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Organic Farming for Sustainable Agriculture: A Review

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Abstract - Agriculture and farming have a long history. Agriculture is the main economic structure for many developed and developing countries. The agriculture sector faces multiple challenges in meeting the growing food demand of an ever-increasing population. Conventional farming is one of the most widely practiced approaches due to its affordability and accessibility, but it is associated with various drawbacks. A resilient and sustainable agriculture system is required to face different environmental challenges. Sustainable agriculture includes different eco-friendly farming techniques that boost crop yield and livestock production without having an adverse effect on the environment. Organic farming is one such approach that should be practiced for attaining the goal of sustainable agriculture. In simple words, organic farming can be defined as the production of plants by avoiding the use of harmful synthetic additives (fertilizers, pesticides, antibiotics etc.). Organically cultivated foodstuffs have become increasingly popular due to their numerous health benefits. India has experienced a significant expansion of organic farming and is presently one of the major organic producers in the world. Though there are some difficulties yet to be overcome in order to ensure that organic farming has a beneficial economic and health impact, it can be argued that it has a better prospect in India. This review deliberates the current state of organic farming in India along with its components, advantages, associated constraints and future potential.The modern agricultural practices affect the environment namely nutrient cycle, soil erosion, carbon sequestration, and many other ecological patterns. Organic farming is influential practice to minimize the environmental and ecological impact of sustainable development. Usage of more organic matters in agricultural practices can reduce the adverse effects on the environment by keep saving its natural cycles on recovery process and organic farming may enhance the food quality too. The innovative methods and new approaches making new trends toward sustainability farming system and enhances the agricultural productivity, and quality of life of many farmers in an environmentally friendly way.

Keywords: Agriculture Farming, Organic Product, Sustainable

1. Introduction

Agriculture is the most basic kind of human activity, encompassing both crop production and animal domestication. Agricultural land is thus the most basic of the world's vast and varied resources, and it is from it that the world's population is fed and sheltered. Although Agriculture's exact beginning is unknown, as the human population developed, fishing and hunting became more important as a means of supplementing what was lacking in the field, and a never-ending search for food ensued. It was apparent that food production was required if human beings were to live a long and secure life. Thereby it is obvious that the importance of agriculture arose from this argument. Agriculture provides a significant proportion of the household economy worldwide. People rely on agriculture to feed their families, earn a living, and start a business, no matter how small (Dorosh and Thurlow, 2016; Abhilash et al., 2021) In affluent countries, agriculture is a less popular source of income, but agriculture benefits everyone in the world, regardless of direct or indirect. As a result of the growing need for agricultural products on a global basis, a variety of job opportunities have arisen. (Mathlouthiet al., 2022). Agriculture is an important part of many people's jobs. The agriculture industry has been a source of income for many individuals in developing and developed countries, with construction programs, drainage systems, suppliers, and more (Bennett et al., 2013). Agriculture has brought a plethora of benefits, and its significance should not be overlooked. It has basic, economical, and developmental benefits. It enriches every country in the world in some form while functioning a critical role in both developed and developing countries when it comes to the way of life (Christiaensenet al., 2011; Dubey et al., 2022). Modern agriculture is an evolving approach to agricultural innovations and farming practices based on the use of high-yielding varieties of seeds, chemical fertilizers, irrigation water, pesticides, etc (Gamage et al., 2022a).). During the earning process of food safety,

