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A REVIEW ON SUSTAINABLE ORGANIC FARMING IN INDIA

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ABSTRACT

The biggest challenge India faced after independence was producing enough food to feed its expanding population. As a result, high-yielding varieties are utilized in conjunction with water, fertilizers, and chemical infusions. This combination of high-yield processing methods aided in the growth of the country's food surplus, soil quality, deforestation, pesticide toxicity, and long-term farming. Furthermore, many scientists are rethinking agricultural practices based on biological data rather than the heavy use of artificial chemical fertilizers. Organic agriculture is gaining popularity throughout the globe as a way to improve agricultural efficiency, income, food security, and environmental protection. In addition, the report's goal was to evaluate the status of organic farming in India. Organic farming has the potential to offer high-quality food without compromising soil, environmental, or human health; nevertheless, large organic farms must produce enough food to feed India's entire population. The present study will aid future research and raise awareness about the advantages of organic farming as well as the advantages of organic food production.

KEYWORDS: *Environment, Organic Farming, Pesticides, Soil, Sustainable.*

1. INTRODUCTION

Having agriculture as the cornerstone of the Indian economy, which is supported by almost 67 percent of the population and 55 percent of the overall workforce, is reaching the criteria for satisfying the demands of the growing Indian population via agricultural and other related activities. For India to attain double-digit GDP growth, agricultural growth of about 4% or more was expected to be required. While farming has the potential to meet the demands of an ever-increasing population, it also confronts many difficulties. It is undeniable that India's agricultural production increased dramatically during the green revolution. The inventions used at the outset of the green revolution, assisted by policy, and further encouraged by agrochemicals, equipment, and irrigation availability, have been the main driving factors in increasing agricultural output. While these innovations certainly improved Indian food security, there was one major drawback: farmers had to depend on the supplies they had purchased. When manufacturing fertilizers and insecticides, the two most essential inputs in green revolution (GR) technologies, the requirement for fossilizing fuel or expensive energy, both of which are linked to major health and environmental problems, was a critical consideration[1], [2].

Organic agriculture, in its most basic form, refers to plant cultivation without the use of synthetic fertilizers or pesticides. The maintenance of the soil and the use of natural instruments to add organic matter to the soil are all part of organic agriculture. Organic farms are those that avoid or limit the use of pesticides and fertilizers, chemicals, growth regulators, and animal feed additives to the greatest degree feasible. The term "organic" refers to agricultural processing methods for the production of food and fiber. Organic farming is used to produce both agricultural products such as grains, foods, milk, and eggs, as well as fibers such as flowers, cotton, and refined food products. Organic agriculture regulation is dependent on the establishment of biological variety in the field in order to eliminate pest species' habitat and properly maintain and regenerate soil fertility. Organic farmers should not use synthetic pesticides or fertilizers[3], [4].

The ecological approach to agriculture and horticulture recognizes that the environment in which plants thrive is far larger than the sum of its individual parts, and that all living things are interdependent and linked. Organic farming entails treating the soil and the nutritional ecology in a way that benefits future generations. The provision of a healthy source of food to land living forms via the use of composts, manure, and/or organic materials. Rather of being discarded and burnt, renewable resources should be chosen, a viable planet developed, the atmosphere lowered, and waste repurposed.

Organic manures, such as agricultural manures, cultivation residue, biogas slurry, crop waste, oil cakes, earthworms, and compost, enhance fertile soil. The rhizophore's environment will be influenced by changes in porosity, ventilation, temperature, water retention, and soil microorganisms as a result of these soil changes. Sulphur, nitrogen, potash, phosphate, magnesium, and calcium are all elements that these crustaceans provide to plants. Earthworms are important for aeration, microflora development, and soil turnover, all of which are important for growing plants. One acre of organically rich soil with high humidity may produce 25-30 tons of earthworms, ranging from 50,000 to 4,00,000. The castings of earthworms are rich in soil nutrients such as magnesium, sulphur (2.9 percent), nitrogen (2.5 percent), calcium, and potash (1.4 percent), among others. Aside from organic alteration and the addition of earthworm

castings (the highest in Actinomycetes) to the soil, a range of diseases and nematodes also had a role in regulating[5], [6].

1.1.Main Principles of Organic Farming:

The following are the fundamental concepts of organic agriculture:

- Work in a closed setting as much as possible, relying on local services.
- Long-term soil fertility should be preserved.
- Remove all possible sources of contamination from agricultural practices.
- Produce high-quality, nutrient-dense foods.
- Reduce the use of fossil fuels in agricultural techniques.
- Providing cattle with living conditions that meet their physiological requirements.
- To enable farmers to make a living and develop their human potential via their labor.
- Adhere to organic farming's four foundations (Figure 1).

