



Organic Farming, Sustainability and Health



Neerja Kapoor and Prahlad Kumar*

Department of Economics, University of Allahabad, India

*Corresponding author: Prahlad Kumar, Department of Economics, University of Allahabad, India

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Abstract

The term “organic” is best thought of ‘as referring not to the type of inputs used, but to the concept of farm as an organism , in which all the components – the soil minerals, organic matter, microorganisms, insects, plants, animals and humans – interact to create coherent, self- regulating and stable whole.’ Reliance on external inputs, whether chemical or organic, is reduced as far as possible. Organic farming is thus a holistic production system that , takes the local soil fertility as a key to successful production. As a logical consequence, the International Federation of Organic Agriculture (IFOAM) stresses and supports the development of self- supporting systems both on local and regional levels.

The basic rules of organic production are that natural inputs are approved and synthetic inputs are prohibited. But there are exceptions in both these cases. Certain natural inputs determined by several certification programs as harmful to human health or environment are strictly prohibited .e.g. arsenic, while certain synthetic inputs identified as consistent and essential with organic farming philosophy, are allowed. e. g. insect pheromones. An “organic” label indicates to the consumer that the product has been produced using certain special production methods. In other words, ‘organic’ is a ‘process claim’ rather than a ‘product claim’.

Sustainable agriculture describes farming system that focuses on producing food in a way that does not degrade the environment and contributes to the livelihood of the communities. It is the act of farming using the principles of ecology, the study of relationships between organisms and their environment. Adoption of modern farming has resulted in land degradation and environment pollution besides creating a very unsustainable system for the mankind. The organic farming increases the crop productivity while sustaining the ecosystems.

Health is also a consideration in all farming practices. Humans may be exposed to chemicals and pathogens in the environment by a number of routes, including the consumption of crops, treated with pesticides or have taken up contaminants from soil; livestock that have accumulated contaminants through the food chain; fish exposed to contaminants in water; surface and ground water used for drinking; from direct contact with water bodies or agricultural soil; via the inhalation of particulates or volatiles etc. There has been a general decline in the health of human beings due to increase in the amount of toxins in bodies and a decrease in the amount of nutrients in the diet.

In the present paper, the benefits of organic farming, its sustainability and health effects have been discussed. The government should play a major role in motivating the farmers towards adopting organic farming by initiating awareness programs on a large scale and by field demonstrations. These programs should also be aimed to influence the ultimate consumers about benefits of organic food.

Keywords: Organic farming; Traditional farming; Sustainable agriculture; Health

Introduction

Organic farming is agriculture that makes healthy soils, healthy plants, healthy food and healthy environment along with crop productivity. Many people think that traditional agriculture, sustainable agriculture etc. are synonyms to organic farming. Some people are of the view that the use of organic manures and natural methods of plant protection instead of using synthetic fertilizers or pesticides is organic farming. But, the organic farming in the real sense is a comprehensive management approach to improve the health of underlying productivity of soil. Organic farmers use biological fertilizer inputs and management practices such as cover cropping and crop rotation to improve soil quality and build soil organic matter. By increasing the amount of organic matter in the

soil as the nature does on a forest floor, organic farmers enhance the soil’s ability to absorb water, reducing the impacts of drought and flooding. Improving soil organic matter also helps it to absorb and store carbon and other nutrients needed to grow healthy crops, which, in turn are better able to resist insects and diseases. The term “organic” is best thought of ‘as referring not to the type of inputs used, but to the concept of farm as an organism , in which all the components – the soil minerals, organic matter, microorganisms, insects, plants, animals and humans – interact to create coherent, self- regulating and stable whole.’ Reliance on external inputs, whether chemical or organic, is reduced as far as possible. Organic farming is thus a holistic production system that, takes the local soil fertility as a key to successful production.

Sustainable agriculture is the act of farming using the principles of ecology, the study of relationships between organisms and their environment. Adoption of modern farming has resulted in land degradation and environment pollution besides creating a very unsustainable system for the mankind. The organic farming increases the crop productivity while sustaining the ecosystems.

Health is also a consideration in all farming practices. There has been a general decline in the health of human beings due to increase in the amount of toxins in bodies and a decrease in the amount of nutrients in the diet. Organic food contains more nutrients, vitamin C and healthy fatty acids.

Status of organic farming

India has diverse agro-climatic regions and so it has a lot of potential to produce all varieties of organic products. The Govt. of India has implemented the National Programme for Organic Production (NPOP). The program involves an accreditation scheme for certification 2 bodies, sets norms for organic production, promotion of organic farming etc. The NPOP's standards for production and accreditation system have been recognized by the European Commission and Switzerland. The Department of Agriculture of the USA (USDA) has recognized NPOP's conformity assessment procedures of accreditation as equivalent to theirs. With these recognitions, all the Indian organic products duly certified by the accredited certification bodies of India are accepted by the importing countries world over. The details on the number of certification organizations in India and their share in the world from 2005-2010 are presented in Table 1.