people have to face various kinds of natural and manmade hazards. The growing demand for food is not only to fulfill the issues of food security but also to earn foreign exchange. The food manufacturing process has been evaluated from cultivation to distribution for consumers. However, the rapid increase in the requirement for food couldn't be provided by using traditional methods and people have invented more ways over the natural process. But now it has exceeded the natural boundaries of the environment and occurred so many adverse effects due to not following sustainable ways. The cost of environmental quality cannot be sustainable in the future because of the adverse changes being caused to the environment and ecosystem. Resources are limited, but the requirements and ambitions of human beings are limitless and also recovery or regeneration may take thousands/millions of years. As the best agricultural land has already been farmed and has exceeded the safe limit, the natural resources available for further farming expansion are practically exhausted. Organic farming is recognized as the best-known alternative. It is economically feasible to practice when the farmers can get a premium price for their product. The widespread challenges organic growers face includes lower yields, difficulty maintaining soil fertility levels, gaining proper certifications, and market access. A combination of organic farming and new technologies is of utmost importance to reduce the limitations and challenges of organic farming. The innovative and sustainable approach of organic farming enhances the agricultural productivity, and quality of life of many farmers in an environmentally friendly way. In this review, agricultural pollutants and their impacts, sustainable development and organic farming, challenges and limitations of organic farming are mainly considered and will give information about new innovation technologies improve the application efficiency of organic fertilizers as well as use efficiency of organic farming.

The soil fertility is largely maintained by using organic manures, following crop rotation and planting cover crops. Pest diseases and weeds are managed via physical and biological control systems. Organic livestock is reared without the application of antibiotics and growth hormones. They are also given routine immunization, vitamins and minerals supplementation (Roychowdhury et al., 2013; Patil et al., 2014; Das et al., 2020). Organic farming is associated with numerous economic, social and environmental benefits.

The Agricultural and Processed Food Products Export Development Authority (APEDA) under the Ministry of Commerce & Industries, Government of India has administered National Programme for Organic Production (NPOP). The major responsibilities of this program are the accreditation of different certification bodies, marketing, setting guidelines for the development of organic products, strengthening organic agriculture etc. Organic product certification is very crucial for establishing authenticity. Buyers should seek different logos like FSSAI (Jaivik Bharat), PGS organic India, etc. on organic items for determining their validity.

This article attempts to review the principles, components, benefits and challenges associated with organic farming. It also highlights the present Indian scenario in terms of organic farming and future directions in this field.

2. Organic Farming

2.1 What is organic farming?

According to the definition by the United States Department of Agriculture (USDA), the term organic farming refers to "a system which avoids and largely excludes the use of artificial inputs" (e.g., fertilizers, pesticides, hormones, feed additives, etc.). Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and good quality of life for all involved “(Organic Farming | NRCS. (n.d.). Organic farming also promotes sustainable and environmentally friendly management, conservation practices, and restoration activities. The financial need for organic farming is low compared with modern agriculture. Furthermore, organic farming helps farmers and communities to adapt to the susceptible effect of climate change. In addition, organic farming fulfills many of the requirements identified for successful adaptation strategies (Muller, 2009; Murmu et al., 2022). Organic livestock practices produce animal products without antibiotics and other drugs. It helps slow the growing health crisis retarded by the dangerous spread of antibiotic-resistant bacteria. Organic farmers promote and manage biodiversity, increased populations of natural enemies (helps control pests and diseases without chemicals), improved natural resources such as soil, water, air, and wildlife, and support pollinators, which are essential to maintaining a healthy environment as well as producing healthy foods (Merrigan et al., 2022).

2.2 Principles of Organic Farming

The four main principles of organic production given by IFOAM in 2005 (IFOAM, founded in 1972) are:

- The Principle of Health – Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.
- The Principle of Ecology – Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
- The Principle of Fairness – Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.
- The Principle of Care – Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment (I.F.O.A.M., 2005b).

Fig -1: Organic Farming Methods

2.3 Objectives of Organic Farming

These are major objectives of sustainable organic farming:

- A high crop yield
- Synchronization between nature and agriculture system by rejuvenation of soil and e nutrient recycling
- Increasing microflora and microfauna of soil, thus enhancing fertility
- Enhancing soil quality without compromising biological diversity in the ecosystem
- Promoting alternative energy resource usage
- Developing equilibrium between crop farming and animal husbandry
- Keeping animals in an environment which is close to their natural habitat
- Preserving and applying traditional knowledge in farming and management

