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Review Article

Status, benefits and future prospects of organic farming in India: A review

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ABSTRACT

Agriculture is still a major livelihood option for majority of population especially in developing countries. While addressing the global food demand, it should also be sustainable in nature in the sense that it should not directly or indirectly cause to depletion of natural resources and the ecosystem in general. Conventional farming is often based on excessive and unscientific use of chemical fertilizer, pesticide and insecticides. It is argued that conventional farming contributes to climate change, depleting fresh water resources, degrading soil fertility and polluting the environment. From this angle, organic farming is suggested as an alternative to conventional farming since its principles and philosophy are entirely different and it has an edge over conventional farming on various grounds. Considering the fact that organic agriculture covers only a small percentage of the net sown area especially in the case of developing countries like India, whether organic agriculture is a better option to follow, is a pertinent question. In this context, this paper attempts to examine some of the major relevant literature (from year 2000 to 2021) on various aspects of organic farming like definition, principles, and proposed benefits (environmental, economic and social), present status in India, and its prospects.

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1. Introduction

For ages, agriculture is central to human existence and survival. It provides food fuel and other ecosystem services. It is an important source of livelihood and plays a crucial role in economic development. At the same time, it is also a major source of environmental degradation and a force driving the Earth System beyond the 'safe-operating space' for humanity (Parrott, et al. 2006).¹ It also contributes to climate change, depleting freshwater resources, degrading soil fertility and polluting the environment through excessive and unscientific use of chemical fertilizer, pesticide and insecticides. It has imposed a serious threat on the biodiversity, fertility of the soil, traditional varieties of seeds, and century-old agricultural practices

(Govt. of Kerala, 2008).² This input-intensive (of water, chemical fertilizer and chemical pesticides) technology along with prejudiced pricing policies for fertilizers and irrigation water, are environmentally unsustainable (Sankar U, 2011).³ The agriculture practice based on synthetic chemical fertilizers and pesticides is having serious impacts on public health and the environment (Bhardwaj D, et. al., 2014).⁴ Ironically, food production is critically dependent on the very natural resources it is degrading.

Sustainable agriculture, therefore, requires not only that all people at all times have access to sufficient and nutritious food, but also that this food be produced with minimal environmental impact. Sustainable agricultural development, therefore, requires that agricultural practices and the output should meet the needs of the present without compromising the ability of future generations to meet their own needs. Current agriculture fails in achieving these goals

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on numerous ends: it also does not feed people adequately, as currently still one in six people in developing countries are undernourished due to lack of sufficient access to nutritious food (FAO, 2010).⁵ We do not achieve sustainable food security today and we will probably need to double food production by 2050 to feed 9 billion people with increasing demand for meat and dairy products (Foley, et. al., 2011).⁶ There is a drastic need for changes in the food-producing system. It is observed that widespread uptake of sustainable practices in agriculture and food supply chains are essential to meet current and future threats to food security and environmental resilience (Beddington J, et. al., 2012).⁷ From an agricultural sustainability perspective, need to produce more food in the right locations at affordable prices; ensuring livelihoods to farmers and reducing the environmental cost of agriculture are essential. Considering the huge challenge ahead, it is important to assess the potential contribution of different types of farming systems to sustainable food security. 'Alternative' farming systems that try to while minimizing external inputs are often suggested as more sustainable forms of food production. Organic agriculture - a system aimed at producing food with minimal harm to ecosystems, animals or humans is the most prominent of these alternative farming systems and is often proposed as a practice for more sustainable agriculture.

1.1. Definition

Organic agriculture is a farming system aimed at producing food with minima harm to ecosystems, animals or humans (FAO & WHO, 2007).⁵ According to its original ideas, organic agriculture encompasses not only environmentally sound management practices but also a farming system that is socially just and economically responsible. As per the definition of the USDA study team, "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives, etc) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection". Some other important definitions of organic agriculture are listed below.

"Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfill any specific function within the system", (FAO/WHO Codex Alimentarius Commission,1999)⁸

"Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on the ecological process, biodiversity and cycles adapted to local conditions rather than the use of inputs with adverse effects. Organic farming combines tradition, innovation and science to benefit the shared environment and promote fair relationship and a good quality of life for all involved" (IFOAM, 2008).⁹

1.2. Organic farming principles and components

The four basic principles of Organic Farming- Principle of Health, Principle of Ecology, Principle of Fairness and Principles of Care, are the roots from which organic agriculture grows and develops (IFOAM). These principles clearly explain how organic farming can improve all agriculture practices in a global context and to what extent it can contribute to the world. These principles are framed to inspire the organic movement worldwide in its full diversity. The organic food system based on these principles has to potential to contribute significantly to future food security.

