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Organic Farming in Vegetable Crops

(*Riya Verma, Dr. Vijay Bahadur, Dr. Anita Kerketta and Dr. Samir E Topno)
Naini Agriculture Institute, SHUATS, Prayagraj
*Corresponding Author's email: riyaverma0@icloud.com

Vegetables are an important part of the global diet as they are rich in carbohydrates, proteins, vitamins, minerals, glucosinolates, antioxidants, fibre etc. Vegetables and fruits are consumed for nutrition, health maintenance and many for their therapeutic values and disease prevention. The indiscriminate use of chemical inputs in agriculture makes us fear contamination of food with agrochemicals and pollution of the environment, soil and water, thus prompting us to think about alternative forms of agriculture to produce food free from pollutants. In this era of global warming and climate change, agriculture needs to become more environmentally friendly. Therefore, the main focus should be on developing production technologies that are sustainable in the long run. Organic farming is one of the wide range of production methods that protect the environment and limit the use of synthetic substances. The main objective of organic vegetable production is to optimise the health and productivity of the interdependent communities of soil, plants, animals and people. With increasing awareness of food safety and quality, long-term sustainability of the system and mounting evidence that it is equally productive, organic farming has become an attractive source of income and is also a viable livelihood option. India, with its varied climate and diverse soils, has enormous potential for the organic production of vegetables and for generating income through exports. Organic farming has gained significant momentum in recent years as an environmentally friendly and sustainable alternative to conventional agriculture. This method prioritizes soil health, biodiversity, and natural pest management over synthetic chemicals. In the realm of vegetable crop production, organic farming is proving to be not only a viable but also a superior option. In this article, we'll explore the principles and benefits of organic farming in vegetable crops.

Keywords: Organic Farming, Rishi Kheti, Benefits

Components of Organic Farming

- Maintaining genetic diversity
- Managing soil health
- Selection of variety
- Nutrient management
- Water management
- Weed management
- Pest and Disease management
- Livestock management

The Principles of Organic Farming

1. Soil Health: Central to organic farming is the belief that healthy soil is the foundation of successful crop cultivation. Organic farmers employ practices such as composting, cover cropping, and crop rotation to enhance soil fertility and structure.

2. Biodiversity: Organic farms promote diversity in plant and animal species. By cultivating a wide variety of crops, farmers encourage beneficial insects and microbes, leading to a more balanced and resilient ecosystem.

3. Natural Pest Management: Instead of relying on synthetic pesticides, organic farmers use natural methods to manage pests. This may include introducing predator insects, employing companion planting techniques, and utilizing physical barriers.

4. Avoidance of Synthetic Chemicals: Organic farming strictly prohibits the use of synthetic fertilisers, herbicides, and pesticides. Instead, natural alternatives like compost, organic mulches, and biological pest controls are favoured.

5. Sustainability and Resource Conservation: Organic farms aim to minimize environmental impact by conserving water, reducing energy use, and minimizing waste. Techniques like rainwater harvesting, no-till farming, and utilizing renewable energy sources are common.

Approaches to Growing Organic Vegetables

The many concerns and problems of modern agriculture have given rise to various new concepts of farming, such as organic farming, biodynamic farming, natural farming, ecological farming, etc. The basic concept of these practises remains the same, back to nature, with the philosophy being to feed the soil rather than the plants in order to maintain the health of the soil and give back to nature what has been taken from it (Funtilana, 1990). Organic farming is called different things by different people, but the basic concept and philosophy remain the same. There are a number of terminologies, which are listed below:

1. Organic farming: This is a holistic production management system that avoids the use of synthetic fertilisers and pesticides, minimises pollution of air, soil and water, and optimises the health and productivity of independent communities, plants, animals and people. It uses organic additives to provide nutrients to the soil and plants.

i.) Bulky organic fertilisers (i.e. FYM, vermicompost, etc.)
ii.) Green manures (i.e. dhaincha, sun hemp, etc.)
iii.) Concentrated organic fertilisers (i.e. peanut cake, neem cake, etc.).

2. Natural farming: It was developed in Japan in 1930 by Mokichi Okada, who later founded the "Mokichi Okada Association (MOA)". Natural farming is similar to organic farming in many ways but places special emphasis on soil health through composting and the use of microbial preparations.