2.4 Modern agriculture to organic farming

The environment and people are impacted differently by modern agriculture and organic farming methods. Increased greenhouse gas emissions, land erosion, water pollution, and human health are significant consequences of traditional agriculture. Organic farming reduces carbon emissions, improves soil health, and reloads natural ecosystems for cleaner water and air, all while avoiding hazardous pesticide residues. The primary distinction between organic and conventional farming is that conventional farming depends on chemical involvement to combat pests and weeds, as well as to supply plant nutrients. Synthetic pesticides, herbicides, and fertilizers are included in this category. At the same time, organic farming produces healthy, abundant food by solely relying on natural principles such as biodiversity and composting. "Organic farming production" is defined as not merely avoiding conventional chemical inputs or substituting natural inputs for synthetic ones; it also uses strategies that have been practiced for thousands of years, such as crop rotations and the utilization of composted animal manures and green manure crops, in ways that are economically feasible ways today. The interaction of management methods is the primary issue in organic production, which emphasizes overall system health. Organic farmers use various techniques to increase and sustain biological diversity while maintaining high soil fertility from time to time (Walmsley and Sklenicka, 2017).

3. Components of Organic Farming

Various components of organic farming are meant for better soil structure and its management for good yield, farm waste recycling by composting to produce organic manure, weed management system by non-chemical and non-toxic means and addition of bio fertilizers instead of any chemical fertilizers.

3.1. Crop and Soil Management

Soil organic matter is an important factor governing soil fertility, which can be enhanced by good farming methods. Fertile soil should have good water holding capacity, cation exchange and be less prone to soil erosion. The use of green manures is one of the aspects

of organic farming which carefully manages soil by enhancing its biological activity. Crop rotation, and inter-cropping are involved in organic farming which help in controlling weeds and also managing chemical and physical properties of soil. Livestock, farm residues or leftover, straw, etc. are used for mixed cropping which keeps a check on the leaching of essential nutrient from surface soil and reduce soil erosion.

3.1.1. Crop rotation and inter-cropping

Organic agriculture is basically dependent on soil biology and soil health. Various organic farming practices which include crop rotation, mixed cropping and inter-cropping are believed to help in increasing soil life by enhancing soil properties and its biological activities. According to Jean-Paul Courtens (a farmer) "rotations balance soil-building crops (soil improvement crops) and cash crops, and can allow for bare fallow periods to break weed cycles and incorporate plant matter into the soil". So a legume crop can be followed by high nitrogen demanding crop and then by less nutrient requiring crops in subsequent years. This method keeps a check on weed growth and also helps in nutrient recycling in the ecosystem (Mohler & Johnson, 2009).

3.1.2. Crop residues

In developing countries like India, tonnes of crop residues are left every year which are a great source of nutrient recycling in soil. Generally, crop residues are inoculated with fungal hyphae and spores which enhance soil health and help in organic farming. The crop residues include straws, stalks, bristles, cobs of maize and halms of beans, peas, potatoes, etc. Thrashing sheds are also included like oil cakes, rice husks, peanut shell, Indian millet and pearl millet (Mohler & Johnson, 2009).

3.1.3. Organic manure

Organic fertilizers or manures are the keys to sustainable and well-managed soil. They improve the quality of soil without compromising ecosystem health. Different biological sources like plant or animal residues can be used for composting. Organic manure enhances the biological activity in the soil which increases the availability of inorganic nutrients in the soil and increases humus for good crop yield. National Organic Program (NOP) has set standards for the proper usage of organic manure for conventional farming methods. Organic manure is generally categorized into bulky and concentrated organic manures (Santhoshkumar et al., 2017; Migliorini & Wezel, 2017).

Bulky organic manure, which is comprised of well-decomposed animal excreta like dungs, urine and also other farm residues and regarded as Farm Yard Manures. Bulky organic manure also includes compost and most importantly green manures. Compost is humus like material produced from organic waste due to microbial activity in anaerobic conditions. Compost can be made from farm waste and also from household waste. Green manures are actually the crops grown for the benefit of soil. Green manure not only increases the fertility of the soil by addition of surplus inorganic nutrients, organic matter, microbial growth and humus but also prevents soil erosion, leaching of nutrients and controls weed growth. Green manures are generally used for sustainable annual cropping systems. These plants are only grown for the benefit of soil and not for grazing or harvesting purposes. Green manure plants are the part of crop rotation method. Legumes are important green manure as they fix atmospheric nitrogen into the available form of nitrogen in the soil with the help of nitrogen-fixing bacteria present in their root nodules. Some of the legume plants used as green manures are *Sesbania aculeate* (Dhaincha), *Vigna unguiculata* (Cowpea), *Melilotus parviflor*(Senji), *Cyamopsis tetragonoloba L. Taub.* (Cluster Bean), *Crotalaria juncea* (Sun hemp), Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44