Principle of Health envisages that organic agriculture should be capable of sustain and enhance the health of soil, plant, animal and planet as one and indivisible. At the same time, the Principle of Ecology states that organic agriculture should be based on living ecological systems and cycles, work with them, emulate and help to sustain them. The Principles of Fairness, on the other hand, states that the relationship among the stakeholders of the organic agriculture system should be based on equity, respect justice and stewardship of the shared world. This is essential to ensure fairness at all levels and all parties- farmers, workers, processors, distributors, traders and consumers, thereby ensuring a good quality of life to all. The Principle of Care suggests that the organic agricultural practices should frame in such a manner that it addresses not only the health and well-being of current but also of the future generations and the environment.

1.3. Components of organic farming

Organic agriculture involves techniques like inter-cropping, rotation of crops, double-digging, mulching, integration of crops and livestock. What makes organic agriculture unique, as regulated under various laws and certification programmes, is that: (1) almost all synthetic inputs are prohibited, and (2) 'soil building' crop rotations are mandated (FAO, 1999).⁸

The increasing demands for organic produce and the rapid growth of the organic sector-led, however, to the need to regulate organic production. This resulted in the definition of organic standards that were considered best environmental practices, e.g. enhanced crop rotations and crop diversity, use of organic fertilizers and biological pest control. Organic agriculture today is thus closely tied to a

certification and labeling process and to a set of prescribed management methods that are regulated by international standards and national laws. Considering the wealth of meanings and definitions of 'sustainable, agro-ecological or low-input agriculture, it is important to adhere to these rules and standards when discussing organic agriculture. Organic agriculture here refers to 'truly' organic systems, i.e. farming systems that follow defined organic standards and regulations.

2. Benefits of Organic Farming

To assess the potential contribution of organic farming to agricultural sustainability and rural development, (1) environmental benefits; (2) socio-economic benefits and impact on farmer's livelihood and (3) health benefits are discussed.

2.1. Organic farming and environment

A major subject in the organic debate is whether organic farming methods have less impact on the environment, can be equally as productive, and can be no more expensive than conventional approaches. A variety of surveys and studies have attempted to compare these issues for organic and conventional farming methods. Many believe that organic farming is less damaging to the environment because organic farms do not use or release synthetic pesticides into the environment, some of which have the potential to harm soil, water, and local terrestrial and aquatic wildlife reported that the development of agriculture usually has a serious negative impact on wild biodiversity (Clement Allan Tisdell, 2012). The present system of agriculture usually referred to as 'conventional' and which is evolved in the western nations, is inherently self-destructive and unsustainable (Narayan S, 2005). It is estimated that, in India, more than 50 percent of the land area is either decertified or degraded and the excessive and unscientific use of chemical pesticides and fertilizers is one of the major reasons for this (Sankar U, 2011).³ It has been suggested that this system enhances biodiversity in agricultural landscapes- increases species richness, having on average 30 percent higher species richness. It is found that soil organic matter (soil carbon) and nitrogen were higher in the organic farming systems, providing many benefits to the overall sustainability of organic agriculture.

Bio fertilizers plays an important role in maintaining long term soil fertility and sustainability by fixing atmospheric dinitrogen, mobilizing fixed macro and micronutrients or convert insoluble P in the soil into forms available to plants, thereby increasing their efficiency and availability (Mahdi S S, et. al, 2010). There exist a strong body of evidence that organic farming is more environmentally friendly and it is due to (a) increased soil fertility, (b) organic matter content and biological activity, (c) reduced pollution and

(d) improved plant and animal biodiversity (Kasperczyk and Knickel, 2006).¹⁰

It is observed that there was an overall improvement in soil quality in terms of various parameters, viz, physical, chemical, biological properties, availability of macro and micronutrients, indicating enhanced soil health and sustainability of crop production in organic farming production (Ramesh, et. al, 2010).¹¹ It reduces pesticide use, it can increase species abundance and richness (Bengtsson, et al., 2005)^{4,12}, reduce soil erosion and increase soil fertility (Leifeld and Fuhrer, 2010)¹³, use less energy and reduce agricultural greenhouse gas emissions (Gomiero, et al., 2008)¹⁴, and reduce nitrogen losses from the system (Drinkwater, 2009).¹⁵

Thus, it is clear that organic agriculture shows a superior environmental performance per unit area than conventional agriculture. The major environmental benefits include increased species abundance and richness leading to better plant and animal biodiversity, reduce greenhouse gas emissions, and reduce environmental pollution. It also provides an opportunity to increase soil fertility and reduce soil degradation.

