Review Article

INDIA'S ORGANIC AGRICULTURE: A VISION FOR A HEALTHY COUNTRY

Abstract: The two key elements of food quality and safety are receiving more and more attention from the general public. The inclusion of increased levels of conventionally grown food has pesticide residue, hormones, toxic metals, antibiotic residue, elevated nitrate, and genetically modified organisms. Farmed food has a significant negative impact on health. Additionally, foods cultivated traditionally are less nutrient-dense and contain fewer protective antioxidants. Due to its potential health advantages and rising food safety concerns, demand for foods cultivated organically has expanded over the past few decades. Organic food production is described as farming without using artificial pesticides, hormones, and antibiotics, as wellas artificial fertilizers and insecticides. A growing number of people are choosing to eat organicfoods because of their advantages in terms of nutrition and health. Additionally, organic farming safeguards the environment and greater socioeconomic impact on a nation. India is a nation equipped with native abilities and the growing possibility of organic agriculture. India, whichfor a variety of reasons lagged behind other countries in adopting organic farming, is now oneof the world's top producers of organic food, thanks to its rapid -growth in organic agriculture. Therefore, by ensuring sustainable development, organic farming has a big influence on a nation's health, like in India.

Keywords: food quality, safety for health, antibiotic residue, quality of food, nutritional advantage, impact on the environment, socio-economic effect

1. Introduction:

Food safety and quality are two important issues that consistently receive attention from the general public. Consumer confidence in food quality has substantially declined because of the past few decade's increasing environmental awareness and several food risks (such as bacterial pollution, bovine spongiform encephalopathy, and dioxins). The food chain can get contaminated as a result of intensive conventional farming. Because of these factors, customers are looking for safer and healthier meals that are made using more environmentally friendly and genuine local processes. Food and food items that are organicallyfarmed are thought to satisfy these requirements. Growing in popularity over the past several years as a growing method is organic farming**)**. Foods cultivated organically have emerged asone of the greatest options for both customers and farmers. Organic food is a component of living a sustainable lifestyle. So what does "organic agriculture" actually mean? **(2013)** Chopra et al.

The term "organic" was originally used by Northbourne in his 1940 book "Look to the Land," which was about the land. In fig 1.1 farmer itself should be biologically whole, a living organism, and a unit with a balanced organic life, As stated by Northbourne (Nourthbourne, 2003). Nourthbourne also refers to organic farming as the management of ecological production methods that promote and expand biodiversity, biological processes, biodiversity, and soil biological activity.

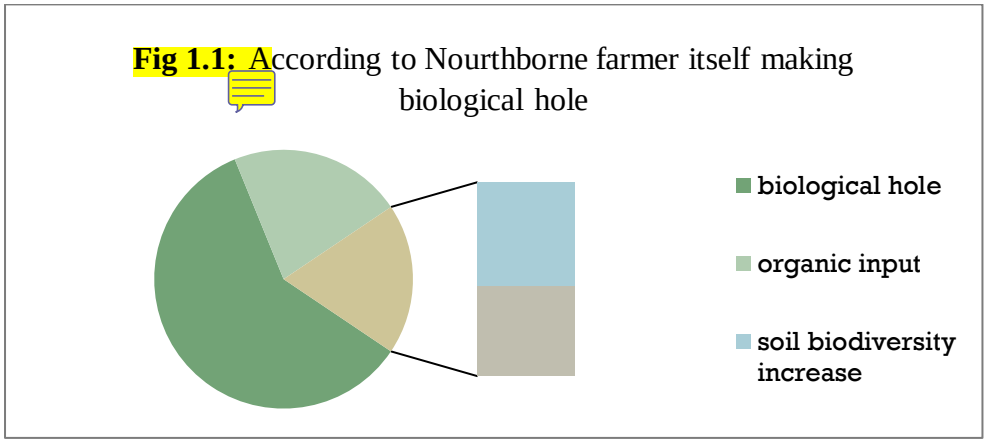

Fig 1.1: According to Nourthborne farmer itself making biological hole

It is predicated, in the words of Winter and Davis (2006), " How to handle techniques which restore, preserve and increase ecological equilibrium." According to them, organic produce is grown without using growth hormones, synthetic antibiotics, insecticides, and methods of genetic manipulation (such as those used to create sewage waste, genetically engineered crops, or chemical fertilizers). Contrarily, traditional farming involves the application of artificial pesticides and artificial fertilizers throughout the growing process to increase