3.2. On-farm Waste Recycling

Organic waste recycling is very important for sustainable farming as it suppresses the consumption of expensive and harmful chemical fertilizers. Farm and household wastes, including pruned branches, straw, and discarded parts of fruits and vegetables undergo composting, anaerobic digestion, and thermo-chemical treatments (catalytic, pyrolytic and hydrothermal), which lead to maximum recycling. This leads to a reduction in the usage of conventional chemical fertilizers and other energy sources. Industrial waste, household waste, and wastes from MCD is also an important component of organic waste (Santhoshkumar et al., 2017; Migliorini & Wezel, 2017).

3.3. Weed Management in Sustainable Agriculture

To avoid the use of herbicides and chemicals on farms, alternative and sustainable weed management methods are practiced in organic agriculture. This includes

cultural weed management methods like crop rotation, crop and cultivar choice, increasing crop density by higher seeding rates, row spacing for earlier canopy closure, weed control by mechanical and physical methods, tillage, soil heating by solar radiation, Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 inter-cropping, stale seed bed, mulching, hand weeding, biological weed control and bioherbicides (Tahat et al., 2020).

3.4. Biofertilizers

Excessive use of chemical fertilizer not only deteriorates the quality of soil but its long usage also compromises human health. Long term use of chemicals in soil has a negative impact on microflora and microfauna. So for the overall benefit of the ecosystem, an alternative method is essential. Microbes are an important part of this, as they increase crop yield by increasing the availability of micronutrient in soil and thus increases soil productivity. Some useful strains of microbes like bacteria, fungi, and algae are used as biofertilisers (Santhoshkumar et al., 2017).

3.4.1. Symbiotic nitrogen-fixation

A type of biotic interaction- symbiosis is useful in fixing atmospheric nitrogen into various forms of nitrogen in the soil which is readily available to plants. The symbiotic relationship between legume plants and *Rhizobium* bacteria is very useful for nitrogen fixation in soil. *Rhizobium* bacteria live in the root nodule of leguminous plants which make available atmospheric nitrogen in the soil for the plants.

3.4.2. Asymbiotic nitrogen-fixation

Some organisms like blue-green algae (BGA), Mycorrhizae, bacteria like *Azospirillium*and *Azotobacter, Azolla* (a small aquatic plant) can decompose soil organic matter and by chemical reaction converts nitrogen from the atmosphere into available forms like nitrates, nitrites, ammonia, etc. in soil without establishing any symbiotic relationship with other organisms.

3.5. Bio-pesticide

Biopesticides are biological agents producing toxins that are harmful to the pests invading plants. Secondary metabolites like alkaloids, phenolics, terpenoids, etc. are produced as active biopesticides against nematodes, insects, fungi and other pests. Biopesticides check the growth of nematodes, fungi, insects and other pests and kill them. A few examples of biopesticides are Pyrethrum, Nicotine, Neem, Margosa, Rotenone etc. (Santhoshkumar et al., 2017). Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44

3.6. Vermicompost

In vermicomposting, certain earthworm species are used where they are fed organic waste materials and after digestion gives out the granular form (cocoons) known as vermicompost. Vermicomposting requires moderate environmental conditions where microorganisms and earthworms are used. Vermicompost are rich in micronutrients and macronutrients, phytohormones and also contains microflora essential for the growth of plants (Santhoshkumar et al., 2017).

3.7 Sludge

Sludge is semi-solid slurry that can be produced from a range of industrial, water treatment, wastewater treatment, or on-site sanitation processes. Sludge also contains valuable organic matter and nutrients such as nitrogen and phosphorus and can therefore be very useful as an organic fertilizer or soil improver. Table 3 show several studies conducted on using wastewater treatment plant sludge as an organic fertilizer.

