

A PAPER ON SUSTAINABLE ORGANIC FARMING IN INDIA

Dr. Madhavi R¹, Dr. G S Vijaya², Malathi.H³

JAIN (Deemed-to-be University), Bengaluru, India

Email Id-¹r.madhavi@jainuniversity.ac.in, ³h.malathi@jainuniversity.ac.in

Abstract

After the independence, the greatest problem in India faced was to make sufficient food for the growing population. Consequently, high-yielding variants are used with water, fertilizers or chemical infusions. This synthesis of high yield processing technologies contributed to the country's development of food surplus, soil quality, deforestation, pesticide toxicity and sustainable farming. Furthermore, many researchers are reevaluating farming activities based more on biological information than on the intensive use of artificial chemical fertilizers. Organic agriculture is gaining worldwide importance because it can expand agricultural practices to achieve better efficiency, agricultural revenue, food and environmental protection. Furthermore, the objective of this report was to assess the state of organic farming in India. Organic farming could provide quality food without detrimental impact on the health of the soil, environment as well as on human health; nevertheless, big organic farms must produce sufficient food for the broad population of India. The current study will help in further research and will spread awareness about the benefits of organic farming as well as the benefits associated with the production of organic food.

Key words: Environment, Food, Health, India, Organic Farming, Soil, Pesticides, Traditional methods.

Introduction

Having farming as the cornerstone of the Indian economy, which is assisted by almost 67% of our people and 55% of the total workforce are meeting the thresholds for fulfilling the needs of the increasing Indian population, based on agricultural and other associated activities. Agricultural growth of around 4% or more was projected to be essential for India to achieve double-digit GDP growth. While there is such an ability to address the needs of the growing population, farming faces many challenges [1]. In the age of the green revolution, it is certainly correct that India saw enormous growth in agriculture productivity. The major driving forces in increased agricultural production have been the innovations engaged at the start of the green revolution aided by policies and further promoted by agrochemicals, machinery and irrigation availabilities. While these developments undoubtedly solve Indian food security, a significant limitation was that farmers also needed to rely on the supplies they had bought. The need for fossilizing fuel or costly energy, that are correlated with significant health and environmental issues, was a crucial factor when producing fertilizers and pesticides as the two most important input in green revolution (GR) technology [2].

In basic words, organic agriculture implies plant culture without using synthetic fertilizers or pesticides. Organic cultivation continues with the care of the soil and the use of natural tools to bring the organic matter to the soil. Organic farms are cultivation approaches that prevent or largely prohibit, to the fullest extent possible, the use of pesticides and fertilizers, chemicals, growth regulators and animal feed supplements [3]. Organic refers to farm processing systems for food and fiber production. Both types of agricultural goods, like items, grains, foods, milk and eggs, and fibers, like flowers, cotton and refined food product, are grown organically. Regulation of organic agriculture depends on the development of biological diversity in the field to destroy pest species' habitat in order to maintain and regenerate soil fertility in a proper way. Synthetic pesticides or fertilizers should not be used by organic farmers.

The ecological approach to cultivation and agriculture acknowledges that the whole world wherein plants flourish is much more than the number of their individual components and that all living creatures are interdependent and interconnected. Organic cultivation means the treatment of soil and the nutritional ecosystem as a benefit for coming generations. The provision by providing land life forms with composts, manure and or

organic products, with a healthy supply of food. Renewable resources should be selected, a viable world created, the atmosphere reduced, and recycled, rather than dumped and burned.

Fertile soil is improved by organic manures such as farming manures, cultivation residue, biogas slurry, crop waste, oil cakes, earthworm, and compost. The implementation of such soil changes will influence the atmosphere of the rhizosphere by impacting porosity, ventilation, temperature, water retention and soil microflora. These lobsters supply the basic components for plants like sulphur, nitrogen, potash, phosphorus, magnesium and calcium. Earthworms often play a prominent part in aeration, the production of microflora as well as soil turnover that is essential to growing plants. One acre of soil abundant in organic material and high humidity can be anticipated to yield 25-30 tons, from 50,000 to 4,00,000 earthworms. Earthworms' casts are abundant in soil nutrients including magnesium, Sulphur (2.9%), nitrogen (2.5%), calcium, potash (1.4%), etc. In addition to organic modification and earthworm casts (the highest in Actinomycetes) to the soil, the variety of illnesses and nematodes also was active in regulating [4].