2.2. Socio-economic benefits and impact on farmer's livelihood

Organic agriculture has several benefits for farmers, including cheaper inputs, higher and more stable prices, and organization in farmer cooperatives. Organic cash crop production is, however, also associated with problems, including potentially reduced yields, compared to intensive conventional methods, the costs of certification and high labour requirements. Whether the benefits of organic agriculture overcome the problems depends on the socio-economic and agronomic context, e.g. the magnitude of the organic price premium, the cost of certification, the availability of agricultural labour and of organic inputs.

Organic farmers often receive higher and more stable prices for their products and the net economic return per hectare is often higher than that of conventionally produced crops (Bolwig, et al. 2009; and Valkila, 2009)^{1-3,5,6,8-11,13-33} and organic inputs are often cheaper and total production costs thus lower (Eyhorn, et. al, 2007 and Valkila, 2009).^{1-3,5,6,9-11,13,14,21-33} But the argument in favour of productivity is questioned by some case studies. On the other hand, organic production comes along with high entry costs, including higher labour requirements that often cannot be met by household resources, the need for increased knowledge and training, substantial certification costs and sometimes the need to purchase expensive organic inputs (Chongtham, et al., 2010).¹⁸ These costs are aggravated during the transition period during the conversion to organic agriculture required by organic standards — in this period organic practices are implemented but the products cannot be sold yet with

the organic price premium. The net effect of organic cultivation on production costs thus depends on whether the typically reduced costs of inputs outweigh the typically increased costs of labour and certification. Some studies suggest that the total production costs of organic agriculture are lower than those of conventional agriculture (Eyhorn, et al., 2007; Valkila, 2009 and Panneerselvam, et al., 2011)^{1-3,5,6,9-11,13,14,21-33}, while other studies found that reduced input costs did not always make up for increased labour costs (Bolwig, et al., 2009).¹⁶ Premium prices are sometimes not necessary (Eyhorn, et al., 2007 and Panneerselvam, et al., 2011)^{2,5,6,9,10,13-15,21-29}, while in other cases they are essential and not always sufficient to make up for the costs of conversion and certification.

As the yields of organically grown foods are low, the costs of them are higher. The higher prices made a barrier for many consumers to buy organic foods. Organic farming needs far more lands to generate the same amount of organic food products as conventional farming does, as chemical fertilizers are not used here, which conventionally produces a higher yield.

There is growing consensus that organic, sustainable agricultural practices can provide synergistic benefits that include adaptation and mitigation of climate change with addressing concerns like livelihood, employment and working conditions. In an emerging country like India, sustainable agriculture can help in meeting the twin challenges of food security and job creation (Harsh Sharma, 2011).²⁴ There exists a clear link between the growth of agriculture and that of poverty reduction. Growth of agriculture is considered as a pre-requisite for inclusive growth, reduction in poverty levels, development of the rural economy and enhancing of farmers income (Economic Survey, GOI, 2011-12).¹⁹ By quoting the experience of the BRIC nations the report stated that a 1percent growth in agriculture is at least two or three times more effective in reducing poverty than the same amount of growth from the non-agriculture sector. In developing countries, where three out of four poor people live in rural areas and more than 80 percent of rural people live in households that are involved in agriculture, improving poor farmers' livelihoods is central for addressing rural development (World Bank, 2007). Some studies have suggested that 'organic' agriculture could contribute substantially to farmers' food security and improve farmers' livelihoods (Parrott, et al., 2006).¹ Many of these studies, however, do not differentiate between 'truly' organic and other 'agro-ecological' or 'sustainable' forms of agriculture.

Organic agriculture can also provide benefits independent of the profitability of the organic cash crop. Organic cooperatives often foster social networks, provide training and extension services, as well as access to health and credit programs (Valkila, 2009).³³ In many areas organic agriculture can also provide the opportunity

for the use of local resources and for integrating traditional knowledge, as many elements of organic management are reminiscent of traditional farming methods in developing countries. Rural areas may also benefit from the creation of employment in labour-intensive organic agriculture (Bakewell-Stone, et al., 2008; Karunakaran. N and Sadiq M. S, 2019)² Organic agriculture can also facilitate the participation of women who have less access to the formal credit market and often cannot purchase agricultural inputs.

2.3. Organic food, nutrition and health

Health is the primary reasons for consumers' preference for organic goods (Sirieix, et. al, 2007)³¹ even though safety, quality and taste (Magnusson, et. al, 2003)²⁶ are very important motivations for buying organic food. Indeed, eating pleasure (particularly tastiness) is now the main argument in marketing and promoting organic foods, followed by health and then environmental benefits (Reed, 2009)³⁰ Surprisingly, consumers appear to be relatively unaware of the beneficial impact that organic agriculture has on the environment (Sirieix, et. al, 2007)³¹ Although the nutritional role of agriculture has often been overlooked, agriculture can be a useful tool in addressing nutritional and health problems.