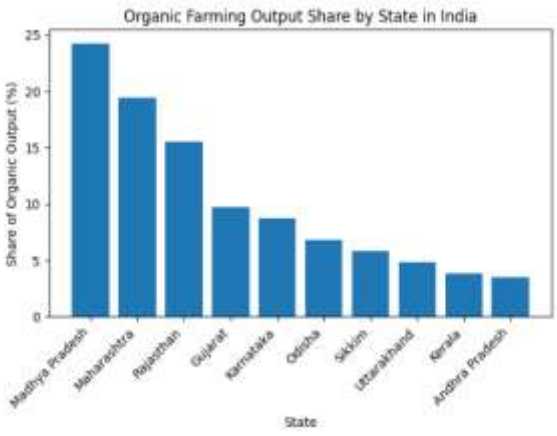

Chart- Indian state wise organic production in the year 2025

4. Relative advantages of organic farming

NPOP takes care of accreditation for certification bodies, organic production standards, and organic agricultural marketing, among other things. Importing countries acknowledge Indian organic products that have been certified by India's certification bodies (Shukla et al., 2013). In India, there are six accreditation boards

recognized by the Ministry of Commerce, namely- APEDA, Coconut Development Board, Tea Board, Directorate of Cashew and Cocoa, Spices Board, and Coffee Board. The accrediting boards authorize certification agencies to certify organic goods in accordance with the established standards. The Government of India also designated accreditation agencies and certification through these boards and agencies is now required, particularly for export markets (Singh et al., 2019; Singh et al. (2019) highlighted the relative advantages of organic farming in India. India excels at producing high-quality crops such as tea, spices, rice varieties, and medicinal herbs. It has a long history of agricultural practices that may be used to build organic farming methods. Agriculture in various parts of India is not extremely intense in terms of using agrochemicals, especially in mountainous and tribal areas, which makes the transition to organic farming easier. Organic farming practices have proven to provide equivalent or even higher yields on marginal soils than conventional farming (particularly in the humid tropics). In India, labour is relatively inexpensive in comparison to input costs, favouring the transformation to less input-dependent, but more labour-intensive production processes, as long as acceptable yields are attained. India's non-governmental organisations (NGO) sector is quite robust and promotes organic farming by providing training, information, extension services, and marketing services to farmers.

5. Current Status of Organic Farming

In India, organic farming is no more an alien concept. In reality, the earliest scientific approach to organic farming may be traced back to the later Vedic period's Vedas, which emphasized living in peace with mother nature instead of exploiting her. Several organic inputs are also mentioned briefly in our ancient literature such as the Rigveda, Mahabharata, Kautilya's Arthasashthra, Ramayana etc. Organic farming has its origin in ancient agricultural techniques that have evolved over millennia in innumerable villages and farming groups (Singh et al., 2019). Organic agriculture accounts for approximately 1.5 % of global agricultural output. Due to its diverse agro-climatic conditions, India has a lot of potential for producing a wide range of organic products. In some parts of the country, the practice of organic farming is an added bonus. This provides an opportunity for organic producers to tap into a market that is gradually expanding both domestically and internationally.