1.1.1. Organic Certificates:

Organic foods that have been certified are those that have been grown and processed in compliance with universal standards that have been verified by an independent government or a USDA-accredited private organization. Both "organic" and "non-organic" goods must be certified. The yearly submission of an organic framework schedule, as well as a farm and production facility assessment, are required for certification. Organic measures such as long-term soil management, buffering between organic farming and conventional neighborhood farms, and record keeping are all checked by inspectors. Production inspection includes procedures such as cleanup and pest control, component shipment and storage, and documentation and audit management. Biological foods are treated gently to maintain food safety without the need of additives or containers. Approved organic goods are exempt from synthetic agrochemicals, irradiation, and genetically engineered crops or additives[7], [8].

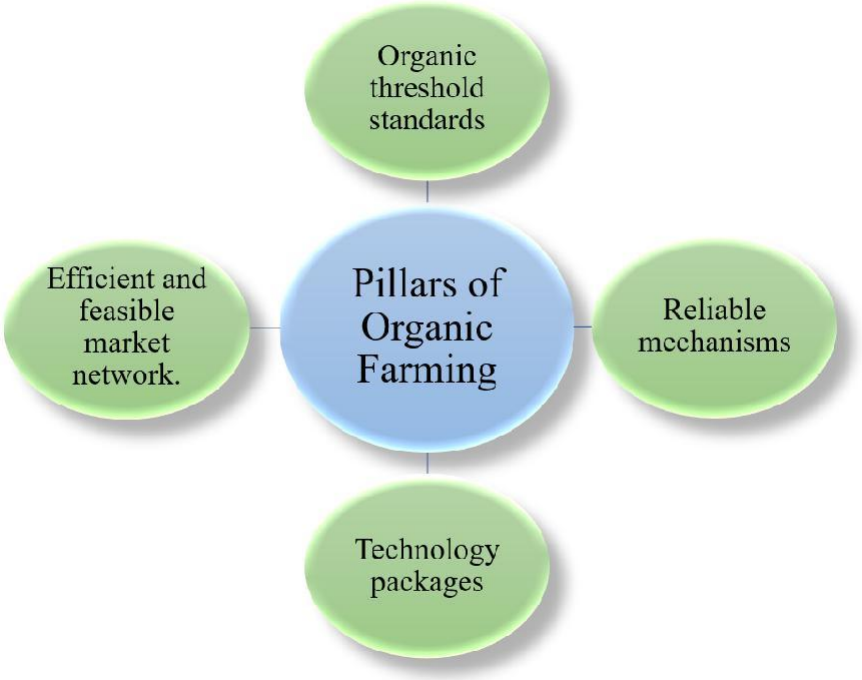

Figure 1: Displays pictorial representation of the four main pillar of organic farming

1.2. Organic Food Vs Conventional Food:

Organic foods are significantly less likely than conventional meals to contain pesticides, according to a 2002 research. Organic food prices are higher than conventional food prices because the organic price tag more closely reflects the true cost of food production: replacement labor and the extensive use of chemicals, both of which have nutritional and environmental consequences that society bears. Water cleansing and pesticide residue removal are two examples of such costs. Costs of organic food include expenditures for cultivation, harvesting, storage, and transportation. In the case of packaged goods, manufacturing and service costs are also applied. Organic foods must adhere to stricter regulations than conventional foods when it comes to any of these processes. Organic farming is usually (but not always) more expensive than conventional farming because of the intensive management and labor required. The evidence is mounting that organic foods will cost the same as or less than conventional foods if all of the operational costs of standard food processing are included into food pricing.

1.3. Safety of Organic Food:

Organic foods are just as healthy as any other kind of food. Customers, like any other product, should be cleaned before use to ensure maximum hygiene. Organic goods, as previously mentioned, have much less pesticide contamination than conventional items. Organic crops are thought to be more susceptible to E. coli contamination as a result of different raw manure implementations, while conventional farmers utilize tons of raw manure with little supervision. Organic laws impose strict manure requirements for organic agriculture, such as composting or spreading manure at least 90 days before harvest, giving pathogens more opportunity to break through microbially. [9].

1.4.Organic Food Industry:

Approximately 2% of American food supply are generated using organic methods. Sales of organic products, the fastest growing agricultural sector, have increased by at least 20% on average over the past decade. Organic vegetables may be found at natural and mainstream grocery stores, as well as straight from producers such as CSAs and the farming sector. Organic food CSAs are also available. Many chefs utilize organic food in their restaurants throughout the globe, and they seek greater flavor and consistency. Organic food acceptance is also increasing internationally, with major global organic food industry nations such as Japan and Germany leading the way [10].

2. BENEFITS OF ORGANIC FARMING IN INDIA

While switching from conventional agricultural methods to organic farming offers numerous advantages, in the context of the rural Indian economy, many of these advantages may not be realized. Finally, the advantages that are really possible to be considered as benefits for Indian agricultural methods must be clarified. Here are a few of the advantages of this partnership (Figure 2) [9].