1.1. Main Principles of Organic Farming:

Organic agriculture's key principles are:

- Operate in a closed environment and rely on local services as far as possible.
- Preserve long-term soil fertility.
- Evitate all sources of contamination from farming methods.
- Produce good quality and adequate nutritious food.
- Minimize fossil fuel utilization in farming strategies.
- Giving livestock living environments that support the required physiological needs.
- To allow farmers to earn their livelihoods through their work and to grow their human potential.
- Follow the four pillars of organic farming (Figure 1).

1.1.1. Organic Certificates:

Certificated organic foods belong to products that are produced and manufactured in accordance with universal requirements, which have been validated by independent government or the USDA-accredited private association. Both products marketed as "organic" have to receive certification. Certification entails the annual submission of an organic framework schedule and farm and production plant review. Inspectors check that organic practices are practiced, including long term soil maintenance, buffering among organic farming and traditional neighborhood farms, and record keeping. Cleanup and pest management processes, shipping and storing of components, and recording and audit management are part of production inspection. Biological foods are handled mildly so as to preserve food safety lacking added additives or containers. Refusal of synthetic agrochemicals, irradiation and genetically modified crops or additives includes approved organic products [5].

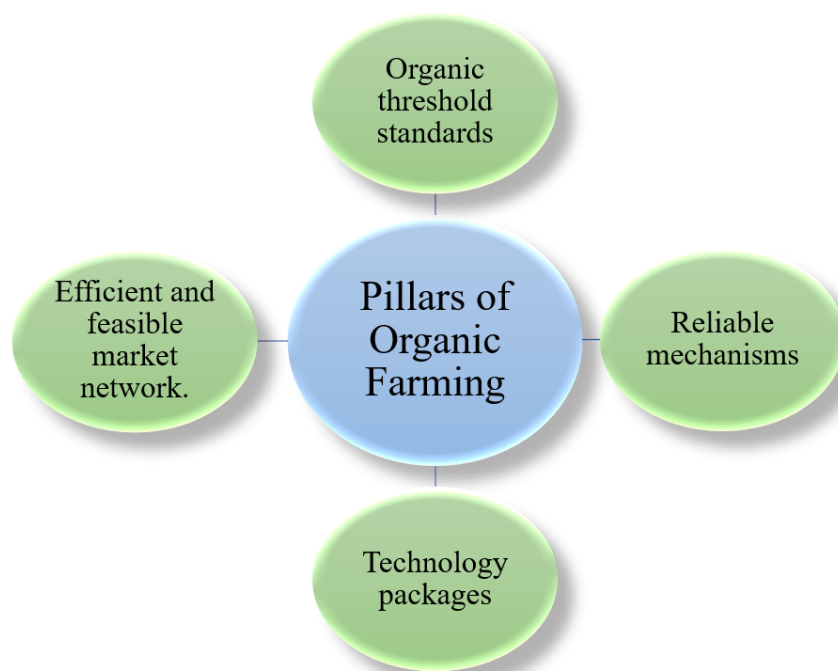


Figure 1: Pictorial Representation of The Four Main Pillar of Organic Farming

1.2. Organic Food Vs Conventional Food

A 2002 study shows that organic foods are much less probable than traditional foods to involve pesticides [6]. Organic food prices are greater than traditional food costs since the organic price tag represents more accurately the real cost of food production: replacement labor and the heavy use of additives, whose nutritional and environmental costs are paid by society. Such expenses involve water purification and pesticide residue abatement. Organic produce costs involve production, harvesting, storage and transportation expenses. Manufacturing and service charges are also used in the situation of packaged foods. Organic foodstuffs must comply with tighter laws covering any of these procedures than traditional foodstuffs (Figure 2). The intense management and work carried out in organic farming are always (but not always) more costly than pesticides used extensively in traditional farms. The proof is growing that organic foods will cost equally or, more probably, be cheaper than traditional foods if all the operating expenses of traditional food processing were taken into account in food prices [7][8].

1.3. Safety of Organic Food

Organic foods are as nutritious to eat as any other kind of food. As with any product, customers should be washed in order to guarantee optimum cleanliness before use. As stated above, organic products contain substantially less pesticide contamination than traditional products. It is a general belief that organic foods can be at increased risk of infection by E. Coli due to various implementation of raw manures while traditional farmers usually use tonnes of raw manure without any oversight. Organic regulations set stringent manure directives for organic production, including composting or applying at least 90 days until harvest, allowing for more time to break through the pathogens microbially [9].