3. Ecological agriculture: This is a labour-intensive system based on crop cultivation techniques. Every effort is made to promote renewable energy sources (draught animals), electrical energy from waste disposal and biogas from organic waste. This also includes efficient water use through the sharing of rainwater, cisterns, underground wells and river water. Practises to improve crop productivity (genetic and agronomic), i.e. hybrid vigour, gene pyramid, multiple cropping, integrated plant nutrient management (IPNM) and integrated pest management (IPM) are the essential components of organic farming.

4. Agnihotra: Agnihotra is a process of purification of the atmosphere as a cumulative effect of various scientific principles leading to an incomparable purification and healing phenomenon. The process of Agnihotra consists of making two offerings to the fire at the

exact time of sunrise and sunset while reciting two small Sanskrit mantras. Agnihotra balances the cycle of nature and nourishes human life. It purifies the negative effects of pollution.

5. Rishi Kheti: This system was developed by Mohan Shankar Deshpande in Maharashtra and is promoted by a large number of farmers in Maharashtra and Madhya Pradesh.

In this system, the following tools are used to maintain soil fertility and crop yield.

a) Angara: Bhomi Sanskar is carried out to make the soil fertile. In this process, 15 kg of rhizosphere soil of the Banyan tree (*Ficus benghalensis*) is spread over one hectare of land. It contains many earthworms and other beneficial microbes that improve soil fertility.

(b) Amrit Pani: Amrit Pani is prepared by mixing 20 kg of cow dung, 1⁄2 kg of honey, 1⁄4 kg of

ghee. All the ingredients are mixed and left overnight. This is used to treat seed fields and plants (Beej Sanskar, Jala Sanskar and Vanaspati Sanskar).

(c) Panchya Gavya: It basically consists of five products of the cow, viz. dung (5 kg,) urine (5 litres), milk (3 litres), curd (3 litres) and ghee (1 kg). These are mixed with sugarcane juice, tender coconut water, ripe banana and toddy and incubated for 15 days. The mixture is stirred daily so that it mixes well and ferments. The mixture is diluted with water in a 1:10 ratio, filtered and sprayed on the pl;ants.

6. Homoeopathy in farming: It is a way of farming with homoeopathic remedies, i.e. with homoeopathic nutrients and Homoeopathic pesticides.

7. Biodynamic Agriculture or Vedic Kheti: Biodynamic farming is defined as working with energies that create and sustain life. It involves certain principles and practices for healthy soil, healthy plants and healthy food for humans and feed for animals. In this system, the energies from the cosmos, the earth, the cow and the plants are used systematically and synergistically.

Nutrient management for organic vegetables

Nutrient management is the key factor for all farming systems. In organic farming, there is no place for synthetic chemicals, so the use of chemical fertilisers is avoided. In organic farming, nutrient management depends on biologically derived nutrients obtained by recycling inputs. As a strategy, the amount of biomass taken from an organic farm for the production of food and fibre, livestock feed or firewood should be replaced by other bio-waste on the farm. Managing nutrients for organic vegetables is crucial for healthy and productive crops. Here are some options:

1. Compost: Rich in organic matter, compost is a valuable source of nutrients. It improves soil structure and water retention while providing a slow release of essential elements, such as Vermicompost, and enriched compost,

2. Cover Cropping: Planting cover crops like legumes (e.g., clover, vetch) can fix nitrogen in the soil, improving fertility. When incorporated, they add organic matter.

3. Crop Rotation: Rotating crops helps prevent nutrient depletion and reduces pest and disease pressure. It's advisable to alternate heavy-feeding crops with light-feeding ones.

4. Green Manures: These are specific cover crops that are grown to be incorporated into the soil while still green. They contribute nutrients and organic matter such as nitrogen. Like: Sunhemp and dhaincha.