Organic agriculture is supposed to produce healthier and more nutritious food and could thus potentially contribute to dietary and nutritional needs. The scientific evidence on the nutritional quality of organic, vs., conventional food is, however, rather uncertain due to the poor quality and contradicting results of many studies (Magkos, et al., 2003).²⁵ Nutritional value of organic food Nutrient contents of organically and conventionally produced foods do not appear to differ strongly (Dangour, et al., 2009)²⁰. However, their bioavailability, as well as the nutrient quality, might be better in organic food (Magkos, et al., 2003).²⁵ It has also been hypothesized that non-nutrient component, like plant secondary metabolites, might be higher in organic food and might provide the most important health benefit of organic food (Brandt and Mølgaard, 2001).¹⁷ The reduced use of pesticides in organic systems is one of the most important reasons for consumers to buy organic. However, in developed countries, pesticide residue levels even on conventional food are low. Although the non-use of chemical pesticides in organic systems likely results in organic food having lower pesticide residue levels, there are not enough studies to provide solid scientific evidence for a significant difference. In developing countries, where many older and more toxic pesticides are used widely, pesticide residues on conventionally produced food are of more concern and organic food might be relatively more important than in developed countries in reducing exposure to pesticides. The content of aryltenoids may depend on soil type, genotype, as well as the fertilizers and pesticides used (Barrett, et. al, 2007).³⁴ This might

explain the inconsistency of the findings compared to earlier studies. At this time, however, there does not appear to be convincing evidence of a substantial difference in the nutritional quality of organic versus conventional produce (Forman Jand Silverstein J, 2012)²²

3. Status of Organic Farming in India

Organic food and farming have continued to grow across the world. Since 1985, the total area of farmland under organic production has been increased steadily over the last three decades (Willer and Lernoud, 2020).³⁵ In 2019, there was a total of 72.3 million hectares of organically managed land, including in conversion areas, recorded globally. Australia has the largest organic lands with an area of 35.7 million hectares followed by Argentina (3.7 million hectares). The regions with the largest organic agricultural land areas are Oceania (35.9 million hectares, which is half of the world’s organic agricultural land) and Europe (16.5 million hectares). Latin America has 8.3 million hectares followed by Asia (5.9 million hectares); North America (3.6 million hectares) and Africa (2 million hectares) (Figure 1). India occupies the fifth position with a total organic agriculture area of 2.3 million hectares (Figure 2); in terms of the number of organic producers, India stands first with a total of 1,366,226 (Figure 3).

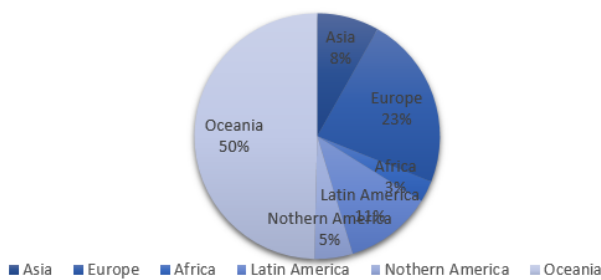


Fig. 1: Distribution of organic arable cropland by region (Source: FiBL & IFOAM, 2021)

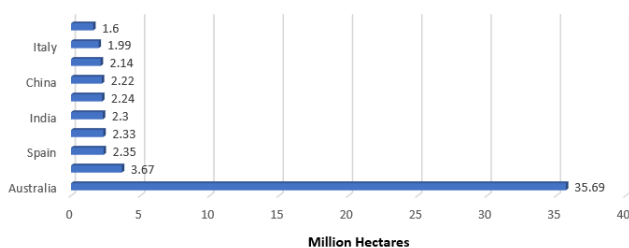


Fig. 2: Ten Countries with largest areas of organic agricultural land (Source: FiBL & IFOAM, 2021)

The national-level organic farming movement is promoted by National Programme for Organic Production

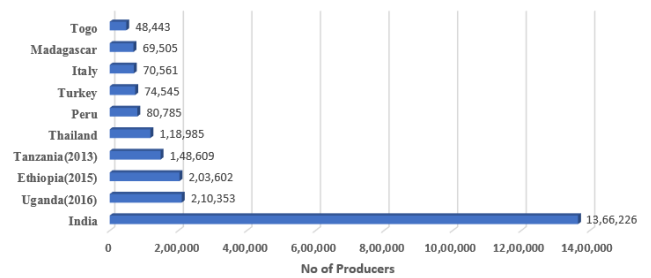


Fig. 3: The ten countries with the most organic producers (Source: FiBL & IFOAM, 2021)