Table 1: No. of Certification Organizations in India and World during 2005-2010.

| Year | No. of Bodies in the World | No. of Bodies in India | % |
|------|----------------------------|------------------------|------|
| 2005 | 419 | 9 | 2.15 |
| 2006 | 395 | 10 | 2.53 |
| 2007 | 468 | 12 | 2.56 |
| 2008 | 481 | 13 | 2.7 |
| 2009 | 489 | 16 | 3.27 |
| 2010 | 532 | 17 | 3.2 |

Source: The Organic Standard and the Agricultural and Processed Food Products Export Development Authority (APEDA) 2010.

Food products from organic farming represent a relatively small but slowly growing proportion of foods purchased in Europe and North America. Across the EU, the agricultural area devoted to organic farming has increased from 0.5 percent in 1993 to ca 3 percent in the year 2000. The value of organic foods sold in United States is estimated at \$ 10billion, across the EU at 8 bn Euro. The total value of retailed processed foods in the United States is over \$ 500 billion, in the EU more than 350 billion Euros. [1]. In the South-East Asia also, the efforts are being made to develop organic farming. , particularly by creating a strategic plan of action 2016-2020 for the sector and also to develop an ASEAN Standard for organic agriculture covering all the productions, identifying at

the same time plans and initiatives to support the organic sector's promotion and implementation. [2].

Benefits of organic farming

The benefits of organic farming are innumerable .Some of these are:

- The organic farming system has the potential to improve soil fertility by retaining crop residues and reducing soil erosion [3-4].
- The organic farming system has the potential of reducing the use of irrigation water and sequencing CO₂ [5].
- The organic farming system has the potential to reduce the emission of greenhouse gases by agronomic practices as the nitrogen application rates in organic farming systems are 62-70% lower than those compared to conventional agriculture due to recycling of organic crop residue and use of manure [6].
- The organic matter has a stabilizing effect on the soil structure, improves moisture retention capacity and protects soil against erosion [7-8].

Health effects of organic farming

Health is also a consideration in all farming practices. Humans may be exposed to chemicals and pathogens in the environment by a number of routes, including the consumption of crops, treated with pesticides or have taken up contaminants from soil; livestock that have accumulated contaminants through the food chain; fish exposed to contaminants in water; surface and ground water used for drinking; from direct contact with water bodies or agricultural soil; via the inhalation of particulates or volatiles etc. There has been a general decline in the health of human beings due to increase in the amount of toxins in bodies and a decrease in the amount of nutrients in the diet [9].

There are many nutritional, environmental, economic and health benefits associated with the consumption of organic foods. Nutritionally speaking, USDA does not claim that organic foods are safer or more nutritional than conventionally grown products. Yet, some studies have found that organic foods have higher amounts of minerals and some vitamins, less heavy metals, better quality protein and less nitrates.

Health effects of organic food in human beings are as follows:

- Organic food contains 10-50% higher phytonutrients, higher minerals and dry matter [10].
- In crops vitamin-c ranges 5-90% more in organic food eg. Peaches and tomatoes. Higher carotenoid content was found in organically grown sweet peppers, yellow plums, tomatoes and carrots. Some studies observed that the quality of amino acids was higher in organic products [11-12].
- Studies show that dairy products from organically raised animals are healthier. The content of omega-3 fatty acids, antioxidants were higher in organically produced milk. Several

studies indicate that 10-60% more healthy fatty acids and omega-3 fatty acids occur in organic dairy products [13].

4. In organic food fewer residues of pesticides are present in organic food [11-12]. Pesticide residues in food are regulated by FQPA but the tolerance levels assigned to certain pesticides still pose potential health risks. Organic food production method avoids the use of pesticides, chemical fertilizers, preservatives and other artificial ingredients. There has been a general decline in the health of human beings as indicated by increase in obesity, diabetes, osteoporosis, cancer, heart diseases, allergies, respiratory sensitivity and mental health problems. Many doctors and nutritionists believe that the cause of this rise in degenerative diseases is due to increase in the amount of stressors and toxins in our body and a decrease in the amount of nutrients in our diet needed to deal with those stresses [14].

5. Organically raised animals are not given antibiotics; therefore, organic dairy and meat products do not contain these residues. Even low doses of antibiotic residues, if taken constantly for a long time, can disrupt the normal growth of bacteria in the gut of human beings. As a result, the number of useful bacteria is reduced and humans become more vulnerable to harmful bacteria and illness [14].

6. Studies show that organic food is higher in total antioxidant capacity, total polyphenols and flavonoids. Organically grown products eg., straw berries and corn contain higher total phenolics. Phenolics are important for plant health as they protect plants from insects and diseases. They are important for human health also for their potent antioxidant activity and wide range of pharmacologic properties including anticancer, antioxidant, platelet aggregation inhibition activity [15].

