

# Organic farming

## A sustainable farming technique in Flower crops

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### Abstract

Agriculture significantly contributes to anthropogenic global warming, primarily through methane and nitrous oxide emissions. Reducing these emissions can play a crucial role in mitigating climate change. While conventional farming is widely practiced due to its affordability and accessibility, it is associated with numerous environmental drawbacks. To address various environmental challenges, a resilient and sustainable agricultural system is essential. Sustainable agriculture involves eco-friendly farming techniques that enhance crop yield and livestock production without harming the environment. Organic farming is a key approach to achieving sustainable agriculture. It avoids the use of synthetic chemicals and

fertilizers, thereby reducing chemical residues and environmental impact. In the context of ornamental plants, which are vital for environmental planning in urban and rural areas, sustainable practices are particularly important. Ornamental plants help mitigate pollution, support social and rural forestry, and contribute to wasteland development. Flower crops, in particular, can provide higher income per unit area. However, inorganic farming practices can lead to chemical residues in flowers and reduced vase life, causing rejection in export markets. Therefore, transitioning from conventional to sustainable farming practices in flower crops is necessary to ensure higher quality and environmentally friendly production.

### Introduction

**Organic farming:** Organic farming is a type of farming that maintains and improves the natural balance of the environment. To put it another way, this farming technique is based on the usage of organic fertilizers. Traditional farming practices include the use of chemical fertilizers, harmful pesticides, and other practices that have a significant negative impact on the environment. As a result, this method of farming is used to create toxin-free produce while also maintaining soil fertility and contributing to ecological balance. This form of

farming promotes environmentally responsible, long-term economic development. Recently, Finance Minister Nirmala Sitharaman announced in her Budget speech that in the next two years, one crore farmers across India will be introduced to natural farming. This initiative will be supported by certification and branding efforts to ensure the success and widespread adoption of organic farming practices. This move aims to boost sustainable agriculture and enhance the livelihoods of farmers nationwide.

### Sources of organic farming

The potential organic sources of plant nutrients are green manure crops, crop rotation, crop residues, organic manures, FYM, Night soil, sludges, oilcakes, blood meal, compost, phospho-compost, vermicompost, biogas slurry, agricultural wastes, press mud, Biodynamic preparations, biofertilizers etc.

**1. Green manure crops:** Green un decomposed material used as manure is called green manure. It is obtained in two ways: by growing green manure crops or by collecting green leaf (along

with twigs) from plants grown in waste lands, field bunds and forest. Green manuring is growing in the field plants usually belonging to leguminous family and incorporating into the soil after sufficient growth. The plants that are grown for green manure known as green manure crops. The most important green manure crops are sunhemp, dhaincha, *pillipesara*, clusterbeans and *Sesbania rostrata*

Plant	Scientific name	Nutrient content (%) on air dry basis		
		N	P2O5	K
Sunhemp	<i>Crotalaria juncea</i>	2.30	0.50	1.80
Dhaincha	<i>Sesbania aculeata</i>	3.50	0.60	1.20
Sesbania	<i>Sesbania speciosa</i>	2.71	0.53	2.21

### Green Manure Crops



2. **Crop rotation:** Crop rotation, planting a different crop on a particular piece of land each growing season, is required in organic crop production because it is such a useful tool in preventing soil diseases, insect pests, weed problems, and for building healthy soils. Plants exude a spectrum of photosynthates into the soil that are unique to each plant species, and these root exudates influence the soil microbial biodiversity, which, in turn, supports soil function and plant health.

3. **Crop Residue Composting:** Crop residues are the non-economic plant parts that are left in the field after harvest. The harvest refuses include straws, stubble, stover and haulms of different crops. Crop remains are also from thrashing sheds or that are discarded during crop processing. This includes process wastes like groundnut shell, oil cakes, rice husks and cobs of maize, sorghum etc. The greatest potential as a biomass resource appears to be from the field residues of sorghum, maize, soybean, cotton, sugarcane etc.