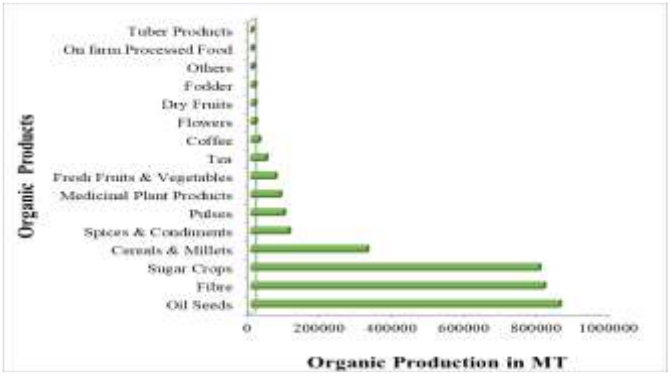

Figure 2: Production of organic products (In MT) during year 2025 in India

6. Socio-Economic implications and Challenges

Organic farming is an environment friendly method that guarantees sustainable development; preserves and maintain soil fertility, provides employment, assures long term income and thus promises better livelihood to the farmers. Organic farming is based primarily on the use of natural resources and integrates traditional knowledge and skills of the organic system thereby having a positive effect on the environment's health (Das et al., 2017; Das et al., 2020; Singh, 2021). Organic foods offer various nutritional, health as well as safety benefits. This is one of the major reasons of their growing demand which is a result of growing concern and awareness among the public regarding food safety and health issues. Thus, purchasers are willing to pay the elevated price for these products which are comparatively greater than products derived via conventional farming. These organic products also have a longer shelf life as they have lesser nitrate content and an elevated number of antioxidants (Mukherjee et al., 2018; Das et al., 2020).

India has a history of practising the indigenous method of organic farming in numerous rural areas and with the availability of huge area under natural organic cultivation, it possesses immense potential for the cultivation of organic products. Presently, it is one of the leading organic producers in the world. As per the Agricultural and Processed Food Products Export Development Authority and report of the Research Institute of Organic Agriculture, India ranks 8th with respect to organic agriculture land and holds 88th position in regard to fraction of organic crops to agricultural land. There are several states in India like Himachal Pradesh, Kerala, Karnataka, Gujarat, Maharashtra, Madhya Pradesh, Uttarakhand, Rajasthan, Sikkim and Tamil Nadu that majorly practise as well as

promote organic farming among their farmers (Willer &Lernoud, 2017, 2019; Das et al., 2020).

Organic farming is a labour intensive and thus is a costly method but this problem can be overcome as the family members of small-scale producers work on subsistence or small holdfarms. Besides this, organic farming is based on use of the available local or natural resources which further cuts down the cost of production. As it is labour demanding system, it can also help in eradicating poverty by providing employment Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 opportunities in developing countries, particularly for the small holder and farmers with small resources. It promises increased sustainable income, better livelihood and access to education and health facilities (Kleemann, 2011; Jouzi et al., 2017).

The cost of organic products is reported to be 10%–40% more than the food crops grown by conventional methods that depend on various parameters in the terms of both input and output costs involved. The input factors that result in the higher cost is due to various reasons like a high cost for getting the organic certification, labour intensive, be deficient in subsidies available on organics like in India, but on the contrary, it also minimizes the other input cost involved in the purchase of fertilizers, pesticides, etc. The biofertilizers and biopesticides can be produced locally using plant and animal waste that reduces the investment in chemical inputs. Moreover, despite the low productivity; the profit is significantly higher (22–35%) in organic farming which is because of the price premium of these organic products (Nemes, 2009). It also promotes social capital by promoting NGO and social organizations at both local as well as regional levels and encourages farmer's organizations too. The small-scale holders can derive numerous benefits like bargaining rights, access to markets and credits facility, low certification costs etc. (UNEP, 2008). It has a positive role in the occupational health of farmers as it reduces their exposure to agricultural chemicals (Das et al., 2020).

As organic farming is based on the application of indigenous knowledge and skills, thus producers can apply their knowledge and skills rather than learning new methods and this encourages sharing their knowledge regarding their traditional practise. This method is also profitable for women running deficit of credits, thus empowering and enabling them to provide better nutrition to their families as well. This also provides opportunities to augment their income by growing cash crops that require little input (Seufert, 2012).

There are several examples of organic projects that have employed small-scale farmers like organic tea production in Sri Lanka and China, cotton (India), rice (Philippine), honey (Ethiopia) and pineapple (Ghana) (Kleemann, 2011; Panneerselvam et al., 2012; Fayet& Vermeulen, 2014; Girma &Gardebroek, 2015; Qiao et al., 2015). According to studies, organic farming in countries like India and China is beneficial for farmers with Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 low income and small-scale holders, living in more difficult environmental situations. There are several reports where it has been found that organic cultivation increases the income of these farmers. For example, the income of farmers producing organic cotton in India was increased by 10 to 20% and in Kenya, increased by 40% (UNEP, 2008; Jouzi et al., 2017). It is reported that the price premiums of these organic products are between 10 and 300% and farmers get 44–50% of this price premium. Hence adopting organic farming can help in eradicating poverty in developing countries and also decreases the risk of failure of the main crop through numerous ways like intercropping, rotation and other agroforestry systems (Müller, 2009; Jouzi et al., 2017).

