

Popular Article

Organic Vegetable Production for Sustainable Livelihood

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Abstract

With sustainable resource use, organic agriculture has the ability to meet the world's food needs. This review demonstrates how organic agriculture contributes to development that is less polluted and contributes less to greenhouse gas emissions, which eventually combats climate change. Given that organic farming produces yields that are comparable to conventional farming, it is a more sustainable system because it is more effective, efficient, and profitable and because it accumulates rather than depletes soil organic matter. It is vital to switch to organic farming methods in order to avoid the negative consequences of conventional farming systems. Organic farming practices not only enhance community health but also have the potential to reduce climate change due to their ability to sequester carbon in the soil.

Introduction

In the modern age, the increasing population in every sphere is a critical challenge in the sustainable development of our environment. The agricultural system is also affected by pollution (Kasturi, 2007). Modern farming techniques (such as the use of pesticides, synthetic fertilizers, etc. to maximize crop yield) disturb the nutrient balance of the soil and reduce soil fertility. Organic farming is an environment-friendly, animal and plant-based organic resource that enriches nutrients that are required for crop plants (Badgley, 2007). Organic agriculture is an efficient and promising agricultural approach for environmental sustainability as it provides yield stability, improves soil health, no environmental concerns, organic food, and reduction in the use of synthesized fertilizers. (Melissa, 2003).

Even the Green Revolution, as we know, has led to reduced genetic diversity, increased vulnerability to pests, soil erosion, water shortages, reduced soil fertility, micronutrient deficiencies, soil contamination, and reduced availability of nutritious food crops for the local population. This led to the displacement of vast numbers of small farmers from their land, rural impoverishment and increased tensions and conflicts (Bengtsson, 2005)

According to Bello, “Agricultural development strategy for developing countries needs to be geared towards increasing the productivity of land under cultivation, with reduced cost, higher efficiency uses of inputs with little or no harm to both human and the environment (IFAD, 2003). And India’s growth story is service sector-led and manufacturing sectors growth remaining stagnant, the relevance of agriculture is fast declining. This makes the economic and trade liberalization and adoption of food security bill to exert heavy pressure on India’s land resources (Bolwig, 2009)

As a result, countries like ours are now forced to consider their options for switching from the prevalent farming method known as organic farming to conventional agriculture. Organic farming is a holistic production management system that is supportive of the environment, health, and sustainability (FAO, 2010). It also has the added effect of meeting food demand under the constrained effect of producing toxins-free agricultural produce. Ecology shouldn't be destroyed in the name of development. Now more than ever, sustainable development is necessary. It would be necessary to not only stabilize agricultural production but also boost it further in a sustainable way as a result of population growth (Pretty *et al.*, 2011). Nowadays many people are turning to organic products as they become more concerned about health issues and food safety, which is rising desire for food free of pesticides and chemical residues has contributed to consumers' increased interest in organic food (Dangour *et al.*, 2009).

The connection between organic farming and sustainability

The production systems and the policies along with the institutions that determine the regulations are inadequate. Healthy ecosystems and sustainable management of land, water, and natural resources while ensuring world food security must be developed with sustainable agriculture (Eyhorn *et al.*, 2007). It should ensure profitability, a healthy environment and social and economic growth and also meet the needs of present and future generations for its products and services. A global transition to sustainable food and agriculture will require significant improvements in the efficiency of resource use, environmental protection and systems resilience (CIDA, 2006).

In response to this need to maintain the health of soils, ecosystems, and people, many nations throughout the world are becoming interested in organic farming techniques, which are essential to sustainable agriculture. Due to its commercial viability, unconventional agriculture may offer solutions to the existing issues (John, 2011).

The ethics of organic farming is to generate all the required plant nutrients within the farm and adopt crop protection using local resources, restricting external inputs to the bare minimum, if not completely dispensing with them. Enhancing soil health is the cornerstone of organic farming (Conford, 2001). The International Federation of Organic Agriculture Movement (IFOAM), which

is the worldwide umbrella organization for organic agriculture, is expected to be followed in organic farming as per IFOAM Standards are as follows (IFOAM, 2012):

- To encourage and enhance biological cycles within the farming system
- To increase, enhance and maintain long-term soil fertility
- To mobilize organic matter and nutrient elements locally within closed systems
- To use, as far as possible, renewable resources in locally organized agricultural systems
- To avoid all forms of pollution
- To maintain genetic diversity
- To allow livestock to express their innate behaviour
- To allow adequate returns to the producer
- To produce qualitative food in sufficient quantity this is acceptable socially and economically

An environmentally sustainable system must maintain a stable resource base, avoiding overexploitation of renewable resource systems or environmental sink functions, and depleting non-renewable resources only to the extent that investment is made in adequate substitutes. This includes the maintenance of biodiversity, atmospheric stability, and other ecosystem functions not ordinarily classed as economic resources (Harris, 2000).