4. **Organic manures:** Organic manures are derived from animal, human and plant residues which contain plant nutrients in complex organic forms. Organic manures contributes carbonaceous matter to soil, which when decomposed offers mineral nutrients to plants, also acts as a base exchange material, and helps to improve the physical, chemical, and biological aspects of soil. Organic manure also gives energy to soil microbes, increasing biological activity in the soil. Major sources of Organic manure can also be grouped, into bulky organic manures and concentrated organic manures based on concentration of the nutrients.

#### 1) Bulky organic manures

a) **Farmyard manure:** Farmyard manure refers to the decomposed mixture of dung and urine of farm animals along with litter and left over material from roughages or fodder fed to the cattle. On an average well decomposed farmyard manure contains

0.5: 0.2: 0.5 per cent N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O respectively.

b) **Sheep and Goat Manure:** The droppings of sheep and goats contain higher nutrients than farmyard manure and compost. On an average, the sheep and goat manure contains 3 per cent N, 1 per cent P<sub>2</sub>O<sub>5</sub> and 2 per cent K<sub>2</sub>O. It is applied to the field in two ways. The sweeping of sheep or goat sheds are placed in pits for decomposition and it is applied later to the field. The nutrients present in the urine are wasted in this method. The second method is sheep penning, where in sheep and goats are kept overnight in the field and urine and fecal matter added to the soil is incorporated to a shallow depth by working blade harrow or cultivator or cultivator.

c) **Poultry Manure:** The excreta of birds ferment very quickly. If left exposed, 50 percent of its nitrogen is lost within 30 days. Poultry manure contains higher nitrogen and phosphorus compared to other bulky organic manures. The average nutrient content is 3.03 per cent N; 2.63 per cent P<sub>2</sub>O<sub>5</sub> and 1.4 per cent K<sub>2</sub>O.

d) **Vermicompost:** *Vermicomposting* is the process of turning organic debris into worm castings. The worm castings are very important to the fertility of the soil. The castings contain high amounts of nitrogen, potassium, phosphorus, calcium, and magnesium. Castings contain: 5 times the available nitrogen, 7 times the available potash, and 1 ½ times more calcium than found in good top soil. Several researchers have demonstrated that earthworm castings have excellent aeration, porosity, structure, drainage and moisture-holding capacity. The content of the earthworm castings, along with the natural tillage by the worms burrowing action, enhances the permeability of water in the soil.



## 2) Concentrated organic manures

Concentrated organic manures have higher nutrient content than bulky organic manure. The important concentrated organic manures are oilcakes, blood meal, fish manure etc. These are also known as organic nitrogen fertilizer. Before their organic nitrogen is used by the crops, it is converted through bacterial action into readily usable ammoniacal nitrogen and nitrate nitrogen. These organic fertilizers are, therefore, relatively slow acting, but they supply available nitrogen for a longer period.

Oil-cakes	Nutrient content (%)		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
<b>Non edible oil-cakes</b>			
Castor cake	4.3	1.8	1.3
Cotton seed cake (undecorticated)	3.9	1.8	1.6
Karanj cake	3.9	0.9	1.2
Mahua cake	2.5	0.8	1.2
Safflower cake (undecorticated)	4.9	1.4	1.2
<b>Edible oil-cakes</b>			
Coconut cake	3.0	1.9	1.8
Cotton seed cake (decorticated)	6.4	2.9	2.2
Groundnut cake	7.3	1.5	1.3
Linseed cake	4.9	1.4	1.3
Niger cake	4.7	1.8	1.3
Rape seed cake	5.2	1.8	1.2
Safflower cake (decorticated)	7.9	2.2	1.9
Sesamum cake	6.2	2.0	1.2

**b) Blood meal:** Blood meal is prepared from the blood collected from slaughter house treating with copper sulphate, dried, powdered and bagged and sold as bloodmeal. Bloodmeal is a quick acting and effective for all crops on allsoils. Dried blood or blood meal contains 10-12% N and 1-2% P<sub>2</sub>O<sub>5</sub>.