Thus, it has been observed that organic farming involves low-cost input, possesses less risk and provides a high price premium, enhances social competence; empowers farmers and women with low income and no credits; sustainable source of income, improved livelihood and health and also helps in improving the quantity as well as the quality of the natural resources. Thus cultivation via organic farming is more feasible for poor farmers in contrast to conventional methods of farming and promoting organic farming among poor and small-scale holders could be one of the best strategy in overcoming various socio-economic problems as discussed above (Jouzi et al., 2017; Mariappan & Zhou, 2019; Das et al., 2020).

7. Challenges and Drawbacks

The demand for organic products and subsequently organic farming has been reported to get increased all over the world. Despite of numerous advantages, it offers in terms of preservation of natural resources, protection of environment, better food quality etc., a shift to organic farming still remains a big challenge in developing countries like India. Besides other

drawbacks, government policies in regard of promoting organic farming are one of the biggest challenges in India (Bhardwaj & Dhiman, 2019; Das et al., 2020). Also, other constraints like lack of good marketing; proper agricultural policies and guidelines; in apt marketing of organic input; complexity involved in certification process; lack of proper education and research among small scale holders and farmers; lack of awareness; scarcity of biomass; paucity of good quality of manure and seeds; Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 dearth of livestock; difficulty in soil nutrients management; low yield as well as failure in achieving the desired quality of the organic produce; lack of constancy in quality of the produce, organic pesticides are less effective in comparison to chemical pesticides; labour intensive process and thus high input cost, lack of finances or credits; insufficient infrastructure; inability to meet the export demand (like high price related to quality, paper related work is a complicated as well as time taking process and lack of proper economic amenities required for quality assessment both for input as well as organic produce which opens up the possibility for fake products in the market resulting in loses of trust and interest in the product among the consumers (Barik, 2017; Bhardwaj & Dhiman, 2019; Das et al., 2020). Organic farming has a major disadvantage in that it produces low yield which in turn is balanced with the high price premium and low input cost involved in producing organic products. However, in India, organic produce does not offer a high price premium, thus decrease yield leads to lower profit if they are sold domestically. Other limiting factor is that a large number of farmers belong to a marginal and small category and therefore; to support organic farming in a country like India, the government needs to invest to provide financial incentives to the farmers. There is a need to bring out more schemes wherein cooperation with non-government agencies, they should help in the certification process and provide special training to the farmers to enhance their knowledge and skills that are required for the production, processing and for the marketing strategy of organic products. Besides financial assistance, they need to be supported by extension programmes on how to use their own input resources instead of purchasing and relying on outside resources and also there is a need to encourage them in making associations and trade unions to improve their marketing efficiency (Barik, 2017; Das et al., 2020; Yadava &Komaraiah, 2021).

8. Future Prospects of Organic Farming

Agriculture is the main source of livelihood in India and accounts for 20-30% for each household income (Qiao et al., 2015). Organic farming has been a traditional practice in India. However, the increasing population posed a huge pressure on agricultural land to produce more in order to meet the food demand which consequently forced to shift to conventional mode of farming. Conventional farming is an intensive process which Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 requires use of fertilizers, pesticides and herbicides; use of genetic modification tools, recent agricultural techniques and irrigation methods, etc. Conventionally agricultural products have been found to have an adverse effect on health due to the occurrence of elevated levels of pesticide residue, antibiotic residue, nitrate, hormones, heavy metals etc. Thus, the demand for organic products has increased in the past as a result of growing knowledge and awareness among consumers regarding the nutrition, health and safety issues related to food.

