



## Organic Cultivation of Vegetable Crops

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With a steadily growing population, India is the second most population nation. However, the cultivated fields are decreasing day by day and India's economy relies heavily on agriculture. Agriculture production and soil health must be enhanced in order to meet the demand for food, fodder, fuel, fibre, and other demands resulting from an expanding population. Agriculture has always been practised organically using fertilisers made from plants and animals. Farmers began utilising synthetic biocides or inorganic fertilisers in the middle of the 19<sup>th</sup> century. However, in the past two decades or so, people have almost universally become aware of the negative effects that chemical fertilisers have on human health and have begun to switch to organic farming.

One of the keys to achieving sustainable agriculture is organic farming. It refers to farming without the use of fertilisers and pesticides. This exceptional type of diversified agriculture attempts to produce wholesome, high-quality food while also increasing job and money generation. The use of the majority of synthetic inputs is prohibited by a number of laws and certification programmes, and soil health is the key idea behind this approach. For boosting and preserving soil fertility, organic agriculture makes use of some novel types, precise, more efficient technology, cover crops, mulching, crop rotations, and other natural based practises.

### Principles involved in organic cultivation

**Principle of Health:** Organic agriculture must enhance and sustain the health of soil, plant, human, animal and planet as one and should be indivisible.

**Principle of Ecology:** Organic agriculture must be based upon the living ecological systems and cycles, work with them, emulate them and help them to sustain.

**Principle of Fairness:** Organic agriculture must build on the relationships that ensure fairness with regard to common environment and life opportunities. Fairness is characterized by respect, equity, stewardship and justice of shared world, both among people and in their relations with other living beings.

**Principle of Care:** Organic agriculture must be managed in precautionary and responsible manner to protect health and well-being of the current and future generations and environment.

### Requirements for Organic Farming

**Selection of Site:** By growing the vegetable in the right spot, the best quality produce can be achieved. If possible, the field or garden should be situated in an open area with southern exposure. The chosen location must receive 6 to 8 hours a day minimum of direct sunshine. The manufacturing area should be close to the water source. In order to reduce soil runoff and erosion, slopes greater than 1.5% should be avoided. A proper drainage system must be provided.

**Conversion Period:** Conversion period refers to the intermediate period needed for the implementation of an organic management system and soil fertility. Before the start of the production cycle, a minimum conversion period of 12 months is necessary for vegetable crops. The certification body may shorten or lengthen the minimum term for conversion depending on historical ecological and climatic conditions.

**Choice of the Crops and Varieties:** The plants that are employed must be organically grown and tolerant to a variety of environmental stressors. If approved planting material is not readily available, care should be taken to ensure that it is one that has not been chemically treated. There are limitations on the usage of transgenic plants, pollens, and seeds made via genetic engineering. The market demand is the most important factor to consider when choosing vegetables. The warm season and the cold season vegetable harvests are used to categorise vegetables. Every vegetable crop has unique requirements for the climate and the season chosen for growing (Singh *et al.*, 2016). The typical timetable is listed below.

**Planting:** The methods utilised for planting are primarily based on the size of the location and any size-related issues. To reduce compaction, to hold organic materials, and to facilitate harvesting, raised beds are installed on smaller plots. Tractors and other equipment are used in one form or another on larger sites. Producing vegetables mostly relies on clean farming, which incorporates agricultural waste from previous years into the soil. This is done to prevent the preceding crop leftovers from having an allelopathic effect.

**Irrigation:** The successful vegetable cultivars are determined by water application at the correct time and at correct growth stage. Drip and sprinkler method of irrigation are most commonly used in vegetables.

**Nutrient Management:** Since synthetic fertilisers and chemicals are no longer used, organic farming relies heavily on nutrients that are produced biologically for nutrition management. Organic materials have been put to use. Here are the sources of the nutrients.

**Green Manure:** Incorporating living biomass into the soil to provide nutrients is known as "green manuring." The methods' crops are converted into green manure crops. Green manuring crops should have a non-woody, quick-growing, and transient nature. Fast-growing, nitrogen-fixing crops including cowpea, hemp, and dhaincha may fix 60 to 100 kg of nitrogen per hectare and are frequently utilised as green manure crops. They raise the productivity and health of the soil.

