Vivekanand College, Kolhapur (Empowered Autonomous)

DEPARTMENT OF BOTANY

B. Sc. I, Open Elective (NEP)

TOPIC: ORGANIC FARMING

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M.Sc., Ph.D.

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What is Organic Farming?

- Organic farming is a production system which avoids or excludes the use of synthetic preparations-artificial fertilizers, pesticides, growth accelerators and fodder additives.
- As an alternative to these means, of applies a number of modern preventive methods to maintain the natural soil fertility, such as:

1− Alternating sowing of cultures (with leguminous plants inclusive)

2− Suited use of manure

3− Stimulating the populations of useful insects.

4− Vegetation associations (combined cultivation of two or more cultures in one and the same place)

5− Use of mechanical methods for weed control

6− Use of sustainable plant varieties and live stock breeds that are well adapted to the relevant environmental conditions

Aim

- **To maintain the long term fertility of the soil**
- **To reduce the input cost.**
- **To effectively utilize the natural resources .**
- **To avoid all forms of pollution caused by agricultural techniques.**
- **To provide a quality foodstuff.**

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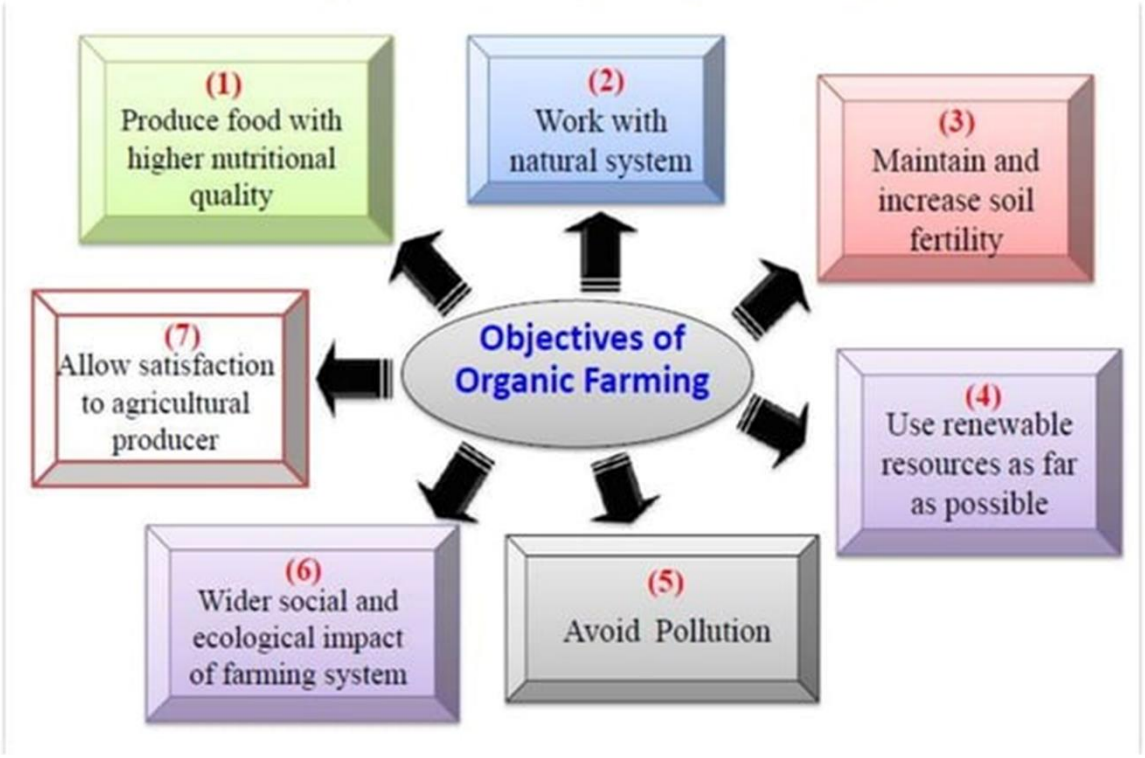
Objective of organic farming



Key Characteristics

- Relies primarily on local, renewable resources.
- Makes efficient use of solar energy and the production potential of biological systems.
- Maintains the fertility of the soil.
- Maximizes recycling of plant nutrients and organic matter.
- Does not use organisms or substances foreign to nature.
- Maintains diversity in the production system as well as the agricultural landscape.
- Gives farm animal's life conditions that correspond to their ecological role and allow them a natural behaviour.
- Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats.

Components of Organic Farming

1. Crop rotation:

- Systematic arrangement of different crops in a more or less sequence on same land in a period of two or more years.
- Selection of optimal crop rotation (Legumes are essential)

2. Crop Residue:

- Straw of major cereal and the pulses for recycling of nutrient. Proper composting with efficient microbial inoculants is necessary (increase crop yield and physicchemical properties of soil).

3. Organic Manure:

- Plant, animal and human residues for augmenting crop growth and soil productivity by increasing uptake of humic substances and its decomposed products.

  -Bulky organic manure – FYM, Compost, Green Manuring

  -Concentrated Organic Manure – Oilcakes, Blood meal, Fishmeal, Meat meal and horn and hoof meal.

4. Waste:

-**Industrial Waste – spent wash from ditilisers** and molasses and press mud from sugar industry (improves soil fertility and enhances microbial activity); coir waste can be used as manure after decomposition.