India is bestowed with a variety of naturally occurring organic nutrients which is more suitable for the organic cultivation of a wide range of crops. Moreover, the climate and soil conditions of India's drylands are also appropriate for organic agriculture in comparison to the convention system (Barik, 2017; Jouzi et al., 2017; Das et al., 2020; Yadava &Komaraiah, 2021). Interestingly, India also has a history of traditional farming methods where indigenous farmers and natives have been making use of their traditional knowledge and skills and using organic fertilizers and pesticides made from wastes derived from plants and animals. In many parts of India like the north-east, hilly areas and several rural areas have been practising organic farming for quite some time where very less amount of chemicals are required. The traditional farmers also have deep knowledge as to how to maintain the fertility of the soil and pest disease management which would be of great value in organic production (Deshmukh & Babar, 2015; Gour, 2016; Das et al., 2020). Thus, organic farming can help in restoring and maintaining the ecological health of these drylands.

Organic farming though requires less investment, but being a labour-intensive method increases product cost. However, labour here in India, being in abundance and inexpensive, it is feasible to adopt organic farming. It involves less investment, less risk, promises increased income, assures debt-free and better livelihood for farmers (Barik, 2017; Das et al., 2020).

At present, India is the biggest producer of organic products and was assigned the eighth position with organic cultivable land of 1.78 million ha in the world, in 2017 (Willer &Lernoud, 2017, 2019; Das et al., 2020). The rising demand for organic produce in developed countries and government policies supporting their exports are the major Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 factors accountable for the growth of organic food industry in India (Das et al., 2020). Several technologies like nanobiostimulants and mycorrhizal fungi as bio fertilizers, sensor tools to map cultivatable land areas, spatial geodata, 3D Printers, better drip irrigation, Bee Scanning App; Inhana Rational Farming Technology; production from waste and side streams along with major, site specific farming (precision agriculture), and agro-environmental practices were invented to boost organic farming. The growing demand for organic products along with these innovations and their implementation will further confirm the feasibility of organic cultivation. This would help in promoting farmers to adopt organic farming even without the requirement of any subsidy and premium price (Nova-Institut GmbH, 2018; Barik, 2017).

The government of India has been trying its best by starting programmes and bringing out various schemes to popularize organic farming among farmers. There are also several schemes initiated by public institutions for example- NPOP, Paramparagat Krishi Vikas Yojana-sPKVY, etc. Different Non-profit Organisations-NGOs are also putting in a lot of effort to popularize organic farming practise in India (Yadava &Komaraiah, 2021). The PGS-India i.e. Public Guarantee System India is spreading in many states of India. In this system, the farmers share their information about their organic practices; organize themselves for the common-pool resources in addition to other programmes that work towards the self-interest of farmers to achieve both economic as well as health benefits of farmers (Lemeilleur& Allaire, 2019; Yadava &Komaraiah, 2021). Thus, promoting the adoption of organic farming can facilitate in achieving both an economically and ecologically sustainable nation.

9. Conclusion

Organic farming is an economical and environmental-friendly method that has immense potential in preventing environmental degradation as well as improving socioeconomic status. Organic food is rapidly gaining popularity all over the world as a result of growing concerns and awareness among consumers regarding nutrition and food safety and health issues. It produces safe and healthy nutritious food with very less or no contaminants, also decreases the risk of crop failure, promises high net return, is less dependent on the outside or purchased farm inputs, decreases the financial risk and assures the improved Vantage: Journal of Thematic Analysis, 2022; 3(1): 21-44 livelihood of the farmers. It is also economically practical to carry out organic farming as it reduces input costs and in turn, farmers get a higher premium price for their produce. However, the conventional producers have better economies of scale in comparison to organic producers. However, favouring and supporting the premium price of organic produce and providing accessibility to the marketplace would encourage the farmers to opt for organic farming. Moreover, the various innovative organic farming methods will further help promote organic farming among poor farmers by ensuring economical and ecological production. Therefore, practising the indigenous method of organic farming, providing better organic market facilities, support funding, training, education and awareness programs would facilitate in production of more land for organic farming for profitable, healthy, as well as sustainable agricultural production.

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