Although it is common to equate organic farming with sustainable agriculture, the two are not synonymous. Sustainability in agriculture is a broad concept, with considerations on many levels, such as environmental health, economic profitability, etc., (Lee, 2005). Organic farming methods strikes balance between what is taken out of the soil with what is returned to it, without relying on outside inputs. Organic farming today is only a small part of the agricultural landscape, with a relatively minor impact on the environment (UNEP-UNCTAD, 2008)

Present status of organic farming in India

Organic food is in high demand with the rising domestic market, India is set for faster growth. The growth of India's domestic markets is crucial to the organic movement's success (Méndez *et al.*, 2010). Organic farming has emerged as an alternative system of farming that may not only address quality and sustainability concerns, but also ensures a debt-free future, with increasing awareness about the safety and quality of food, long-term sustainability of the system, and accumulating evidence of being equally productive (Rigby and Cáceres, 2001).

Organic farming is also a sustainable and environmentally beneficial production strategy that benefits small-scale farmers in particular. Organic farming is appropriate for small farmers in developing countries like India that helps to poverty reduction and food security through a variety of factors, including (Pretty and Hine, 2001):

- Increasing yields in locations with low inputs;
- Biodiversity and natural resources conservation on the farm and in the surrounding environment;
- Increasing revenue and/or lowering costs;
- Creating food that is both safe and diverse;
- Having long-term sustainability.

In India, the organic food market is approximately INR 5.6 billion and is an emerging opportunity for generation of employment and income at village level. India is blessed with and has the potential to produce all varieties of organic products due to its various agro-climatic regions (Seufert *et al.*, 2012). Organic farming is an inherited practice in India and adds to our advantage. This holds the key for organic producers to tap the market which is steadily growing at 15 - 25 percent in the domestic market (Lyngbaek *et al.*, 2001).

The top exports included cotton and textiles (17363 MT, 25%), basmati rice (5243 MT), non-basmati rice (1634 MT), oil crops (17966 MT, 26%), processed foods (8752 MT, 13%), tea (2928 MT, and coffee (5%), honey (2408 MT, 3%) and dry fruits (1472 MT, 2%) as well as spices, medicinal plants and their processed products, and other items (13 percent) (Getz and Shreck, 2006). Cereals, spices, medicinal and herbal plants, coffee, vegetables, fragrant oil, and pulses make up the remaining product categories, which account for 5% of total sales (FAO, 2010). Europe received 44% of the organic products exported there, followed by Canada (22%), the United States (19%), and Asia (9%). (13 percent). India is currently becoming a significant competitor in the international market, exporting more than 300 products across 20 different categories to more than 20 countries (Mondelaers *et al.*, 2009; OTA, 2011).

How can sustainability be increased through organic farming

A sustainable farming system should provide food alongside other ecosystem services such as water flow and water quality regulation, climate regulation and biodiversity preservation (Foley *et al.*, 2005). Organic agriculture was developed as a farming system that is specifically aimed at producing food in a more environmentally friendly way. On a per unit area basis, organic agriculture has been shown to have several environmental benefits compared to conventional agriculture (Lotter *et al.*, 2003).

One of the key goals of organic agriculture is to improve soil fertility by returning organic matter to the soil. Soils managed with organic methods have therefore typically a higher organic matter content, which results in soils that can hold more water (Colla, 2000; Lotter *et al.*, 2003) and that are less likely to suffer from erosion (Siegrist *et al.*, 1998). Organic management methods can thus potentially provide useful ways of restoring degraded soils or preventing further degradation of soils in regions prone to land degradation.

It reduces pesticide use, it can increase species abundance and richness (Bengtsson, 2005), reduce soil erosion, increase soil fertility (Leifeld and Fuhrer, 2010), uses less energy and reduce agricultural greenhouse gas emissions (Gomiero *et al.*, 2008), and reduce nitrogen losses from the system (Drinkwater *et al.*, 1998). On some environmental issues, like soil carbon storage or water pollution through nitrate and phosphorus leaching, the better environmental performance of organic agriculture is, however, not totally unambiguous (Mondelaers *et al.*, 2009).