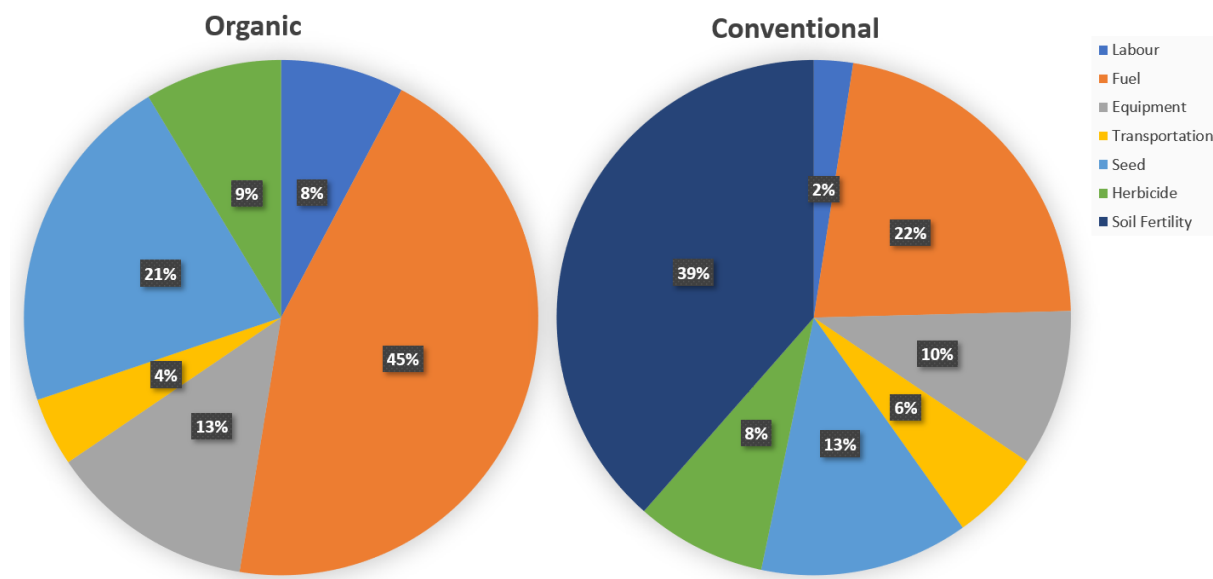


Figure 2: Charts Representing the Use of Labour, Fuel, Equipment, Transportation, Seed, Herbicide and Impact on Soil Fertility in Organic and Conventional Farming

1.4. Organic Food Industry

Utilizing organic processes, roughly 2% of American food supplies are produced. The last decade has seen an average growth of at least 20% in sales of organic goods, the fastest developing agricultural market. Organic produce is available in natural and main grocery food shops and also in direct selling from producers like CSAs and the industry of farmers. CSAs are also available for organic foods. A lot of chefs from restaurants around the world use organic food and they want to taste and better consistency. International adoption of organic food is also growing, with the significant global organic food industry countries such as Japan and Germany [10].

1.5. Benefits of Organic Farming in India

While the change from traditional agricultural practices to organic farming has many benefits, all benefits may not be achievable in the light of the rural Indian economy. Finally, it is necessary to clarify the benefits which are truly feasible to be regarded as benefits for Indian farming practices. Here are a few benefits of this association (Figure 3) [11].

1.5.1. High Premium:

Although organic food is the trend that aid cost is 20-30% higher than the conventional produce, a moderate farmer has plenty of space for the income of the medium-sized farmers to keep food on the table with a meal, so it has a chance to thrive.

1.5.2. Low Investment:

In comparison with conventional chemical farming methods, organic farming expenditure is not as huge. Moreover, the processing of organic fertilizers needs no advanced methods. Besides, because it is possible to manufacture organic fertilizers and pesticides locally, farmers have lower annual costs as well. Since agriculture is strongly affected by different various influences, such as temperature, pests, and diseases, as well as by different weather factors, including the rainy season, whenever crop failure occurs, small producers in organic farming have very little to suffer because their investments are low so there is no need to fear from natural disasters, pesticides or disease attack and intermittent rainfall.