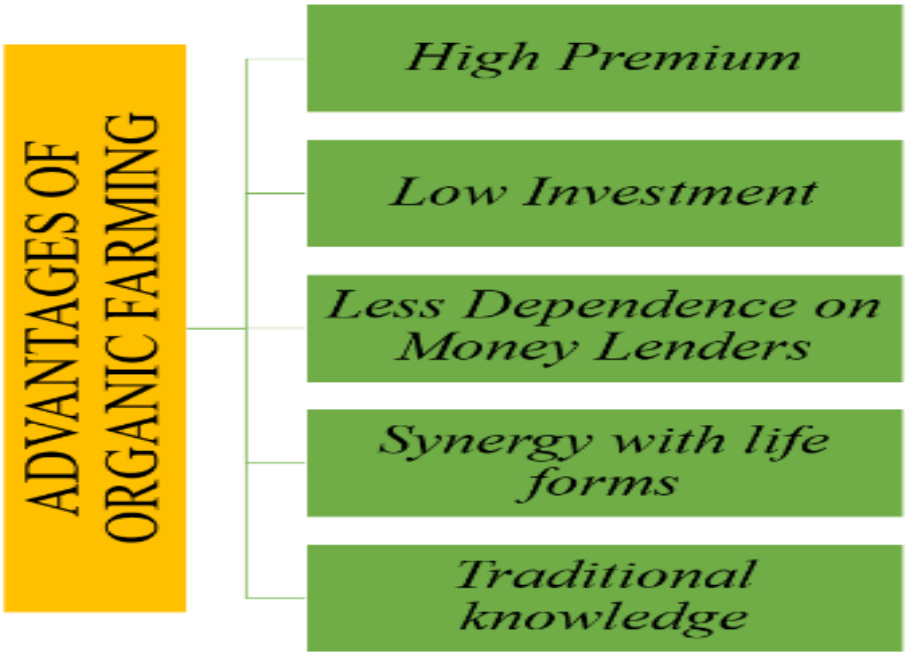

Figure 2: Illustrates the Major Advantages that are Associated with the Organic Farming in India.

2.1. High-Priced:

Despite the fact that organic food is on the rise and costs 20-30% more than conventional produce, a moderate farmer has plenty of room for the income of medium-sized farmers to keep food on the table with a meal and flourish.

2.2. Low Capital Expenditure:

Organic agricultural costs are lower when compared to traditional chemical farming techniques. Furthermore, organic fertilizer manufacturing does not need the use of sophisticated techniques. Furthermore, since organic fertilizers and insecticides may be manufactured locally, farmers have reduced yearly expenses. Because agriculture is heavily influenced by various factors such as temperature, pests, and diseases, as well as various weather factors, including the rainy season, whenever crop failure occurs, small producers in organic farming have very little to lose because their investments are low, so natural disasters, pesticides, or disease attack are not a concern.

2.3. Reduction in reliance on money lenders:

Farmers' suicides are frequent in India as a consequence of overwhelming debt. Farmers are not dependent on greedy money lenders since excessively expensive chemical supplies are not required in biological agriculture. By failing to produce crops, this would not compel farmers to perform a certain action.

2.4. Synergy with living things:

Synergies with many kinds of flora and animals are part of organic agriculture. This synergy is easily understood by small farmers, making it simple to execute.

2.5. Traditional knowledge:

Farmers should be introduced to organic agriculture based on their conventional expertise in order to obtain excellent outcomes in organic farming methods. In the case of organic agriculture, small farmers do not depend on those who provide chemical knowledge.

3. AGRICULTURE POLLUTION

The public's attention is still focused on the more apparent indications of agriculture's environmental consequences, whereas the unseen or less visible effects of air pollutants are likely to cost the most money[10]. Agricultural output has four major effects on air quality and the environment:

- reduced particle pollution and greenhouse gas emissions from fires (mainly rangeland and woodland fires);
- rice methane emissions and poultry production;
- nitrous oxide from fertilizer and manure;
- ammonia from manure and urine

3.1. Rural Development and Organic Farming Cooperation:

Organic and sustainable agriculture is also a multi-level genuine potential to contribute to dynamic rural economies via sustainable development. In actuality, the organic market's growth has already created new employment possibilities in agriculture, manufacturing, and associated services. These agricultural methods have the potential to offer significant economic and social advantages to rural communities while also having a positive environmental effect. To assist the

industry's expansion and associated businesses in the food chain, financial support and other tools to convert farmers to organic farming are available.

3.2. Organic Food Exports and Consumption in India

People believe that organic food is just a misleading phrase that is solely meant to help poor countries. While India is making strenuous efforts, the majority of organic food is destined for export. But that isn't the case. While 50% of organic food production in India is for export, many individuals are searching for organic food for local use.