By implementing adaptation and organic management, organic vegetable farmers will be able to prosper and achieve reasonable profitability in their organic vegetable growing. For farmers to adapt their methods and improve their understanding of farming, technology, production, and market conditions, training and information about organic farming, standards, and technology are also crucial (Hermansen *et al.*, 2011). The sharing of information on organic farming and the

development of networks among various farmer groups, including those in the public and commercial sectors, should be encouraged (Phalan *et al.*, 2007).

In developing countries, where three out of four poor people live in rural areas and where more than 80% of rural people live in households that are involved in agriculture, improving poor farmers' livelihoods is central for addressing rural development (World Bank, 2007). Many studies have suggested that 'organic' agriculture could contribute substantially to farmers' food security and improve farmers' livelihoods (Scialabba and Hattam, 2002). Many of these studies, however, do not differentiate between 'truly' organic and other 'agroecological' or 'sustainable' forms of agriculture. The scientific evidence on the livelihood impact of 'truly' organic agriculture, which in developing countries is mainly an export-oriented farming system, is, instead, more mixed (Holt-Gimenez, 2002).

The component that motivates farmers to cultivate organic products widely today and the varied purchases of those involve price incentives as well as favourable marketing and distribution aspects. Farmers can also make short-term adjustments during times of difficulty thanks to some long-term sustainable techniques (Goldberger, 2008). Crop rotations, for instance, are a long-term approach for improving soil health that demands time spent on creating markets or market relationships for a variety of crops, as well as time and money spent on acquiring the requisite skills, tools, and expertise to cultivate a variety of crops (Chen, 2011).

Therefore, because of the equipment and agronomic knowledge that have previously been put in place, these long-term strategies and investments enable farmers to make short-term modifications during practice, such as planting more drought-resistant crops or kinds (Bolwig *et al.*, 2009). Through teaching about adopting sustainable practices as a long-term adaptation and about how sustainable techniques may be employed to maximize short-term flexibility during organic activities, farmers' adaptive ability to constraint may be increased (Bakewell-Stone, 2008).

In order to understand farmers' perceptions and their capacity to switch to or enhance their organic vegetable farming, Pinthukas (2015) investigated farmers' practices and limitations in the industry. Additionally, it aids in the choice and identification of the variables that affect farmers' perceptions of and adaptability to the adoption of organic vegetable growing, as well as the investigation of whether this supports the sustainable growth of farmers' livelihoods in the research area. In order to transition to organic vegetable farming in 2013, 108 organic farmers from the Chiang Mai Organic Agriculture Cooperative were chosen at random from three districts based on their prior farming experience.

The results showed that several farmers in three study locations had prior expertise in organic vegetable farming, including preparation of the land, use of vegetable seeds, varieties of crops, planting techniques, control of soil nutrient levels, management of pests and weeds, and harvesting. The drawbacks or barriers to small-farmer adoption of organic agriculture include financial and revenue limits, as well as biophysical and educational barriers.

Insights from Kerala

In God's own land Kerala, the state agricultural policy remained dynamic and energetic in favour of organic farming regardless of which party won the election. Contributors included farmers, political parties and coalitions, universities, NGOs, the Biodiversity Board, and the

Agriculture Department (Palackal, 2009). With the "high yield variety fertilizer-pesticide pack" of the Green Revolution, they understood that they were fighting a losing battle. They also concluded that the state's fragile ecosystems' degradation and disruption are the fundamental causes of the state's water shortage, nutritional insecurity, loss of primary productivity, and agricultural crises (Sapna, 2014).

They wanted an evergreen revolution. The farmers were convinced that the only way is to return to the traditional sustainable ways of cultivation without harming the ecosystem through organic farming, a system with the broad principle of "live and let live" recognized nationally and internationally (Pandey and Rajit, 2018). However, it wasn't simple to come to terms with this terminology and create the policy; it required four difficult years of back-and-forth discussion. The Kerala State Biodiversity Board lacks any legal standing. The state government is only advised by a statutory body.

But it was successful in gaining funding and officially integrating its organic agricultural strategy into the state's regulatory framework in the Agriculture Department. The state acted in accordance with the letter and spirit of the National Biodiversity Bill. NGOs like the Kudumbasree put up a lot of effort (GOK, 2010). That is what Kerala has to offer Incredible India. The renowned Gadgil study recommends that the Kerala state's organic farming policy be adopted by other states. might serve as a model for all six States that benefit from the mountain system, not just the Western Ghats.