**c) Meat meal:** Bones and meat are cooked in special type of pan for 2-3 hours. Bones are

a) **Oil cakes:** After oil is extracted from oilseeds, the remaining solid portion is dried as cake which can, be used as manure. The oil cakes are of two types:

- Edible oil cakes which can be safely fed to livestock; e.g.: Groundnut cake, Coconut cake etc., and
- Non edible oil cakes which are not fit for feeding livestock; e.g.: Castor cake, Neem cake, Mahua cake etc.,

Both edible and non-edible oil cakes can be used as manures. However, edible oil cakes are fed to cattle and non-edible oil cakes are used as manures especially for horticultural crops. Nutrients present in oil cakes, after mineralization, are made available to crops 7 to 10 days after application. Oil cakes need to be well powdered before application for even distribution and quicker decomposition.

separated and meat is dried and powdered. It is quick acting on all soil. It contains 10.50% N and 2.5% P<sub>2</sub>O<sub>5</sub>.

**d) Fish meal:** Fish and fish waste is dried and powdered. It is quick acting on all types of soils. Fish manure or fish meal contains 4 to 10% N, 3 to 9% P<sub>2</sub>O<sub>5</sub> and 0.3 to 1.5%K<sub>2</sub>O.

**5. Biofertilizers:** Biofertilizers are substances that contain active or dormant cells of effective microorganism strains that hasten specific microbial activities in the soil and increase the

amount of nutrients available in a form that is readily absorbed by plants. These biofertilizers are affordable, simple to use, and safe for the environment.

**Types of Biofertilizers**

1.	Nitrogen fixers	Symbiotic Nodulating ( <i>Rhizobium</i> ); Non- nodulating (Anabaena in association with water fern <i>Azolla</i> ) Asymbiotic <i>Azotobacter</i> ; <i>Azospirillum</i> ; <i>Acetobacter</i> ; Blue green algae ( <i>Nostoc</i> or <i>Anabaena</i> or <i>Tolypothrix</i> or <i>Aulosira</i> )
2.	Phosphorus biofertilizer	Bacteria ( <i>Bacillus polymyxa</i> , <i>Pseudomonas striata</i> ); Fungi ( <i>Aspergillus spp.</i> , <i>Penicillium spp.</i> ) Phosphorus mobilizer ( <i>Glomus spp.</i> , <i>Scutellospora spp.</i> )
3.	Potassium solubilizer	<i>Acidithiobacillus ferrooxidans</i> , <i>Paenibacillus spp.</i> , <i>Bacillus mucilaginosus</i> , <i>B. edaphicus</i> , and <i>B. circulans</i>
4.	Silicate and zinc solubilizer	<i>Bacillus spp.</i>
5.	Compost biofertilizer	Cellulolytic ( <i>Trichoderma spp.</i> ); Lignolytic ( <i>Agaricus spp.</i> )
6.	PGPRs	<i>Pseudomonas fluorescense</i>

**Liquid manures**

**Panchgavya:** It is a natural growth promoter and contains essential plant nutrients. It is prepared by mixing of fresh cow dung (5kg), cow’s urine (3 litres), cow’s milk (2 litres), cow’s curd (1 litre), cow’s ghee (100g), sugarcane juice (3 litres), Tender coconut water (3 litres), banana fruits (12 Nos.). Usually, 1 to 5% solution of Panchgavya at 15 days intervals is used only after filtering.

**Beejamrit:** Beejamrit is an ancient, sustainable agriculture technique. It is used for seeds, seedlings or any planting material. It is effective in protecting young roots from fungus. Beejamrit is a fermented microbial solution, with loads of plant-beneficial microbes, and is applied as seed treatment. It is expected that the beneficial microbes would colonize the roots and leaves of the germinating seeds and help in the healthy growth of the plants.