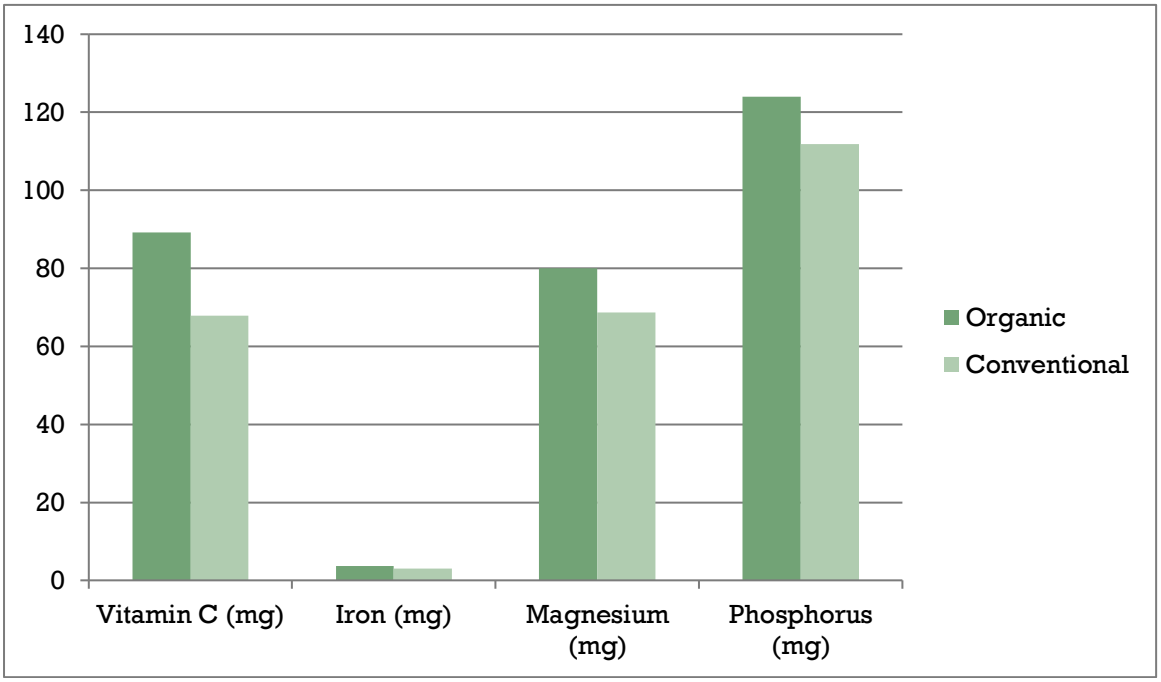

Fig 1.2: Organic versus conventional diet nutrient

crop output and profit. In traditional farming growth agents like synthetic hormones and fertilizers accelerate growth while synthetic pesticides and chemicals may get rid of pests, weeds, and insects (Worthington, 2001). Consuming conventionally grown food is prohibited due to the use of artificial pesticides and artificial fertilizers in traditional agriculture, which is why organic farming is increasingly gaining favor. In fig 1.2 nutrient content of an organic versus conventional diet.

2. The process of organic farming:

Wide-ranging organic farming and food processing methods demand the creation of an economically, socially, and environmentally sound food production system. The four underlying tenets of using organic farming to be healthy, are our environment, justice, and caring, according to the International Federation of Movements for Organic Agriculture (IFOAM). The main tenets of using organic food production are to preserve biological variety in food, take into account the enormous socio-ecological effects of the manufacture of food, and encourage and stimulate biological processes to maintain and encourage deeply entrenched soil fertility in the farming system. eliminate any pollutants, abstain from using synthetic and pesticide fertilizers, and produce high-quality food in sufficient quantities (**IFOAM**, **1998**).

