organic cotton and found that the organic cotton value chain is beneficial at every stage. It was found that organic cotton adds value at every stage of the production process and is also beneficial for mediators and organic farmers. Moreover, the future of organically farmed cotton has the potential to be the largest seller in the future.

Emerging Issues of Organic Farming in India

Marketing in the agriculture sector plays a vital role in the growth of the sector and farmers. This helps farmers in every stage, from storing produce to selling products in the market, and helps them get a reasonable price. Organic products are currently only available to the most affluent consumers in society, creating a small market for farmers. Azam et al. (2019) reported that lack of warehousing was a significant issue, followed by inadequate consumer demand, limited knowledge about premium prices, costly transportation, variation in the price of the crops, and insufficient support from the government. As these factors play an essential role in marketing channels, government support is also needed. Like, the farmers in Haryana also found non-feasible organic farming as a medium of living due to a lack of government support in marketing (Ohlan, 2016). The market for organic products is significantly different from the regular market, which requires a particular skill set to deliver organic products. Das (2007) explained this difference and called for careful selection and development of target marketing to sell organic products in markets.

The other challenge the farmers are facing is the lower yield in the case of organic farming. Yield is the crucial factor through which the farmers' profitability is decided. Farmers' motive is to increase productivity on fixed land to earn more profit. In the case of organic farming, despite having enormous benefits, farmers believe it is an infeasible option because of lower yield. Globally, the organic yield was 10% less when compared to conventional farming (MacRae et al., 2011). Seufert et al. (2011) compared the yield of organic and conventional farming using meta-analysis. The study reveals that organic farming leads to lower yields, ranging from 5% when rain-fed regions to 13% lower yields when best practices are adopted for organic farming. The yield drastically dropped (34%) when both techniques were most comparable. Further, the situation is aggravated under organic farming practices when land is combined with low yields. Kirchmann (2019) reported a 35 % yield gap in organic farming, requiring 50 % more arable land to fill this gap. Adheres, more land is required to keep organic yield at par with conventional farming yields.

In India, high yields of wheat and rice are the by-products of the green revolution. These two crops are consumed immensely and exported to other countries. Nevertheless, organic produce has premium prices, and farmers resist shifting from conventional farming because of low yields. Singh and Grover (2011) conducted a study to examine the viability of organic farming in Punjab, revealing that organic wheat yield is lower when organic farming is undertaken compared to conventional wheat (compensated by the premium prices). Similar results are found in a study by Forster et al. (2013), where yield in the case of wheat is less than 27% in the first crop cycle; additional crops like soybean and cotton were also found to be a larger yield gap compared to conventional farming. However, in the second cycle, organic farming showed a similar yield to conventional farming. Sihi et al. (2012) analysed the quality of basmati rice in the Kaithal district of Haryana and compared every aspect of organic rice with conventional rice. They found that organic rice initially yields 2% lower than conventional rice, but yields are comparable in the long run. A similar trend is reported by Manjunatha & Puttaswamaiah (2021) regarding crops like ragi and maize.

In the case of conventional farming, the yield is directly affected by the chemicals used in the process. However, when farmers shift to organic farming practices and abstain from using chemicals-based fertilisers in the field, a gestation period is required for soil to adopt the biofertilisers and organic composts. This transition is called the conversion period. The conversion period usually lasts one to four years (Singh & Grover, 2011). In this period, the farm yield is low compared to conventional farming (Reddy, 2010). Infers that the farmers must sacrifice years of income or earn less during this period. Bachmann (2011) analysed the potential of organic cotton farming, in which he found out that during the conversion period of the first two years, the yield is lower in organic cotton. The conversion phase is critical for the farmers. Farmers have to give away a portion of their income during this period and do not sell their produce at the organic price (Das, 2007).

Certification is an important document that helps farmers benefit from organic farming. Certification helps farmers take advantage of the premium price of products. The role of certification in organic farming is another constraint that makes farmers continue conventional farming as the process is lengthy and costly too. This process is additionally affected by economic and institutional hurdles, making the certification process tedious (Ohlan, 2016). In India, smallholder farmers share a considerable portion of the composition of the landholding pattern. Thus, taking certification for them is a huge task, and resist them shifting to organic farming. The main problem with the certification process is that it is very costly, and some unnecessary intricacies raise confusion among farmers, especially smallholders and illiterate. Moreover, they reported that the steps taken in the certification process take an excessively long time for the government, roughly 2-3 years (Tiraieyari et al., 2014). Shehrawat et al. (2016) created an index and put weightage according to the issue related to certification and showed that organic certification is a complicated process and is a major hurdle for farmers, predominantly for illiterate and smallholders. Another significant issue is the lack of knowledge of the certification process followed by the standardisation of organic products.