(NPOP), which started in 2001 under the Agricultural and Processed Food Products Export Development Authority (APEDA) of the Ministry of Commerce and Industry, Government of India. It was promoted at the government level mainly with an export-centric approach, backed by a third-party certification system (Amit Khurana and Vineet Kumar, 2020).³⁶ The first organic farming policy of the Government of India was framed in the year 2005. Later during 2014–15, the National Mission for Sustainable Agriculture by the Ministry of Agriculture and Farmers’ Welfare (MoAFW) is launched to promote organic farming. Because of these institutions, policy and various schemes, organic farming is spreading fast too many agro-ecological zones of India, most notably to rain-fed areas, hills and arid zones (Vaidya S, et al., 2007).³² As of March 2020, 2.3 million hectare was covered under organic farming in India. Out of this, around 70 percent of the land is under NPOP. The organic share of total agricultural land is 1.3 percent (FiBL & IFOAM, 2021).³⁵ Compared with 2018, the growth of organic agricultural land in India is 18.6 percent. Major role players, programmes and schemes for the promotion of organic farming in India are summarized in Table 1.

Due to the efforts from government and other organization, organic farming is spreading fast too many agro-ecological zones of India, most notably to rain-fed areas, hills and arid zones (Vaidya S, et. al, 2007).³² In the union budget 2020–21, Rs 687.5 crore has been allocated for the organic and natural farming sector which was Rs 461.36 crore in the previous year (Union Budget 2020-21, GOI). This amount is distributed among NPOF (12.5 crores), Organic Value Chain Development for North East Region (175 crores) and the Paramparagat Krishi Vikas Yojana (500crores).

Among all the states, Madhya Pradesh has covered the largest area under organic certification followed by Rajasthan, Maharashtra, Gujarat, Karnataka, Odisha, Sikkim and Uttar Pradesh. India produced around 2.75 million MT (2019-20) of certified organic products which include all varieties of food products namely oil seeds, sugar cane, cereals and millets, cotton, pulses, aromatic

and medicinal plants, tea, coffee, fruits, spices, dry fruits, vegetables, and processed foods. The organic food export realization was around Rs 4686 crore (Table 3). Organic products are exported to USA, European Union, Canada, Switzerland, Australia, Japan, Israel, UAE, New Zealand, and Vietnam (APEDA).

4. Future Prospects of Organic Farming in India

India has one of the highest arable land areas in the world. The net sown area is 140.1 million hectares. Agriculture—along with its allied sectors such as livestock, forestry and fisheries—is still the largest source of livelihood for India. As per the Lok Sabha Standing Committee on Agriculture (2019–20), agriculture and allied sectors employed 54.6 per cent of the total workforce in India. About 70 per cent of rural households still depend primarily on agriculture for their livelihood. As per the Agriculture Census of 2015–16, about 146 million farming families in India have operational landholdings for agriculture use. Around 85 per cent of these farmers are small and marginal, with landholdings of 2 ha or less. The share of agriculture and allied sectors in the Gross Value Added of the country at current prices has declined from 18.2 per cent in 2014–15 to 16.5 per cent in 2019–20. Natural farming is not a new concept in India, with farmers having tilled their land without the use of chemicals - largely relying on organic residues, cow dung, composts, etc. since time immemorial. This is also in sync with the Sustainable Development Goal 2 targeting 'end hunger, achieve food security and improved nutrition and promote sustainable agriculture'. In reality, however, the organic and natural farming movement in India is still niche rather than a mass movement. Only 2 per cent of net sown area in India is organically farmed and about 1.3 per cent of farmers in India are registered for organic farming. This percentage itself shows the potential for the development of organic and natural farming in India.

Hence with greater awareness and capacity building of the producers in compliance with international standards, Indian organic farmers will soon be reinforcing their rightful place in global agricultural trade. We must also explore the existing untapped domestic as well as international market for certified organic product. For this, organic and natural agriculture must become part of mainstream agriculture. Efforts must be also taken to build rigorous scientific data on the benefits of organic and natural farming. We should also ensure promotion of organic and bio fertilizers instead of chemical fertilizers and at the same time a farmer friendly cost-effective certification policy should also be there to attract more farmers towards organic farming.