Therefore, the Gadgil Report provided advocates of Kerala's organic agricultural policy with a means of opposing the Green Revolution and promoting the expansion of organic farming across the country, using Kerala as an example. Now, the equally well-known Kasturirangan Report supports it (Ramachandran, 1996). The success stories of Kerala's agrarian policy and the USA's sustainable food campaign serve as models for the rest of the world (Thomas, 1999).

Challenges faced in adopting organic farming

Challenges while developing nations are already producing a variety of organic products, they frequently face a number of obstacles, including a lack of technical know-how, such as organic farming practices and production methods, and a lack of market information, such as which products to grow and which markets and distribution channels to select (Goldberger, 2008). Additionally, market access not only presents a technical challenge but also drives up the price of the product, which must be paid by the consumer (Gomiero *et al.*, 2008).

Additional importers, food producers, retail businesses, and consumers seek assurance of Organic origin. Additionally, consumers are still unclear about what exactly is covered by organic farming, which continues to be a problem for the industry (Hochreiter, 2011). Despite these obstacles, organic farming has primarily been practiced by small farmers and is becoming more and more popular in emerging nations like India. One of the biggest issues in India is the financial difficulty that farmers face when transitioning from conventional to organic farming in its first (or "conversion") stages. The overwhelming amount of required paperwork, which has an impact on the farmers who lack literacy, is another problem (Halberg *et al.*, 2006). Additionally, there is the issue of being unable to sell the produce at a premium price during the changeover period because the products cannot be sold as "organic".

Future perspectives of Organic Farming

Commercial organic agriculture has risen at a rate of roughly 25% to 30% annually for the past 10 years, despite being a relatively new market-controlled, consumer-centric agriculture system globally with a strict quality certification system (Lee, 2005). India is poised for faster growth because of its expanding domestic market. The success of the organic movement in India depends heavily on domestic market expansion (IFAD, 2005).

Although India has long been renowned for its organic farming, it has advanced with the emergence of modern scientific, input-intensive farming. Growing in popularity as a practical substitute for traditional farming, organic farming not only addresses issues of quality and the environment but also guarantees debt-free operation (Willer *et al.*, 2016). Even crop insurance support has also been revamped in order to reduce farmer losses and provide single-window comprehensive risk coverage for a variety of crops. In the 2016-19 period, 30 percent of the entire cropped area in the country was covered, compared to a target of 50 percent. Farmers' access to new knowledge and skills is also being improved (Aher *et al.*, 2012).

India is ranked ninth among the top ten countries with the most organic land because of the country's popularity with organic farming with more than 600,000 organic farmers (Eyhorn *et al.*, 2007). Rice, wheat, lentils, spices, tea, coffee, herbal and medicinal plants, cotton, oil seeds, and a variety of fruits, dry fruits, and vegetables are among the crops grown organically in India. The most certified organic farming land is located in Maharashtra, Uttar Pradesh, Rajasthan, and Karnataka in India (IFAD, 2005). In the 2017–18 crop year, India produced 1.7 million metric tonnes of the aforementioned foods. Over 4.6 lakh metric tonnes were exported in the same year to countries like the United States, Canada, the European Union, South Korea, Japan, Australia, and Israel (Parvathi *et al.*, 2016).

Organic agriculture might be able to increase food production by closing part of the yield gap still persistent in many developing countries, especially in Sub-Saharan Africa (Licker *et al.*, 2010) if it can increase yields in low-input smallholder farming systems. But organic agriculture is unlikely to achieve as high yields as are attainable in high-input conventional agriculture (Seufert *et al.*, 2012). The impact of organic agriculture on yields and thus on food production will therefore strongly depend on what type of farming system it is compared to (Phalan *et al.*, 2007).

Conclusion

For many years, conventional agriculture has been increasingly subject to environmental and animal welfare rules. The organic farming sector needs to see where it stands in relation to these new developments. And since organic farming can provide quality food without adversely affecting the soil's health and the environment, there arises a need to identify suitable crops/products for organic production that has international market demands. By doing so, it can provide ample opportunity for employment and bring prosperity to the nation. Therefore, the need arises for favourable policy initiatives to strengthen this sector that in turn lay a solid foundation to promote sustainable development.

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