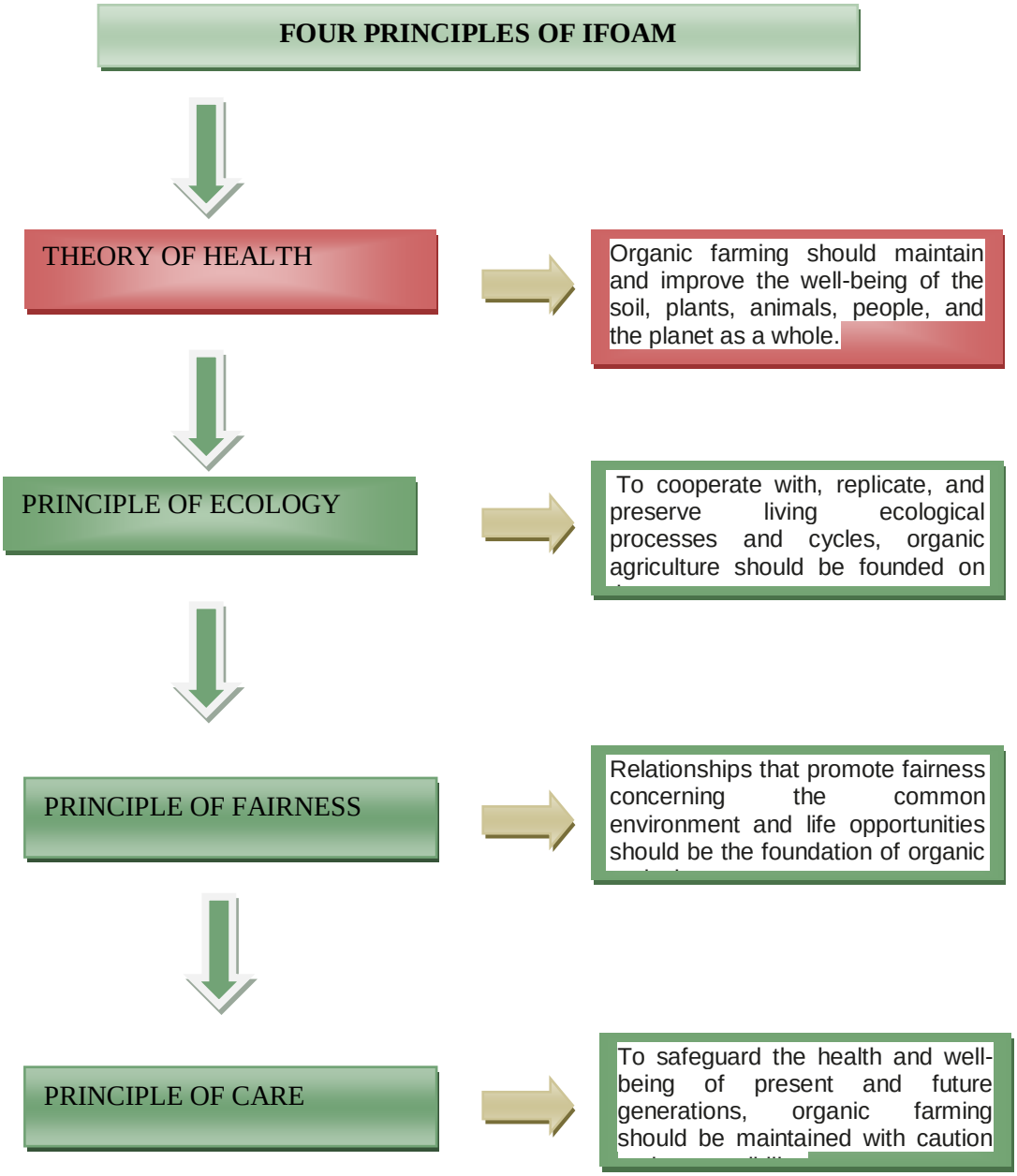

FIG 2.1: IFOAM has four main principles.

The USDA's Organic Food Production Act (OFPA, 1990), which created the National Organic

Programme, states that certain prerequisites must exist for crop cultivation and animal husbandry to take place in agriculture. Before harvest, crops must be produced on land that has not used synthetic pesticides, chemical fertilizers, or herbicides for three years. A sufficient buffer zone must also be present to prevent contamination from other farms. Ionizing radiation, sewage sludge, and genetically modified items are severely forbidden. Using cover crops and rotating crops augmented using manures made of animal and plant waste are the main farming techniquesused to control soil fertility and nutrient content. In the absence of herbicides and artificial pesticides, physical and biological control measures are primarily used to manage pests, illnesses, and weeds. Organic animals must be brought up without the regular use of antibiotics or endocrine hormones, and they must have sufficient outdoor space. Additionally necessary are preventive health measures like regular vaccinations and vitamin and mineral supplements (**OFPA**, **1990**).