5. Findings and Conclusion

Major findings and conclusions based on the review of relevant literature (from year 2000 to 2021) on various aspects of organic farming like definition, principles, proposed benefits (environmental, economic and social), present status in India, and its prospects are summarized:

1. Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity
2. Principle of Health, Principle of Ecology, Principle of Fairness and Principles of Care, are the roots from which organic agriculture grows and develops.
3. Since organic farming keeps away with almost all synthetic inputs like chemical fertilizers, chemical pesticides and insecticides, and since 'soil building' crop rotations are mandated, it shows a superior environmental performance per unit area than conventional agriculture
4. Organic management practices also provide an opportunity to improve soil fertility and reduce soil degradation. The use of biofertilizers plays an important role in maintaining long term soil fertility and sustainability.
5. Nutritional differences between organic and conventional produce appear minimal, but studies examining this have been limited by inadequate controls for the many subtle potential confounders, such as moisture, maturity of the product, and measurement technique. Apart from inputs, the nutritional level is also determined by various other factors like climate, quality of soil, availability of water cropping and processing techniques, etc.
6. Various studies prove that organic produce contains fewer pesticide residues than conventional produce, and consuming a diet of organic produce reduces human exposure to pesticides.
7. Rural areas may benefit from the creation of employment in labour-intensive organic agriculture and can also facilitate the participation of women who have less access to the formal credit market and often cannot purchase agricultural inputs.
8. From the economic point of view, organic agriculture has several benefits for farmers, including cheaper inputs, higher and more stable prices, and organization in farmer cooperatives. In an emerging country like India, sustainable agriculture can help in meeting twin challenges of food security and job creation it also helps in poverty reduction.
9. The increased cost of production during the time of transition from conventional farming to organic farming and the cost related to certification is a retarding factor for the adoption of this method of cultivation.

Table 1: Role players, programmes and schemes for organic farming in India

Institutions/Programmes/Schemes	Role/Objectives
The Agricultural and Processed Food Products Export Development Authority (APEDA)	APEDA is an Apex-Export Trade Promotion (of fresh vegetables and fruits) active government body under the Ministry of Commerce and Industry of the Government of India
National Programme for Organic Production (NPOP)	Launched in the year 2000 under the Ministry of Commerce and Industry under the Government of India, NPOP aims provide focused and well-directed development of organic agriculture and quality products.
National Centre for Organic Farming (NCOF)	Promotion of organic farming in the country through technical capacity building of all the stakeholders including human resource development, transfer of technology, promotion and production of quality organic and biological inputs.
National Project on Organic Farming (NPOF)	NCOF came into force in 2004, for implementing National Project on Organic Farming (NPOF)
National Mission for Sustainable Agriculture (NMSA)	It seeks to address problems and issues regarding 'Sustainable Agriculture' in the context of risks associated with climate change by devising appropriate adaptation and mitigation
The Paramparagat Krishi Vikas Yojana (PKVY)	Cluster formation, certification, training, and marketing are supported under this scheme
National Mission on Oilseeds and Oil Palms (NMOOP)	launched during 2014-15, the mission envisages increasing production and productivity of oilseeds crops and oil palm
Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)	The scheme promotes 3rd party certified organic farming of niche crops of north east region through Farmers Producer organizations (FPOs) with focus on exports.
Participatory Guarantee System of Certification for India (PGS-India)	PSG India is a quality assurance initiative that is locally relevant, emphasize the participation of stakeholders, including producers and consumers and operate outside the frame of third-party certification
Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)	It is a central sector scheme aims at development of organic value chains in the North East Region of India.
Rashtriya Krishi Vikas Yojana (RKVY)	It is a new Additional Central Assistance scheme to incentivize States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating livestock, poultry and fisheries more fully.
Mission for Integrated Development for Horticulture (MIDH)	It is a Centrally Sponsored Scheme for the holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo.
Capital investment Subsidy Scheme (CISS) under Soil Health Management Scheme:	Scheme aims at providing 100 percent financial assistance to state government for setting up of mechanized fruit/vegetable market waste/ Agro waste compost production unit

Source: (1) Amit Khurana and Vineet Kumar (2020), State of Organic and Natural Farming: Challenges and Possibilities, Centre for Science and Environment, New Delhi; (2) Press Information Bureau Government of India (2020), Ministry of Agriculture & Farmers Welfare

10. The organic share of total agricultural land is only 1.3 percent, but the percentage share is showing an increasing trend especially during last decade.
11. The demand for organic product is increasing both domestically and globally. There exists a huge untapped export potential for organic certified products.

For India to become truly self-reliant, the Indian agriculture sector will need drastic change. It must wholeheartedly move towards an approach that helps farmers earn more money, use less chemicals and pesticides, and produce healthy food for the country while conserving natural

resources. Indian agriculture can become sustainable if organic and natural farming becomes a mass movement, i.e. more and more farmers successfully adopt organic and natural farming practices. For this, the governments at the Centre and the states will have to ignite and lead the change at a much larger scale than the ongoing efforts. These measures will have to be aggressive and well-coordinated, reflect the commitment of political leadership and be supported by adequate budgets.