**Farm Yard Manure:** Farm yard manure is the word used to describe the manure produced in the backyard area utilising cow dung, urine and farm trash. This approach has been used for a long time. Any method, including the Japanese approach, the open pit method, and the sealed pit method, can be used to prepare FYM. Utilising FYM has significantly improved the physical characteristics of the soil, the microbial activity, and the yield.

**Enriched Compost:** Composting organic waste products is one of the conventional methods for supplying crop nutrients. Despite the lower nutritional concentration, it still supplies the planted regions with the necessary micronutrients in addition to NPK. The provision of micronutrients satisfies the plants' hidden needs in particular and protects them from harm and toxicity. Additionally, it enhances the soil's chemical, physical, and biological qualities. Additionally, compost is externally enhanced with bio fertilisers, microbial inoculants, etc. It was discovered that applying compost boosted the yield of cucumber.

**Vermicompost:** Earthworms are used as a natural bio-reactor by the technology to recycle non-toxic organic waste into soil. Vermicompost is the term used to describe the manure produced when earthworms are raised on a big scale in either a natural or artificial pit. When there is a significant amount of organic matter that has not yet decomposed, this approach is typically used.

**Oil Cakes (Concentrated Organic Manure):** In order to make the nutrients in the oil cakes available to the crops, they are applied in granular form before the use of fertiliser. As a

result, the organic carbon in the soil is enriched, which boosts microbial activity. Some examples of non-edible cakes include castor cakes, neem cakes, and linseed cakes. The use of edible cakes as a source of nutrients is restricted in India because the majority are fed to cattle as concentrates.

**Crop Residues:** Applying crop wastes boosting the crop productivity, soil fertility, and soil organic matter. Vegetable crops produce a significant amount of crop leftovers following the harvest of their valuable component. The organic nourishment may come from the nutrients that are imbedded in residues. Additionally, they can be utilised to create vermicompost.

**Pest and Disease Management:** The organic farming industry focuses its pest management tactics on minimising and avoiding the aggregation of the insect population. By enhancing the soil with compost, practising crop rotation, intercropping, and conservation tillage, the risks associated with insect outbreaks are reduced (Niggli, 2010). The organic farming pest management strategy promotes the use of pesticides generated from organic materials and restricts the use of chemical pesticides. Field scouting, trap crops, insect trapping, the use of biological control techniques such the introduction of beneficial insects, and the use of natural enemies are all efficient ways to control pest populations.

The incidence of onion thrips was found to be comparable in fields that received organic and mineral fertilisation. According to Simmons *et al.* (2010), the combination of host plant resistance and reflective mulch may be able to control the white-fly infestation that mostly affects the production of organic vegetables. Spraying the nematophagus fungus (*Pochonia chamydosporia*) successfully kills root knot nematodes in vegetable crops (Atkins *et al.*, 2003). Additionally, solarization practises linked to organic fertilisation may help prevent nematodes (Silva *et al.*, 2006).

The majority of diseases are avoided when fungicides are used. Fungicide use is nevertheless restricted in organic farming. The avoidance approach, the utilisation of genetic resistance, and the use of licenced fungicidal agents are important control methods. Some illnesses can be moderately controlled by giving seeds physical therapies such hot air, hot water, or electron treatments. Additionally, biological approaches are employed for control, however they are more prevalent in greenhouse settings than open fields.

## Conclusion

As a result, the adoption of pure organic farming is partially conceivable in nations like India, particularly for exporting to the international market. On the other hand, one of the choices for widely implementing organic farming is the adoption of integrated green revolution farming. The development of hybrid, high-yielding varieties and farm mechanisation that minimises harm to the environment and human health are the cornerstones of the green revolution. Integrated systems like INM (Integrated Nutrient Management), IPM (Integrated Pest Management), and biological control methods that lessen the requirement for chemicals have been created and paired with certain high input technology for this goal.

## References

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