3. Advantages of organic agriculture:

Benefits of diet and health safety:

The increased interest among consumers and producers in the nutritional worth of both commercially and organically farmed food, as demonstrated, among others, by Magnusson *et al*. (2003) and Brandt and Mlgaord (2001). A 2003 research by **AFSSA** (**2003**) found that organically cultivated foods, particularly green, fruits, veg, and tubers atter than those grown conventionally. Despite having less protein than conventional cereals, organic cereals, and their products offer more superior proteins with superior amino acid rankings. Compared as is customary raised cattle and sheep, those raised on organic grazing have meatthat is higher in protein and lower in fat. According to research organically fed cows had muscles that are four times as rich in Linoleic acid, a required -3 fatty acid for cardiac protection, but also have lower levels of oleic and linoleic acid.

Organic goods had greater minerals, antioxidants, and inert matter including poly-phenols including salicylic acid, and poly-phenols, Lairon (2010)'s evaluation, which was based on the French Agency for Food Safety (AFSSA) report. Compared as is customary cultivated foods, organic food (94%–100%) has zero artificial residues. Numerous Phyto-chemicals, which are often secondary plant metabolites and include polyphenols, resveratrol, carotenoids, and pro-vitamin C, are found in fruits and vegetables. According to research by Lairon (2010), produce, and fruits grew organically with a 27% increase in vitamin C than those grown conventionally. These secondary metabolites have been discovered to offer protection from a variety of illnesses, including cancer and chronic inflammation other disorders because they have significant regulatory effects at cellular levels (Lairon, 2010).

Organic fruits have a greater overall sugar content, which enhances their flavor for consumers. It has been demonstrated that produce cultivated organically tastes and smells better (Rembialkowska, 2000). According to Wose et al. (1997), organic veggies often contain significantly less nitrate than conventional vegetables. In agriculture, nitrates are utilized as a fertilizer for the soil, but they may readily be converted into nitrites, which is hazardous to thepublic's health. Methemoglobinemia can be caused by nitrates, which are extremely reactive nitrogen molecules that can compete with oxygen in the blood for binding sites on hemoglobin. Additionally, it bonds to the secondary amine to produce the powerful carcinogen nitrosamine (Lairon, 2010). Organically grown foods are less likely to include pesticide residue and harmful organisms like Listeria mono-cytogenesis, Salmonella sp., or Escherichia coli since they are raised without using insecticides and sewage sludge.

- Organic foods, therefore, provide improved nutritional value and health safety.

4.Impact on the environment:

Environmental preservation benefits from organic farming. Many studies have been done on how conventional and organic farming affects the environment. Organic farming is thought to be less damaging to the environment because it limits the use of synthetic pesticides, the majority of which have the potential to harm nearby terrestrial and aquatic species, water, and soil (Oquist et al., 2007). Because organic farms employ crop rotation techniques, they sustain biodiversity better than conventional farms. In comparison to soil improved by conventional farming, soil improved by organic farming has more organic matter, biomass, greater enzyme levels, better soil stability, enhanced water percolation, increased holding capacity, and decreased water and wind erosion per unit area or unit output. Moreover, organic farming requires less energy and generates less trash.

Socio-economic effects:

Organic farming needs more labor, thus more farms with employment generate cash (Halberg, 2008). Davis and Winter claim that (2006)), the price of an organic product varies depending on several parameters in both the input and output arms, often costing 10%–40% more than comparable conventionally grown crops. On the input side, issues that raise the price of organic items include the high cost of obtaining organic certification, the high cost of labor in the field, and the absence of subsidies for organics in India, unlike chemical inputs. However, because people are becoming more mindful of their health, they are prepared to pay a premium price. Due to lower nitrate levels and higher antioxidant levels, organic food lasts longer than conventional food. Nitrates speed up food decomposition, but antioxidants prolong food's shelf life. Due to the profit generated by using natural foods and the resulting increase in farmer interest in organic agriculture, organic farming is currently a booming economic industry.

5.Sustainability and organic agriculture:

The idea of sustainable agriculture unites three basic objectives: social and economic equality, economic profitability, and environmental health. The principle of sustainability holds that we must fulfill current demands without jeopardizing their ability to fulfill our own needs in the future.

The following is the most fundamental method of using organic farming to protect the environment (Yadav, 2017):

1. Enhancement and preservation of the agroecosystem and natural setting.
2. Preventing the overuse and contamination of natural resources.
3. Reducing the use of nonrenewable energy sources as much as possible.
4. Utilizing the synergies in a natural environment.
5. By encouraging soil activity or organic manures and avoiding hurting them withpesticides, you may maintain and increase soil health.
6. Maximum financial gains and a secure, safe, and productive atmosphere.
7. Acknowledgment of the advantages of traditional farming methods and localknowledge.