Conclusions and Policy Perspectives

Today, developing countries must choose between securing food for their population while harming the environment and protecting the environment by compensating yields. The first situation necessitates the persistent use of conventional farming methods such as pesticides and fertilisers. However, the conventional farming method unsustainable nature and burgeoning negative health effects have already caused numerous concerns about how it will meet the rising population's food demand (Bowler, 2002). The second option points towards organic farming practices, outperforming conventional farming in every aspect except yield. Organic farming promotes soil fertility and biodiversity and provides

healthy and nutritious food for well-being. Further, organic farming can significantly contribute to addressing global environmental challenges. However, organic farming is not commensurate with conventional farming for a country like India, where securing food for its massive population is the highest priority. Nevertheless, organic farming is not developed enough to feed the population and faces multifaceted challenges, at least in the short run (Schoonbeek et al., 2013). Despite these challenges in organic farming, it shows significant performance in different aspects such as the area under cultivation, production of organic produce, number of producers, and exports of organic products. The area under organic farming practices has shown rising trends since 2012-13.

Further, Indian organic producers ranked first globally and showed exponential growth in adopting organic farming practices. Organic farming also fares better in terms of the trade of organic products. India showed a significant rise in exports of organic products. However, policymakers must be careful in adopting organic farming at a large scale taking into consideration of its massive population. Lessons must be learned from the most recent crisis in Sri Lanka, as many experts suggested the crisis in the country is due to an unplanned move to shift toward organic farming, which resulted into multifaceted problems in the sector and economy as well. Policymakers should also consider Sri Lanka's crises while designing policies. Therefore, implementing organic farming instead of conventional farming is a herculean task for policymakers.

In sum, this study analysed the current state of organic farming in the context of India and explored many aspects of organic farming. Although the growth of organic farming is very encouraging, the statistics show the tremendous scope of expansion of organic farming over the globe. Nevertheless, the share of organic farming is minimal and at the very early stage of development. Based on the current state of organic agriculture in India, there is ample opportunity to investigate the unexplored aspects of this practice. However, there are various organic farming challenges. New models aimed at sustainability, productivity, and social dimensions should be developed to provide a self-sustaining framework for agriculture. To effectively resolve field-level issues, the transition from conventional to organic requires detailed and focused interventions by scholars and policymakers. Proper research should be conducted when developing new agricultural development models to understand all aspects of organic agriculture in terms of its ability to preserve the environment, food security, production, and accessibility.

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Annexure

Zone-Wise Organic Production in India from 2012-13 to 2021-22				
Country	**Region**	**States**	**Total**	**Total Production (in million)**
India	North-Eastern States	Arunachal Pradesh	865.152	0.26
		Assam	210383.414	
		Meghalaya	40394.118	
		Manipur	211.11	
		Nagaland	5186.914	
		Sikkim	2507.123	
		Tripura	2552.495	
	Eastern States	Bihar	38.847	0.93
		Jharkhand	3.385	
		Orissa	789152.682	
		West Bengal	146400.408	
	Northern States	Haryana	42773.253	1.62
		Himachal Pradesh	28404.564	
		Jammu & Kashmir	237352.406	
		Punjab	6589.648	
		Uttar Pradesh	1012523.221	
		Uttarakhand	296158.164	
	Southern States	Andhra Pradesh	112936.847	2.91
		Karnataka	2432947.693	
		Kerala	179763.3	
		Tamil Nadu	173604.556	
		Telangana	13702.045	
	Central State	Chhattisgarh	93415.42	7.09
		Madhya Pradesh	6999428.582	
	Western States	Goa	33250.619	7.21
		Gujarat	840199.082	
		Maharashtra	5012735.384	
		Rajasthan	1327581.696	
		Overall Total (India)	20041062.13	20.04
Source: APEDA, 2022				

Ethical Approval and Conflict of Interest

We prepared this manuscript following the ethical issues as per the Helsinki Declaration. We also declare that there is no conflict of interest in relation to the research, authorship, and publication of this study.

Author Contribution Statement

Avinash: Collecting and analysing data, developing the first draft, and cross-checking the references.

Dr Vikas Batra: Conceptualisation, Guidance and Supervision, developing final draft alongside editing and reviewing. Both the authors read and approved the final manuscript prepared for submission.

Informed Consent

All necessary consents were taken while conducting and developing this study.

Funding and Data Availability Statement

We declare that we received no funding to conduct this study. All the data, including the data in Annexure, can be found in the paper here.

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