1.5.3. Less Dependence on Money Lenders:

Farmers' suicides are commonly recognized in India as a result of huge debt. Because too costly chemical supplies in biological agriculture are not necessary, farmers are indeed not reliant on greedy money lenders. This would not push the farmers to take a particular action by failing to produce crops.

1.5.4. Synergy with life forms:

Organic agriculture entails synergies with different species of flora and fauna. This synergy is readily understood by the small farmers and therefore easily implemented.

1.5.5. Traditional knowledge:

The conventional experience that farmers should be introduced to organic agriculture in order to achieve good results in organic farming techniques. Small farmers are also not relying on those providing chemical expertise in the case of organic agriculture.

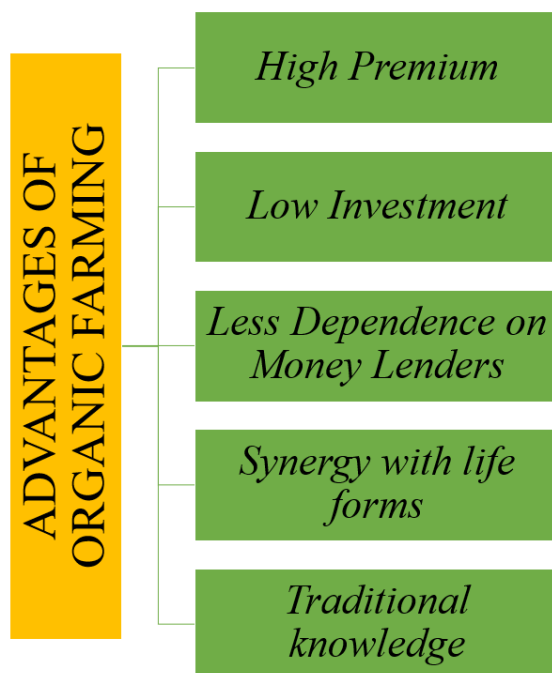


Figure 3: Major Advantages that are Associated with the Organic Farming in India

1.6. Agriculture Pollution

Public interest continues to concentrate on the more noticeable indicators of the environmental effects of agriculture, while the invisible or less evident impacts of air emissions are likely to result in the highest economic expense. Agricultural production impacts air quality and the environment in four primary areas:

- fire-free (primarily rangeland and forest-burning) particle pollution and greenhouse gas emissions;
- rice methane and poultry output;
- fertilizer and manure nitrous oxide;
- manure and urine ammonia.

1.7. Association of Rural Development with Organic Farming

Organic and sustainable agriculture is also a multi-level real opportunity to contribute via sustainable development to dynamic rural economies. In reality, the development of the organic market already demonstrates new job opportunities in agriculture, manufacturing, and related services. These farming systems can provide important economic and social benefits for rural communities as well as the impact on the environment. Financial funding and other resources to convert producers to organic farming are available to help the industry continue to expand and to aid related companies in the food web [12].

1.8. Indian Organic Food Exports and Consumption

The people misunderstand that organic food is simply a deceptive term and only intended for the benefit of developing nations. And while India strives harder, the bulk of organic food is only intended for exports. That's not so, though. While 50% of the manufacture of organic food is for exports in India, many people are looking for organic food for domestic demand (Figure 4) [13].

Children's health has been a major cause that has been preventing masses from eating organic food. In addition to the traditional food in India, organic food prices are over 25% higher. However, several families are now able to shell out more money because of the nutritional benefits of organic produce, as organic food is considered absolutely safe for household use. The fact that numerous organic food stores mushroom in India shows growth in organic products in India. Organic food today is an important feature of many grocery shops and restaurants. India has a somewhat large variation of organic food intake than developing countries. But education is required for the Indian organic food customer. The distinction between natural and processed food is unconscious to several customers.

Many consumers buy natural goods that they believe are organic. In addition, the credential scheme is not known to customers. As a certificate in India for the domestic market isn't really mandatory, there are several bogus organic goods mostly in the sector. With regard to organically produced exports, production in India of organic food is on the rise, with farmers moving towards organic agriculture. India is now a major producer of organic rice basmati, organic spices, organic herbs, etc. Exports account for more than 53% of organic food currently manufactured in India, which is significantly large relative to organic food export previously in 2003-2004, with just 6 - 7% of overall agricultural commodities manufactured in India [14].