Only organic farming is capable of long-term economic viability, and organic farming is more profitable due to its more expensive market pricing. The customary use of pesticides and fertilizers drives up production costs and poses health risks to farmers, and disturbs the community's economic equilibrium, with profits flowing solely to pesticide makers. Due to the continual loss of soil fertility brought on by chemical fertilizers, farming is no longer economically feasible due to output losses and an increase in production costs. To restore agricultural economic sustainability, it will be beneficial to put into practice a plan thataddresses issues such as food security, rural employment creation, poverty reduction, the protection of natural resources, adoption of a production system that is focused on exports, sound infrastructure, significant government involvement, and private-public sector collaboration (Soumya, 2015).

6. Social adaptability:

It is defined as a process or structure that supports an organization's members' well-being while fostering future generations' capacity to uphold a wholesome neighborhood by allowing rural poor people to benefit from agricultural development, respecting indigenous knowledge and practices alongside modern technology, promoting gender equality in the workplace, and enlisting the full participation of vibrant rural communities to boost their self-esteem and mental health. As a result, there will be fewer farmer suicides. For every unit of labor input, labor productivity increases, yet organic farming aims to increase employment in rural regions by 30%. (2012) Panday and Singh

7.India's organic agriculture situation: production, acceptance, andeconomic development:

Organic farming and food are more and more in demand worldwide. From 1985, the total area of farmland used for organic production has increased steadily during the previous three decades. As of 2017, 69.8 million hectares of land throughout the world were being farmed organically, up 20% from 2016. (or 11.7 million hectares of land). This is the organic agricultural industry's fastest-ever growth rate (Willer and Lernoud, 2019). India surpassed Australia, which has the largest organic land area with 35.65 million hectares, moving up to an eighth position with a total area of 1.78 million hectares

dedicated to organic agriculture (Willer and Lernoud, 2019). India's organic agricultural industry has progressively expanded to occupy around 41 000 hectares, or 0.03%, of the nation's total arable area. In 2002, India produced 14,000 tonnes of organic farming goods, and 85% of those items were exported (Chopra et al., 2013).