**Importance of Organic farming in flower crops**

**As substrate media:** Growing media are responsible for the provision of suitable water, nutrients, and oxygen for seedling development and also to physically support the whole plant growth even after transplantation into soil. Compost, garden soil, carbonized rice hull, coir

dust, saw dust, fine sand, poultry manure and other organic materials are used as potting materials for various ornamentals. Potting media should be sterilized in boiling water, solar irradiation or by burning or heating before planting to control soil borne diseases.

Name of ornamentals	Substrate media
Rooted cuttings	Sand, loam, leaf mould
Hard wood plants	Sand, loam, peat moss, leaf mould, humus, cow manure
Rose	Cow dung, loam, sand
Bulbous ornamentals	Cow dung, loam, sand, leaf mould, charcoal
Terrestrial orchids	Leaf mould, sand, caly soil, bone meal, saw dust, wood charcoal dust, wood shavings, manures

Epiphytic orchids	Charcoal, brick pieces, sphagnum moss, tree bark
Anthurium	Coirpith, coarse sand, brick pieces/tiles, sugarcane baggase, leaf mould, rockwool, sawdust, tree barks, wood shavings, poultry manures
Gerbera	Sand, coir pith/cocopeat, leaf mould, FYM, vermicompost
Foliage & potted plants	FYM, sand, leaf mould, cocopeat, Charcoal
Carnation	Peat moss, perlite, sand

**As a component in plug plant production:** A plug is a plant in the regenerative (immature) stage of the plant life cycle. The growth period between the planted seed and developed plug will determine the overall productivity and health of the matured plant, making the plug development stage critical in plant cultivation. The advantages of plug transplants are that each plant is grown in individual cells, making production and transplantation easier, and the roots are never disturbed in the cultivation process since each plant is containerized

**As a component for pot mixture for foliage plants:** The optimum selection of potting mixture is one of the most important factors for quality potted pot production as it holds up plant roots, maintains the plant growth and allows free water and air movement to the plant root zone. Various potting media like sphagnum peat moss, peat moss, shredded bark, leaf compost, coir (shredded cococonut husk), Farmyard manure, rice, peanut hulls, composted cotton gin waste, spent mushroom compost, agricultural by-products, municipal

### Conclusion

Flowers grown with conventional techniques contribute to the contamination of groundwater and streams through fertilizer and pesticides run-off, which can in turn impact wildlife and human health. But organic flowers are grown with consideration for the wildlife, farm workers, and ultimately the ground in which they are grown. Since people don't consume flowers in the same way we consume food, we were more relaxed and tend to choose flowers grown in conventional practices. But with realization of the ill-effects caused by the conventional farming people are now drawn towards a change which is opting for organic

composts, sawdust etc can be utilised each having a unique benefits.

### As important media for greenhouse crops to improve the soil physical properties:

*Addition of organic sources supplement a wide range of nutrients to the plants that help in maintenance of healthy status and increase yield in various flower attributes. Several growing media such as sand, peat, perlite, rockwool, sawdust, cocopeat, compost etc. singly or in combination are found suitable for growing high value crops like gerbera, carnation, rose, orchids, alstroemeria, liliun etc*

**As a plant protection:** Plant extracts without petroleum-based synergists (pyrethrum, nicotine, neem, horsetail, seaweed, yucca) etc., to prevent pest and disease incidence.

### Constraints for adoption:

- Lack of Awareness
- Shortage of Bio-mass
- Marketing Problems of Organic Inputs
- Output Marketing Problems
- Reduced tillage constraints
- Rotation constraints
- Low Yields

flowers. As the concept of local is becoming more accepted in the floral industry, consumers are longing to purchase blooms that are fresh and non-toxic. As this demand spreads, so will chemical-free crops. This will greatly help the community of farmers, designers and florists, who work together throughout the year as seasons change. The organic practices in floriculture is still in its nascent stage, yet the interest shown by the growers and consumers towards organic flowers, the industry promises a strong potential to the farmers and entrepreneurs alike.