7. Organic vegetable juices exhibited significantly stronger suppressive effects against mutagens. A study on comparative effects of extracts from organically grown strawberries on the proliferation of colon and breast cancer cells showed higher anti proliferative activity of extracts from organically grown strawberries on both types of cancer cells, which was probably due to higher content of secondary metabolites with anti-carcinogenic properties in these fruits. These results suggest a possible mechanism by which organic foods can reduce human cancer risks. [16].

8. Many pesticide compounds have oosterogens properties and are called xeno-oosterogens (foreign estrogens). In humans, research has supported the hypothesis that exposure in pregnancy to environmental xeno-oosterogens can affect the human male offspring's reproductive system. The sperm quality is also influenced by exposure to pesticides. Average sperm concentration around the world in 50 years until 1990 fell by half from around 113million/ml. to 66million/ml. Studies found that groups of men who consumed organic food had average concentrations of 99million/ml. and 127million/ml. respectively, the later having higher intake of organic food [17-18].

9. Organically grown food tastes better than conventionally grown. It can indirectly affect the nutritional value of a food through the stimulation of appetite and digestive processes.

10. Studies indicate 30% less eczema and allergy complaints and less body weight among 14000 children fed with organic food.

11. There is scientific evidence that dietary exposure to children to organophosphorus pesticides and their metabolites in urine is much lower on an organic than on a conventional diet and switching over to organic diet decreases exposure substantially. Consumption of organic foods provides protection against exposure to organophosphorus pesticides, commonly used in agricultural practices [19].

Sustainability

Sustainable agriculture describes farming system that focuses on producing food in a way that does not degrade the environment and contributes to the livelihood of the communities. It is the act of farming using the principles of ecology, the study of relationships between organisms and their environment. Adoption of modern farming has resulted in land degradation and environment pollution besides creating a very unsustainable system for the mankind. The organic farming increases the crop productivity while sustaining the ecosystems. Swaminathan [20] has emphasized on soil health, water quality, plant health, genetic homogeneity, abiotic stresses and post-harvest management, to give particular attention for agriculture sustainability.

Cole et al. [21] have observed that conventional agriculture releases about 10-12% of total greenhouse gases emissions. Joshi [22] has also pointed out that intensive agriculture and excessive use of external inputs are leading to degradation of soil, water and genetic resources and negatively affecting agricultural production. Several studies and experiments were conducted by several workers and they have come to the conclusion that significant quantity of organic matter and soil carbon has been lost due to intensive cultivation. As a result of these changes in the agricultural sector, some other ways to come out of the problem of heavy usage of chemical fertilizers and pesticides, were searched .and finally concluded that organic farming is the best remedy for the problem, which will help sustainability of the agricultural sector in the long run [23-26].

Organic farming system focusses on producing food in a way that does not degrade the environment but prevents environment pollution, increases the crop productivity and contributes to the livelihood of the communities besides creating a very sustainable system for the mankind. Soil health, water quality, plant health, genetic homogeneity, abiotic stresses and post-harvest management provide agriculture sustainability. Organic food production method avoids the use of pesticides, chemical fertilizers, preservatives and other artificial ingredients. There has been a general decline in the health of human beings as indicated by increase in obesity, diabetes, osteoporosis, cancer, heart diseases, allergies, respiratory sensitivity and mental health problems.

Many doctors and nutritionists believe that the cause of this rise in degenerative diseases is due to increase in the amount of stressors and toxins in our body and a decrease in the amount of nutrients in our diet needed to deal with those stresses.

Suggestions

Following measures should be taken by Govt. of India in promoting organic farming and sustainable, environment friendly agriculture:

- a) The farmers should be encouraged to avoid the use of pesticides, chemical fertilizers, preservatives and other artificial ingredients
- b) Government should encourage the farmers by providing financial assistance during the initial years of conversion.
- c) Contract farming and cooperative farming should be promoted in initial years of conversion.
- d) Promotion and establishment of Green Markets for organic farmers help them in selling their products in satisfactorily good prices [25,26].
- e) Lower productivity levels and absence of premium prices lead organic farmers to a vulnerable situation. Announcement of premium prices for food crops like paddy, wheat, jowar, bajra etc. is needed by the Government.
- f) The Government should play a major role in motivating the farmers towards adopting organic farming by initiating awareness programs on a large scale and by field demonstrations. These programs should also be aimed to influence the ultimate consumers about benefits of organic food.

Conclusion

Organic farming has to be encouraged on a wider scale to provide nutritious and healthy food to each and every citizen of the country. Strategies for promoting organic farming have to be implemented. Organic farmers should be trained for producing healthy and nutritious food without using chemical fertilizers, pesticides etc.

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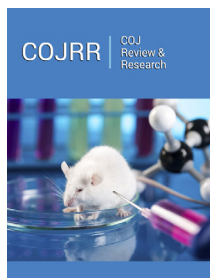
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