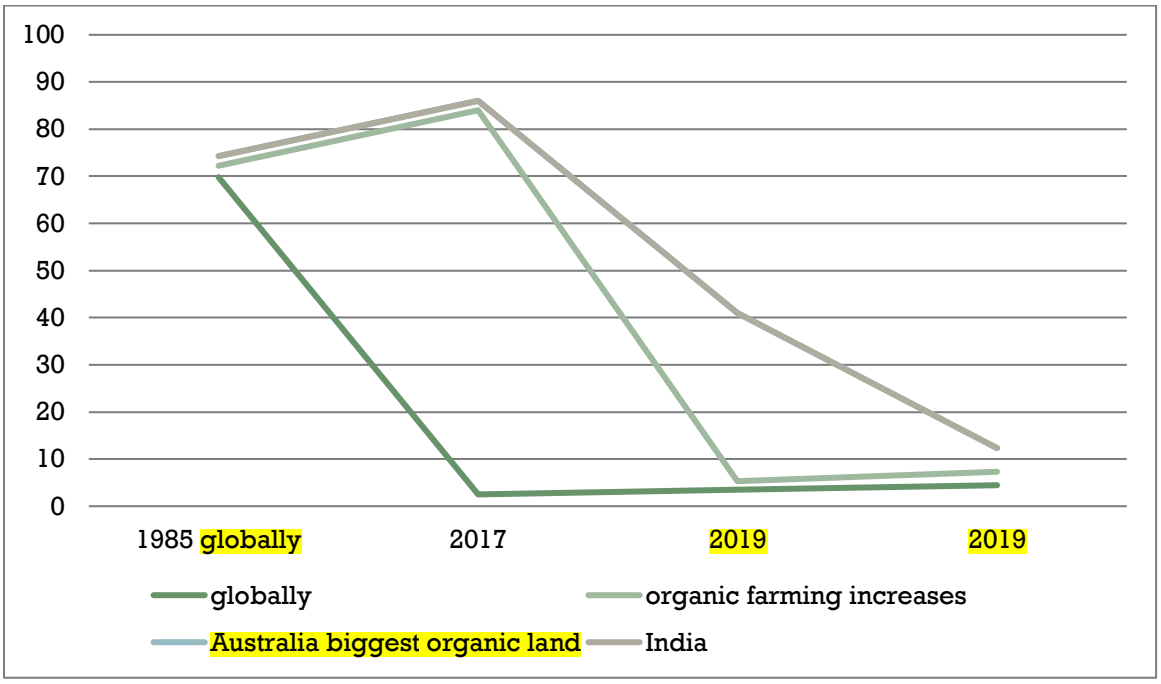

Fig 3.1: organic land in the million-hectare area

Using local resources, ZBNF, or zero-budget natural farming, is a farming technique that uses varied, multi-layered cropping systems to produce and harvest plants at no cost while restoring ecosystem health. Compared to chemical and organic farming, it uses 10% less water and 10% less energy. The good microorganisms in cow dung (300–500 crores per gram of cow dung) break down dried biomass in the soil and turn it into nutrients that plants may utilize right away. In compliance with ZBNF policy, the Government of India implemented the Rashtriya Krishi Vikas Yojana and Paramparagat Krishi Vikas Yojana programs (Sobhana et al., 2019).

The amount of cultivable land has increased by approximately three times, from 528 171 hectares in 2007–08 to 1.2 million ha in 2014–15. According to a survey by the Indian Chambers of Commerce and Industry, the market for organic foods is predicted to growby roughly 25% yearly, to 1.36 billion USD by 2020, up from 0.36 billion USD in 2014. 2017 (Willer and Lernoud). More so than any other age group, households with younger customers like organic fruits and vegetables. The nutritional and physiological benefits of organic food, as well as its favorable effects on the environment and socioeconomic standing, account for its appeal and according to a study. The UN Environment Program claims that organic agricultural techniques result in better yields that are smaller than those of conventional farming (on average 20%lower). Foods cultivated organically have greater costs since their yields are lower. Many people were discouraged from purchasing organic goods due to the higher pricing (Lairon, 2010).

Future opportunities for organic agriculture in India:

In India, 67% population and 55% labor force are dependent on agriculture and related activities. The fastest-growing population in India's fundamental requirements are met by agriculture, which contributed 30% of the total GDP. It has been discovered that organic farming is an ancient Indian tradition that has been followed for millennia in innumerable farms and rural communities. Modern farming methods' introduction and the growing weight of the population have given rise to a preference for conventional farming, which uses synthetic fertilizers, chemical pesticides, the employment of various approaches for genetic editing, etc.

In developing countries like India, there is a rising demand for produce grown organically because

customers are more concerned with the safety and quality of their food. Moreover, because the organic method does not utilize chemical pesticides, it has a substantial impact on soil health. Also, organic farming has enormous financial potential (Bhardwaj and Dhiman, 2019). The soil in India is abundant with a wide range of naturally occurring organic nutrients that support organic. India is a nation with a long history of traditional agriculture, creative farmers, large areas of uncultivated land, and limited usage of artificial fertilizers and pesticides. The country's mountainous northeast, where just a little amount of pesticides are utilized over an extended period of time, also gets enough rainfall to produce naturally organic fields.

Based on their expertise, in-depth observation, tenacity, and strategies for sustaining soil fertility and pest control that are deemed helpful in bolstering organic output and ensuing economic progress in India, traditional Indian farmers have a keen understanding. It's impressive how far organic farming has come. Nowadays, With 1.78 million hectares of organic farming in 2017, India ranked eighth in the world as the major producer of organic food (Willer and Lernoud, 2017, 2019).

The foundation of Inhana Rational Farming Technology is "Element Energy Activation," which draws on both contemporary scientific research and conventional Indian philosophy. To ensure agricultural production that is both ecologically and economically sustainable, it uses a completely organic approach. The technology's two main goals are to (1) energize the soil system, which entails reactivating the dynamics of the soil-plant-microflora by restoring the population and efficacy of the native soil microflora, and (2) energize the plant system, which entails restoring the two defense mechanisms of the plant kingdom, which are superior plant immunity against pest/disease infection and nutrient use efficiency.

Conclusion:

Food grown organically is more wholesome and secure. The demand for organic food is rising as consumers look for products that are thought to be safer and healthier. Hence, eating organic food may ensure food safety from farm to plate. In comparison to conventional farming, organic farming is more ecologically friendly. By sustaining the health of the land and the integrity of the environment, organic farming supports consumer health. Also, the organic food sector is currently expanding at the fastest rate in the world, India included. By holistically producing income, organic farming advances consumer health, ecological health, and economic success in a nation. We might conclude that encouraging organic farming is important given that India is presently the largest top producer of organic food. Farming there would eventually lead to the development of a politically, environmentally, and economically healthy country.

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