5. Organic Fertilizers: Natural sources like composted manure, blood meal, bone meal, fish meal, and kelp meal can supplement nutrients. They release nutrients slowly and enhance soil health.
6. Mulching: Mulches like straw, hay, or organic materials help retain soil moisture, suppress weeds, and slowly release nutrients as they break down.
7. Crop Residues: Leaving some plant residues on the field after harvest can contribute to organic matter and nutrient availability.
8. Biofertilizers: These are microorganisms (e.g., mycorrhizal fungi, nitrogen-fixing bacteria) that form symbiotic relationships with plants, enhancing nutrient uptake.
9. Rock Phosphate and Natural Minerals: These can be used to provide phosphorus and trace minerals to the soil in a form that becomes available to plants over time.
10. Organic Amendments: Products like fish emulsion, liquid seaweed, and compost tea can be used as liquid fertilizers, providing a quick nutrient boost such as Vermi-wash, Jeevaamrit and Panchgavya.

Need for Organic Farming

1. With a rise in the global population, We need to not only increase but also sustain agricultural production.
2. The scientists have realised that the 'Green Revolution' has plateaued due to high input use and is now experiencing diminishing returns.
3. It is imperative that we maintain a delicate balance between nature and human activity in order to safeguard the existence of life and property.
4. Fossil fuel-based agrochemicals are non-renewable and their availability is diminishing. We need to explore sustainable alternatives for a better future.

Benefits of Organic Farming in Vegetable Crops

1. Nutrient-Rich Produce: Organic farming methods lead to a soil that is rich in nutrients, which translates to vegetables that are often more flavorful and nutritionally dense compared to conventionally grown counterparts.
2. Reduced Environmental Impact: By eschewing synthetic chemicals, organic farming helps mitigate soil and water pollution. It also contributes to biodiversity conservation by creating habitats for beneficial insects and wildlife.
3. Healthier Soil: Organic practices foster healthy soil by maintaining a balanced microbial community and preserving soil structure. This enhances the soil's capacity to retain water and nutrients, resulting in better crop yields.
4. Resilience to Climate Change: Organic farming systems tend to be more resilient in the face of climate-related challenges. Diverse crop rotations and cover cropping can help mitigate the impacts of extreme weather events.
5. Enhanced Farmer Well-being: Organic farming often involves smaller-scale operations that prioritize the well-being of the farmer and farm workers. Reduced exposure to synthetic chemicals leads to improved health and safety for those involved in the production process.

Challenges and Considerations

1. Transition Period: Converting from conventional to organic farming can be challenging, especially during the transition period when yields may be lower. However, the long-term benefits often outweigh these initial difficulties.
2. Market Demand and Certification: The organic market continues to grow, but obtaining organic certification and meeting market demands for organic produce can require additional effort and investment.

Conclusion

Organic farming in vegetable crops presents a promising path forward for sustainable agriculture. It addresses critical concerns surrounding food safety, environmental pollution, and the long-term health of our ecosystems. By prioritizing soil health, biodiversity, and natural pest management, organic farming stands as a superior alternative to conventional methods.

The diverse approaches to organic farming, ranging from traditional methods like composting to innovative techniques like homoeopathy in farming, provide a spectrum of options for farmers to choose from. These approaches not only enrich the soil but also contribute to the overall health of the environment.

Nutrient management, a cornerstone of organic farming, emphasizes the use of biologically derived nutrients, effectively eliminating the need for synthetic chemicals. Techniques like composting, cover cropping, and crop rotation play pivotal roles in sustaining the fertility of the soil and ensuring the health and productivity of crops.

As we look to the future, the need for organic farming becomes increasingly apparent. With a growing global population and diminishing returns from conventional agriculture, it is imperative that we adopt sustainable practices. Organic farming not only yields nutrient-rich produce but also minimizes environmental impact and enhances the resilience of our agricultural systems to the challenges posed by climate change.

While transitioning to organic farming may pose initial challenges, the long-term benefits far outweigh the initial difficulties. The increasing demand for organic produce in the market provides a clear incentive for farmers to make the shift. Additionally, the certification process, though rigorous, ensures the integrity of organic products and instils trust in consumers.

In conclusion, organic farming in vegetable crops represents a holistic and forward-thinking approach to agriculture. It not only produces healthier and more nutritious food but also fosters a sustainable and balanced relationship between humans and the environment. Embracing organic farming is not just a choice for the present, but a crucial investment in the future of agriculture and the well-being of our planet.

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