6. Source of Funding

None.

Table 2: India exports by market destination (MY 2018-19)

Country Exported	Country wise export during 2018-19 (MT)	
	Volume	Total Value (USD)
United States	334113	429705430
European Union	155255	223117745
Canada	101943	68602268
Switzerland	6199	9888235
Australia	2131	7468130
Japan	751	2397738
New Zealand	1978	2125925
Israel	3070	1865450
Vietnam	3186	1679401
Lebanon	681	1633755
Rest of World	4783	9014585
Total	614089	757498662

Source: APEDA

Table 3: Organic farming in india- Summary statistics

Total Area covered under organic Farming (2020)	2.3 million hectare
The organic share of total agricultural land	1.3 Percent
Total number of organic Producers (2020)	13,66266
Production of organic certified products (2019-20)	2.75 MT
Export earnings from organic products	4686 Crore
Major export destinations	USA, European Union, Canada, Switzerland, Australia, Japan, Israel, UAE, New Zealand, and Vietnam
Major States under organic farming (Coverage of certified organic land area)	Madhya Pradesh, Rajasthan, Maharashtra, Gujarat, Karnataka, Odisha, Sikkim and Uttar Pradesh.
Major products under organic farming	Oil seeds, sugar cane, cereals and millets, cotton, pulses, aromatic and medicinal plants, tea, coffee, fruits, spices, dry fruits, vegetables, and processed foods.

Source: The Agricultural and Processed Food Products Export Development Authority (APEDA)

7. Conflict of Interest

None.

References

- Parrott N, Olesen J. Certified and non certified organic farming in the developing world. *Global Development of Organic Agriculture: Challenges and Prospects*; 2006. p. 153–79. doi:10.1079/9781845930783.0153.
- Karunakaran N, Sadiq M. Socio economic aspect of organic farming practices for improving farmer's income in some locations of Kerala, India". *J Agricultural Res.* 2019;44(3):401–8. doi:10.3329/bjar.v44i3.43474.
- Sankar U. Sustainable Development of Agriculture. *Indian Ecoc Rev.* 2011;8:62–8.
- Bhardwaj D, Ansari MW, Sahoo RK, Tuteja N. Bio fertilizers function as a key player in sustainable agriculture by improving soil fertility, plant tolerance and crop productivity. *Microb cell fact.* 2004;8(1):13.
- Addressing food insecurity in protracted crisis. Rome, Food and Agricultural Organization (FAO); 2010. Available from: http://www.fao.org/fileadmin/templates/faoitally/documents/pdf/pdf_Food_Security_Cocept_Note.pdf.
- Foley JA, Ramankutty N, Brauman KA, Gerber J. Solutions for a cultivated planet. *Nature.* 2011;478(7369):337–42.
- Beddington J, Asaduzzaman M, Clark M. Achieving food security in the face of climate change: Final report from the Commission on Sustainable Agriculture and Climate change; 2012. Available from: <https://hdl.handle.net/10568/35589>.
- Organic Agriculture. *Codex Alimentarius Commission-FAO.* 1999;
- Definition on Organic Agriculture. *International Federation of Organic Agriculture Movements (IFOAM).* 2008;.
- Kasperczyk N, Knickel K. Environmental impacts of organic farming.; 2006. p. 259–82. doi:10.1079/9781845931698.0259.
- Ramesh P, Panwar NR, Singh AB, Ramana S, Yadav SK, Shrivastava R. Status of Organic Farming in India. *Curr Sci.* 2010;98(9):1190–4.
- Bengtsson AJ. The Effects of Organic Agriculture on Biodiversity and Abundance: A meta- Analysis. *J Appl Ecol.* 2005;42(2):261–9. doi:10.1111/j.1365-2664.2005.01005.x.
- Leifeld J, Fuhrer J. Organic farming and soil carbon sequestration: what do we really know about the benefits? *Ambio.* 2010;39(8):585–99. doi:10.1007/s13280-010-0082-8.
- Gomiero T, Paoletti MG, Pimentel D. Energy and environmental issues in organic and conventional agriculture. *Crit Rev Plant Sci.* 2008;27(4):239–54. doi:10.1080/07352680802225456.
- Drinkwater LE. Ecological Knowledge: Foundation for Sustainable Organic Agriculture. vol. 54; 2009. p. 19–47. doi:10.2134/agronmonogr54.c2.
- Bolwig S, Gibbon P, Jones S. The economics of smallholder organic contract farming in tropical. *World Dev.* 2009;37(6):1094–1104. doi:10.1016/j.worlddev.2008.09.012.
- Brandt K, Gaard JP. Organic agriculture: does it enhance or reduce the nutritional value of plant foods? *J Sci Food Agriculture.* 2001;81(9):924–31.
- Chongtham IR, Neergaard AD, &pillot D. Assessment of the strategies of organic fruit production and fruit drying in Uganda. *J Agriculture Rural Dev Tropics Subtropics.* 2010;111(1):23–34.
- Allan TC. Sustainable Agriculture: An Update. Working paper No. 183-Economics; 2012. Available from: <http://purl.umn.edu/140549>.

