



Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya , Gwalior (MP)

VSC 508

Organic Vegetable Production Technology (1+1)

M.Sc.(Agric.) Hort. Vegetable - Science

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VSC 508

Organic Vegetable Production Technology

Theory

UNIT I

Importance, principles, perspective, concept and component of organic production of vegetable crops.

UNIT II

Organic production of vegetables crops, viz., solanaceous crops, cucurbits, cole crops, root and tuber crops.

UNIT III

Managing soil fertility, pests and diseases and weed problems in organic farming system; crop rotation in organic horticulture; processing and quality control for organic foods.

UNIT IV

Methods for enhancing soil fertility, mulching, raising green manure crops. Indigenous methods of compost, Panchagavya, Biodynamics, preparation etc Pest and disease management in organic farming; ITK's in organic farming. Role of botanicals and bio-control agents.

UNIT V

GAP and GMP- Certification of organic products; organic production and export - opportunity and challenges



Importance, principles, perspective, concept and component of organic production of vegetable crops.

UNIT I

Lecture-1

- ▶ Meaning of organic, organic farming and its importance

Lecture-2

- ▶ Concept of organic production and Principles of organic farming

Lecture-3

- ▶ Component of organic production of vegetable crops



Lecture-3

► Component of organic production of vegetable crops

UNIT I

Major components of organic farming are :

- Crop rotation
- Maintenance and enhancement of soil fertility through biological nitrogen fixation
- Addition of organic manure
- Use of soil microorganisms
- Crop residues
- Bio-pesticide
- Biogas slurry
- Waste





Component of organic farming

UNIT I

Lecture-3

❖ 1. **Crop rotation:**

It is a systematic arrangement for the growing of different crops in a more or less regular sequence on the same land covering a period of two years or more. The selection of optimal crop rotation is important for successful sustainable agriculture. Soil fertility management, weed, insect and disease control. Legumes are essential in any rotation and should 30 to 50 percent of the land. A mixed cropping, pasture and livestock system is desirable or even essential for the success of sustainable agriculture.

❖ 2. **Crop Residue:**

In India there is a great potential for utilization of crop residues/straw of some of the major cereals and pulses. About 50% of the crop residues are utilized as animal feed, the rest could be very well utilized for recycling of nutrients. Incorporation of crop residues e.g. vegetable straw like dried leaves of onion, garlic, potato etc., as such or inoculated with fungal species had beneficial effects on



Component of organic farming

...Contd.....

UNIT I

Lecture-3

❖ 3. Organic manure:

The organic manure is derived from biological sources like plant, animal and human residues. The **direct** effect of organic manure relates to the uptake of humic substances or its decomposition products affecting favourably the growth and yield of plants. **Indirectly**, it augments the beneficial soil microorganisms and their activities and thus increases the availability of major and minor plant nutrients.

(A) **Bulky organic manure**: It generally contains fewer amounts of plant nutrients as compared to concentrated organic manure. It includes FYM, compost and Green manure.

(B) **Concentrated Organic Manure**: The concentrated organic manures commonly used are oilcakes, blood meal, fishmeal, meat meal and horn and hoof meal.



Component of organic farming ...Contd.....

UNIT I

Lecture-3

▶ 4. Waste:

(i) **Industrial waste:** Industrial by products

Ditilisers- spent wash

Sugar industry- Molasses and pressmud (10 tones/ha).

Coir industry - Coir waste

These manures improves the soil fertility and enhances the activity of microbes.

(ii) **Municipal and Sewage waste:**

In India, the total **municipal refuse** is about 12 mt/annum containing about 0.5% N, 0.3% P₂O₅ and 0.3% K₂O.

Sewage sludge is available to an extent of 4 million tones per annum containing 3% N, 2% P and 0.3% K



Component of organic farming

...Contd.....

UNIT I

Lecture-3

➤ 5. Biofertilizers:

Bio-fertilizer is microorganism's culture capable of fixing atmospheric nitrogen when suitable crops are inoculated with them. The beneficial microorganisms in the soil that are greater significance to horticultural situations are biological nitrogen fixers, phosphate solubilisers and mycorrhizal fungi.

Types of Biofertilizers: There are two types of bio-fertilizers.

1. Symbiotic N-fixation : These are Rhizobium culture of various strains which multiply in roots of suitable legumes called root nodules and fix nitrogen symbiotically. Almost 50% demands of N are met by these microorganisms in legumes. The Rhizobium legume association can fix upto 100-300 kg N/ha in one crop season.

2. Asymbiotic N-fixation : This includes Azotobacter, Azospirillum, BGA, Azolla and Mycorrhizae, which also fixes atmospheric N in



Component of organic farming ...Contd.....

UNIT I

Lecture-3

Azotobacter : The beneficial effect of Azotobacter biofertilizers on cereals, millets, vegetables, etc. under both irrigated and rainfed field conditions have been substantiated. Apart from nitrogen this organism is also capable of producing antibacterial and anti-fungal compounds, hormones and siderophores.

Azospirillum: It is an important bacterium, which colonize the root zones and fix nitrogen in loose association with plants. Roots of vegetable seedling treated with azospirillum slurry.

Blue Green Algae: The utilization of blue-green algae as biofertilizers for aquatic vegetables is very promising. It also help to reduce soil alkalinity and this opens up possibilities for bio-reclamation of such inhospitable environments.



Component of organic farming ...Contd.....

UNIT I

Lecture-3

Azolla: A small floating fern, Azolla is commonly seen in low land fields and in shallow fresh water bodies. The Azolla anabaena association is a live floating nitrogen factory using energy from photosynthesis to fix atmospheric nitrogen amounting to 100-150 kg N/ha/year from about 40-64 tones of biomass.

Mycorrhiza: It is the symbiotic association of fungi with roots of Vascular plants. The main advantage of Mycorrhizae to the host plants lies in the extension of the penetration zone of the root fungus system in the soil, facilitating an increased phosphorous uptake. The beneficial effects of Vascular-arbuscular Mycorrhizae (V AM) have been observed in vegetables and fruit crops also.



Component of organic farming ...Contd.....

UNIT I

Lecture-3

Source: Journal of the North Eastern Council:
Anandan Deka, Shantanu Kumar and Aditya

6. Bio-pesticide:

Bio-pesticides are natural plant products that belong to the so-called secondary metabolites, which include thousands of alkaloids, terpenoids, phenolics and minor secondary chemicals.

Botanical insecticides are ecologically and environmentally safer generally affect the behaviour and physiology of insects rather than killing them eg. Neem (*Azadirachta indica*) has justifiably received the maximum attention. Some of other commonly used botanical Insecticides are Nicotine, Pyrethrum, Rotenone, Subabilla, Ryanin, Quassia, Margosa, Acorus etc.

7. **Vermicompost:** It is a method of making compost with the use of earthworms that generally live in soil, eat biomass and excrete it in digested form. It is generally estimated that 1800 worms which is an ideal population for one sq. meter can feed on 80 tones of humus per year. These are rich in macro and micronutrients