

Role of Organic Farming in Sustainable Vegetable Production

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INTRODUCTION

Organic agriculture is based on management practices that embrace preservation, restoration, maintenance, or enhancement of ecological harmony; it relies on the principles of sustainability, and hence, it helps in attaining objectives of environmental, economic, and social sustainability. Thus, sustainable agriculture emphasizes as a production system that can sustain the food needs of all without draining treasured resources. Sustainable agriculture is often referred to as a key system to attain the goal of sustainable development. The United Nations 'Division for Sustainable Development' defines sustainable development as 'Development that meets the needs of present without compromising the ability of future generation to meet their own needs' (UN, 2006). The extent of organically managed farmlands, the number of organic farms, and the global market size for organically grown foods have increased steadily. The latest data show that this tendency was accentuated due to a substantial increase in consumer demand for organic food during the COVID-19 pandemic.

Current Status of organic farming in India

India ranks 2nd in terms of World's Organic Agricultural land and 1st in terms of total number of producers. The total area under organic cultivation in India is 7.3 million ha. The area under organic farming has been increasing consistently. A larger proportion of growers are now shifting to organic production practices to meet the increasing demands. Among all the states, Madhya Pradesh has covered the largest area under organic certification followed by Maharashtra, Rajasthan, Gujarat, Odisha and Sikkim. Among different states Maharashtra is the largest producer followed by Madhya Pradesh, Rajasthan, Karnataka and Gujarat. India produced around 3.6 million MT of certified organic products which includes all varieties of food products namely oil seeds, fibre, sugarcane, cereals and millets, cotton, pulses, aromatic and medicinal plants, tea, coffee, fruits, spices, dry fruits, vegetables, processed foods etc. India's diverse agroclimatic conditions provide it a great deal of potential to produce all kinds of organic products. The ancestral practice of organic farming is a benefit in many regions of the nation.

In India, National Programme for Organic Production (NPOP) was designed to establish national standards for organic products. The Agricultural Processed Food Products Export Development Authority (APEDA), Ministry of Commerce and Industries is implementing the NPOP Programme. The NPOP has basic production standards applicable under Indian conditions and specified guidelines on cultivation of crops organically to be acceptable as organic, which could then be sold under the logo 'India Organic'. Export preference of organic vegetables offers a great scope to a country like India, which has inculcated the skill of growing organically since time immemorial.

Rising health complications due to the overuse of different agricultural chemicals and their consequent presence as residues above maximum permitted residue levels in food (MRLs) has bolstered the demand for a renewed emphasis on organic farming, particularly in vegetables.

Organic agriculture has played an important role in the preservation of traditional species and cultivars all over the world and is crucial for sustainable food security, biodiversity conservation and climate change adaptation. The organic farming is a holistic production management system that promotes and enhances agroecosystem health, including biodiversity, biological cycles and soil biological activity, and consequently, it is an efficient and promising approach for sustainability. The farm biodiversity provides resilience to climate disasters by mimicking natural ecological processes enabling better response to changes. By increasing resilience within ecosystem, organic agriculture increases its ability to continue functioning when faced with unexpected events such as climate change.

The organic vegetable cultivation offers one of the most sustainable farming systems with recurring benefits and promote for long-term soil health besides sustaining stability in production by importing better resistance against various biotic and abiotic stresses. Organic vegetables fetch a premium price of 10-50 per

cent higher over conventional products. The organic farming practices are sustainable they conserve soil moisture and protects crops against microclimate extremes. It contributes to reduced carbon dioxide and nitrous dioxide emissions, reduced soil erosion and increased carbon stocks. It helps in carbon sequestration unlike conventional farming.

Vegetable productivity under organic farming

It is noticed that during the conversion period, the crop yield is low compared to the conventional (using fertilizer and pesticides) and integrated crop management practices. However, the yields under organic farming system start rising from third year onwards and equals to that of the conventional system by the sixth year. Due to 10-50 percent more premium prices under organic farming, the net income increases progressively from fourth year onwards. After practicing 5-6 years of organic farming, the soil fertility sufficiently restored, the yield realized in organic farming of vegetable is either comparable or more than that realized in conventional farming.

The organic materials such as farmyard manure (FYM), compost, vermicompost, biogas slurry, green manures, crop residues, biofertilizers and cover crops are valuable sources of nutrients to improve the growth and yield attributes, yield, nutrient uptake, quality and soil fertility. Organic manures are storehouses of all essential nutrients besides providing substrate for other bio-inoculants. The applications of bio-fertilizers containing beneficial micro-organisms is known to improve plant growth through the supply of plant nutrients and may help to sustain environmental health and soil productivity. The inoculations of vegetable crops with different bio-fertilizers have depicted an encouraging response in terms of increasing yield, quality and soil fertility.

A farm's capacity to adjust to changing consumer demand, climate extremes, and market price fluctuations is enhanced by sustainable agricultural practices. Farmers may frequently establish direct connections with customers and local marketplaces by growing high-quality,

locally farmed products, which lessens reliance on larger, unpredictable supply chains. Additionally, these markets typically place a high value on the environmental responsibility of sustainably cultivated products, which can result in increased customer loyalty and premium pricing

Another significant obstacle to the adoption of sustainable farming methods is the knowledge gap. It's possible that many farmers, particularly those in rural or developing regions, lack the information, expertise, and skills needed to implement contemporary, sustainable techniques. Farmers may not be able to fully benefit from the most recent developments in sustainable agriculture due to this knowledge gap.

CONCLUSION

In conclusion, organic farming plays a pivotal role in promoting sustainable vegetable production by prioritizing ecological balance, soil health, and biodiversity. By avoiding synthetic chemicals and focusing on natural processes, organic farming helps reduce environmental degradation, preserve water resources, and support healthier ecosystems. As climate change poses challenges to global agriculture, organic farming systems offer resilience by promoting biodiversity and enhancing ecosystem services. As consumer demand for organic products continues to grow, organic farming offers a promising solution for achieving sustainable and responsible vegetable production, supporting both current and future generations. The approach provides an opportunity for farmers to adopt sustainable practices that are financially rewarding and environmentally responsible.

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