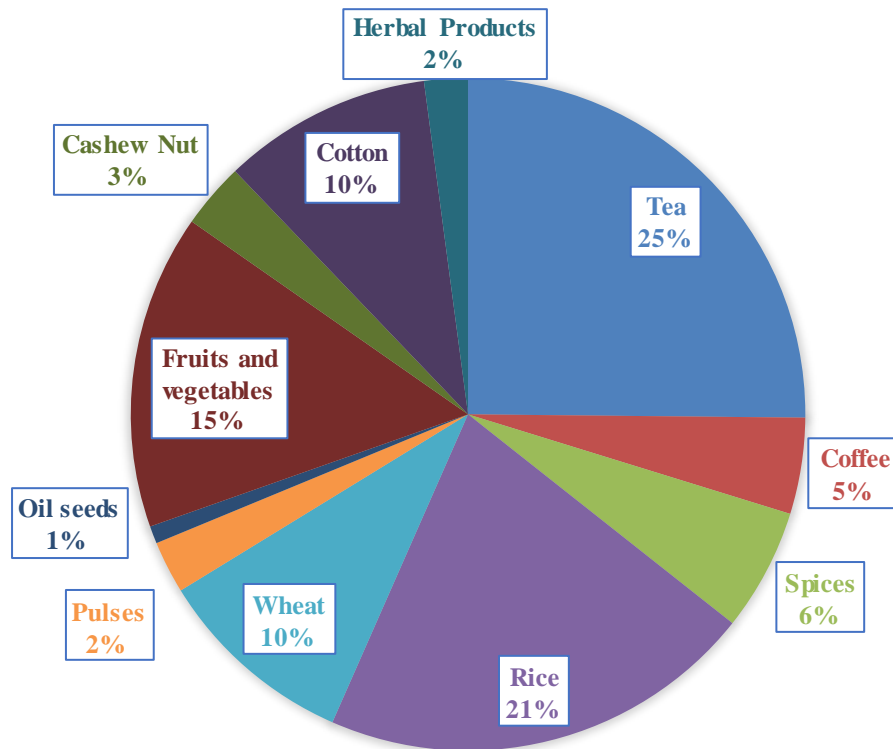


Figure 4: Export Performance of Organic Food Products from India (Total – 11295 tons)

Nevertheless, while the cost of producing organic farming pre-requirements is minimal, in the startup phase with chemicals to organic farming the cost is very high. Many other organic farmers in India are presently already in the transformation and therefore still have a massive price. The production costs are projected to decrease as these farmers pursue their organic farming, making India among the greatest significant manufacturers of organic food [15]. The following are currently included in Organic-foods item manufactured in India and exported:

- Organic grains: barley, wheat, corn or maize.
- Organic pulses: black grammes, red grammes.
- Organic fruits: bananas, peaches, limes, pineapples, Passion fruits, cassavas, walnuts.
- Organic Oil and Seeds: soya, sunflower, mustard, seeds of cotton, groundnut.
- Organic Vegetable: onion, potato, Garlic, Brinjal, cabbage.
- Organic herbs and spices: cloven, mace, cardamom, chilly, nuts, tamarind, pepper, vanilla, cocoa, amla, etc.
- Others: coffee, Jaggery, cotton, tea, textile, sugar.

Discussion

India is a country dependent on agriculture with 67% of its population and 55% of its workforce according to agriculture and related activities. Agriculture meets the standard requirements, which represent 30% of overall revenue for India's fastest-growing population. Bio agriculture was also identified to be an ancient tradition of India practiced over the millennia in numerous rural and rural cultures. The introduction of new methods and a growing demographic pressure have contributed to the use of synthetic fertilizers, artificial pesticides, the use of genetic modifying techniques, etc. The traditional farming propensity. In developed nations, too, as individuals

know more about the protection and food quality, organic food products are increasingly required for organic products, and soil quality, free of chemical plagues, is greatly influenced by organic processes. Organic farming still has a huge potential for generating profits. The soil of India is supported by different kinds of organic nutrient supplies available naturally to support organic production.