20. Dangour AD, Dodhia SK, Hayter A, Allen E, Lock K, & uauy R. Nutritional quality of organic foods: a systematic review. *Am J Clin Nutr*. 2009;90(3):680–5. doi:10.3945/ajcn.2009.28041.
21. Eyhorn F, Ramakrishnan M, Mader P. The viability of cotton -based organic farming systems in India. *Int J Agricultural Sustainability*. 2007;5(1):25–38.
22. Forman J, Silverstein J. Organic foods: health and environmental advantages and disadvantages. *Pediatrics*. 2012;130(5):1406–15. doi:10.1542/peds.2012-2579.
23. National Mission for Sustainable Agriculture. Strategies for Meeting the Challenges of Climate Change, Department of Agriculture and Cooperation -Ministry of Agriculture; 2010. p. 1–23. Available from: <https://krishi.icar.gov.in/jspui/bitstream/123456789/34794/1/jml10.pdf>.
24. Sharma H. Green jobs and decent works: An agenda for sustainable agriculture in India No.4, IAMO Forum 2011: Will the 'BRICS Decade' Continue?-Prospects for Trade and Growth from Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO). *Econstor*. 2011;p. 1–20.
25. Magkos F, Arvaniti F, & zampelas A. Putting the safety of organic food into perspective. *Nutr Res Rev*. 2003;16(2):211–22. doi:10.1079/NRR200361.
26. Magnusson K, Arvola A, Hursti U, Aberg L, Sjoden P. Choice of organic food is related to perceived consequences for human health and to environmentally friendly behavior. *Appetite*. 2003;40(2):109–17. doi:10.1016/S0195-6663(03)00002-3.
27. Mahdi SS, Hassan GI, Samoon SA, Rather HA, Dar SA, Zehra B. Bio-fertilizer in organic agriculture. *J Phytology*. 2010;2(10):42–54.
28. Narayan S. Organic farming in India: Relevance, Problems and Constraints. *Occasional Paper*. 2005;38:1–93.
29. Panneerselvam P, Halberg N, Vaarst M, Hermansen JE. Indian farmers' experience with and perceptions of organic farming. Renewable Agriculture and Food Systems. *Exp Agriculture*. 2012;27(2):157–69. doi:10.1017/S1742170511000238.
30. Reed M. For whom?- The governance of organic food and farming in the UK. *Food Policy*. 2009;34(3):280–6. doi:10.1016/j.foodpol.2009.03.003.
31. Sirieix L, Abreu LD, Aico M, Kledal P. Comparing organic urban consumers in developing and developed countries: First results in Brazil and France. Paper presented at AIEA 2 and SOBER International Conference; 2007. p. 1–12. Available from: http://www1.montpellier.inra.fr/bartoli/moisa/bartoli/download/moisa2007_pdf/WP_4-2007.pdf.
32. Vaidya S, Tejpartap. Organic farming offering opportunity of income security among small farmers in India: A country wide study. In: International Conference on Organic Agriculture and Food Security; 2007. p. 3–5.
33. Valkila J. Fair trade organic coffee production in Nicaragua- Sustainable development or a poverty trap. *Ecological Economics*. 2009;68(12):3018–25. doi:10.1016/j.ecolecon.2009.07.002.
34. Barrett DM, Weakley C, Diaz JV, Watnik M. Qualitative and nutritional differences in processing tomatoes grown under commercial organic and conventional production systems. *J food Sci*. 2007;72(9):441–51. doi:10.1111/j.1750-3841.2007.00500.x.
35. Willer H, Schlatter B. The World of Organic Agriculture. Statistics and Emerging Trends 2020. Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM - Organics International. Bonn; 2020. Available from: [Availableatwww.organic-world.net/yearbook/yearbook-2020.html](http://www.organic-world.net/yearbook/yearbook-2020.html).
36. Khurana A, Kumar V. State of Organic and Natural Farming in India Challenges and Possibilities; 2020. p. 1–15.

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