The health of children has been a significant factor in deterring people from consuming organic food. Organic food costs in India are more than 25% more than conventional food prices. However, due of the nutritional advantages of organic fruit and the fact that organic food is deemed completely safe for home use, many families are now able to spend more money. The proliferation of organic food shops in India demonstrates the country's growing interest in organic goods. Organic food is becoming a common sight in many supermarkets and restaurants. India has a wider range of organic food consumption than other emerging nations. For the Indian organic food consumer, however, knowledge is needed. Several consumers are unaware of the difference between natural and processed foods.

Many people purchase natural products that they assume to be organic. Customers are also unaware of the credential system. Because a certificate for the domestic market in India isn't actually required, there are a lot of fake organic products on the market. In terms of organically generated exports, India's organic food production is on the increase, with farmers shifting to organic agriculture. India is becoming a significant producer of organic basmati rice, organic spices, organic herbs, and other organic products. Exports account for more than 53% of organic food presently produced in India, which is considerably higher than organic food exports in 2003-2004, when they accounted for just 6 to 7% of total agricultural commodities manufactured in India.

However, although the cost of manufacturing organic farming pre-requirements is low, the cost of transitioning from chemicals to organic farming is very expensive. Many more organic farmers in India are in the process of converting and are still paying a high price. As these farmers embrace organic farming, production costs are expected to drop, making India one of the most important producers of organic food. The following ingredients are presently found in organic foods produced in India and exported:

- Barley, wheat, corn, or maize are all organic grains.
- Black grammes and red grammes are organic pulses.
- Bananas, peaches, limes, pineapples, passion fruits, cassavas, and walnuts are all organic fruits.
- Soya, sunflower, mustard, cotton seeds, and groundnut oil and seeds are all organic.
- Organic vegetables include onion, potato, garlic, brinjal, and cabbage.Cloves, mace, cardamom, chilly, almonds, tamarind, pepper, vanilla, chocolate, amla, and other organic herbs and spicesetc.
- Other ingredients include coffee, jaggery, cotton, tea, textiles, and sugar.

4. DISCUSSION

With 67 percent of its population and 55 percent of its workforce depending on agriculture and associated industries, India is a nation that is heavily reliant on agriculture. Agriculture fulfills the required criteria, accounting for 30% of total income in India, the world's fastest-growing population. Bio agriculture has also been recognized as an old Indian tradition that has been practiced for millennia in a variety of rural and rural civilizations. The use of synthetic fertilizers, artificial pesticides, genetic altering techniques, and other approaches has increased as a result of the introduction of new technologies and a rising population pressure. The proclivity towards traditional farming. Organic food items are becoming more needed in industrialized countries as people become more aware of environmental protection and food quality, and soil quality, which is free of chemical pests, is significantly affected by organic processes. Organic farming still offers a lot of money-making potential. Different types of organic nutrient sources are available naturally in India's soil to enable organic agriculture.

India has an inventive, long-lasting traditional agricultural system, extensive drylands, and little use of chemical fertilizers and pesticides. Furthermore, abundant precipitation occurs as natural organic soil in the northeastern hilly areas of the country, with just a few minor chemicals utilized for a long time. Traditional Indian peasants have a broad viewpoint, in-depth research, perseverance, and experience in maintaining soil fertility and pesticides, which has resulted in increased organic food and economic development in India. Organic farming has made tremendous progress. India is now the world's largest organic producer, with 1.78 million hectares of organic agriculture in 2017. Several innovations in organic agriculture have been discovered, including the incorporation of mycorrhizal fungi and nano-biostimulants, more conscientious mapping of cultivation areas through sensor technologies and geo-datography, 3D printers, the development of side streams and wastes, as well as the major resources, development, and enhancement of organic farming through drip irrigation advancements. The Bee Scanning App, which enables apiculturists to fight the parasitic Varroa mite while also providing the foundation for community modeling and captive breeding, is another step forward in organic agriculture.

5. CONCLUSION

Organic farming is seen in a variety of ways. However, there is broad agreement on its environmental friendliness and inherent ability to protect human health. Organic agriculture has also been proven to be efficient and healthful in a variety of studies. Organic agriculture is labor-intensive and employs more people in poor countries, therefore the price of organic output is higher. However, in a nation like India, where labor is abundant and relatively cheap, organically-based agriculture offers a major potential answer to the issue presented by chemical agriculture. The government has made efforts to encourage organic farming in general. In addition, a number of organizations for the marketing of organic agricultural goods have been established. The organic food business in India is being driven by the continuing expansion of organic goods in developing countries and the Indian government's export promotion policies, which are expected to promote economic development as well as health and safety standards for the Indian people.

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