India is a nation with an innovative, durable conventional agricultural scheme, widespread drylands, and nominal usage of chemical fertilizers and pesticides. Besides, ample precipitation occurs as natural organic soil in northeastern hilly regions of the nation, with very some insignificant chemicals used for a long period of time. Traditional Indian peasants have a deep perspective, a thorough study, persistence and practice of soil fertility maintenance, as well as the maintenance of pesticides that are successful in enhancing organic produce and ensuing economic growth in India. Progress is really commendable in organic farming. Today, India is the world's biggest organic manufacturer and in 2017 ranked eighth with 1.78 million ha of organic farmland. Several innovations in organic agriculture like the incorporation of mycorrhizal fungi and nano-biostimulants, more conscientious mapping of cultivation areas through sensor technologies and geo-datography, 3D printers, development of side streams and wastes, as well as the major resources, development and enhancement of organic farming by advancement in drip irrigations, have been discovered. The Bee Scanning App, which allows apiculturists to combat the destructive parasitic Varroa mite as well as provides the backbone for community modeling and captive breeding, is a further advancement in the growth of organic agriculture.

Conclusion

The views of organic farming vary greatly. However, there is a clear consensus about its environmental friendliness and intrinsic potential to safeguard human health. Several kinds of research have also shown how efficient and healthy organic agriculture is. In developing nations, the price of organic production is greater because organic agriculture in such nations is labor-intensive and employs. But organically-based agriculture is a big possible solution to the problem posed by chemical agriculture in a country like India, in which labor is very plentiful and comparatively inexpensive. The Government has Introduced attempts generally to promote organic farming. Also, various organizations for the sale of organic agricultural products were set up. The continued growth for organic products in the developing nations and the Indian govt's export promotion policies are the driving forces behind the organic food industry in India that is likely to improve the Economic growth and also health and safety standards for the Indian people.

References

1. R. Roychowdhury, M. R. A. Gawwad, U. Banerjee, and S. Bishnu, "Status, Trends and Prospects of Organic Farming in India : A Review," vol. 2, no. 2, pp. 38–48, 2013.
2. S. Das, A. Chatterjee, and T. K. Pal, "Organic farming in India: a vision towards a healthy nation," Food Qual. Saf., vol. 4, no. 2, pp. 69–76, 2020, doi: 10.1093/fqsafe/fyaa018.
3. T. Underwood, C. McCullum-Gomez, A. Harmon, and S. Roberts, "Organic Agriculture Supports Biodiversity and Sustainable Food Production," J. Hunger Environ. Nutr., 2011, doi: 10.1080/19320248.2011.627301.
4. M. E. Popa, A. C. Mitelut, E. E. Popa, A. Stan, and V. I. Popa, "Organic foods contribution to nutritional quality and value," Trends Food Sci. Technol., vol. 84, no. November 2017, pp. 15–18, 2019, doi: 10.1016/j.tifs.2018.01.003.
5. S. Narayanan, "Organic farming in India: relevance, problems and constraints," Constraints, pp. 1–93, 2005.
6. A. Uniyal, I. Sharma, and N. S. Bisht, "A Review on Microbiological and Nutritional properties of Livestock Manure and its Impacts on Soil Physical , Chemical and Biological parameters with special reference to Indian Himalayas," vol. 5, no. 4, pp. 227–239, 2017.

7. S. K. Yadav, S. Babu, M. K. Yadav, K. Singh, G. S. Yadav, and S. Pal, "A Review of Organic Farming for Sustainable Agriculture in Northern India," *Int. J. Agron.*, vol. 2013, pp. 1–8, 2013, doi: 10.1155/2013/718145.
8. K. M. Nielsen, "Organic farming," in *Encyclopedia of Ecology*, 2018.
9. F. P. Carvalho, "Pesticides, environment, and food safety," *Food and Energy Security*. 2017, doi: 10.1002/fes3.108.
10. S. Maitra, T. Shankar, D. J. Gaikwad, J. B. Palai, and L. Sagar, "Organic Agriculture , Ecosystem Services and Sustainability : A Review," vol. 9, no. 4, pp. 370–378, 2020.
11. J. Forman et al., "Organic foods: Health and environmental advantages and disadvantages," *Pediatrics*. 2012, doi: 10.1542/peds.2012-2579.
12. J. P. Reganold and J. M. Wachter, "Organic agriculture in the twenty-first century," *Nature plants*. 2016, doi: 10.1038/nplants.2015.221.
13. H. M. Chandrashekar, "Changing scenario of organic farming in India : An overview," *Int. NGO J.*, 2010.
14. Indian Brand Equity Foundation, "Food processing," *J. Agric. Food Chem.*, vol. 3, no. 6, p. 495, 1955, doi: 10.1021/jf60052a618.
15. K. Majumdar, "Export Performance of Processed Food in India," 2013.