-Municipal and sewage waste- Nutrient content for Municipal Refuse (N–0.5%, P2O5 - .03%, K2O .03%) Nutrient content for Sewage Sludge (N- 3%, P-2%, K- 0.3%).

Needed separation of toxic heavy metals.

5. Bio- Fertilizers:

-help in establishment and growth of crop, plants and trees

-enhance biomass production and gain yield by 10-20%

-play an important role in agro forestry/ silvipastoral systems

A**. Symbiotic N Fixation:**

- 50% demand of N by this organism in legumes.
- Rhizobium is most widely used bio- fertilizers
- which colonizes the roots of specific legumes
- and can fix up to 100- 300 kg/ ha/season.

Azotobacter (increase 0-30% yield over control for cereals, vegetables, cotton and sugarcane).

-Produce anti-fungal, anti-bacterial and hormones.

Azospirillium can increase yield of cereals by 5-

- 20%, of millets by 30% and fodder by 50%.
- BGA is a promising bio- fertilizer for rice
- and reduce soil alkalinity as bio- reclamation.

Azolla fixes atmospheric N up to

- 100- 150 kg/ ha/ year from 40-5 tones of bio-mass.

Mycorrhiza is symbiotic association of fungi with roots of Vascular plants.

Facilitates P uptake and increase yield of fruits like citrus, papaya and litchi.

6. Bio-pesticides:

-These are natural plant products, belongs to the secondary metabolites which includes thousands of alkaloids, terpenoids, phenolics and minor secondary chemicals.

-Biological activity against insects, nematodes, fungi and other organisms is well documented.

-Neem tree posses' insecticidal property. Commonly used botanical insecticides are Nicotine, Pyrethrum, Rotenone, Subabill, Ryanin, Quassia, Margosa, Acorus etc.

7. Vermicompost:

-Organic manure produced by the activity of earthworms.

-An ideal population of 1 sq mtr is 1800 worms.

-Nutrient content is 1.6% N, 5.045% P_2O_5 and 0.80% K_2O.

Four principles

1. Principle of health

- Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.
- Healthy soils produce healthy crops that foster the health of animals and people.
- Health is the wholeness and integrity of living systems.

2. **Principle of ecology**

- Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.
- This principle roots organic agriculture within living ecological systems.

3. Principle of fairness

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

4. Principle of care

- Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.
- This principle states that precaution and responsibility are the key concerns in management, development and technology choices in organic agriculture.

Why organic farming

- Sustainable and eco-friendly technology.
- It improves quality, shelf and nutritive value of the farm produce.
- It encourages sustainable livelihood of the producers as well as safeguards consumers health.
- It improves the physical, chemical and biological health of the soil.
- Promotes healthy use of the natural resources and minimizes all forms of the pollution.
- It enhances and sustains biological diversity within the system.

Techniques

- Mulching
- Bio-Fertilizer
- Vermi-compost
- Seed treatments

Types of organic farming

- **Pure organic farming : It includes use of organic** manures and bio-pesticides with complete avoidance of inorganic chemicals and pesticides.
- **Integrated Farming: It involves Integrated Nutrient Management** (INM) and Integrated Pest Management (IPM).
- **Integrated Farming Systems : In this type, local** resources are effectively recycled by involving other components such as poultry, fish pond, mushroom, goat rearing etc. apart from crop components. It is a low input organic farming.

Table: Land area of major countries under organic agriculture (FIBL & IFOAM 2013)

S.No	Name of the Country	Area under organic (ha)	Share % of total agricultural area	PRODUSER
1.	Australia	17151000	4.19	1707
2.	Argentina	3191255	2.27	1018
3.	USA	2178471	0.64	12880
4.	China	2094000	0.94	-
5.	SPAIN	1610129	6.47	30502
6.	Italy	1317177	10.29	45969
7.	France	1060756	3.86	25467
8.	Germany	1060669	6.35	23271
9.	Uruguay	930965	6.29	630
10.	Canada	869239	1.29	3513
11.	Brazil	705233	0.27	12526
12.	Poland	661956	4.28	25944
13.	UK	567751	3.30	3918
14.	Austraia	526689	19.46	21810
15.	India	510000	0.28	650000
	WORLD	43,091,133	0.98	1998592

Table: TOP TEN STATE AREA UNDER ORGANIC FARMING FOR THE YEAR 2010-11

Sir . No	State Name	Certified cultivated organic area (ha)
1.	Madhya Pradesh	270955
2.	Maharashtra	124547
3.	Rajasthan	57566
4.	Gujarat	42267
5.	Uttar Pradesh	17212
6.	Orissa	16883
7.	Goa	13044
8.	UTTARAKHAND	9513
9.	Karnataka	9128
10.	Andhra Pradesh	6070
	Total India	600000

Source: APEDA

Benefits

- 1. Increase long-term fertility of the soil.
- 2. It helps in maintaining environment health by reducing the
- level of pollution.
- 3. It reduces human and animal health hazards by reducing the
- level of residues in the product.
- 4. It helps in keeping agricultural production at a higher level
- and makes it sustainable.
- 5. It reduces the cost of agricultural production and also
- improves the soil health.
- 6. It ensures optimum utilization of natural resources for shortterm
- benefit and helps in conserving them for future
- generation.
- 7. It not only saves energy for both animal and machine, but
- also reduces risk of crop failure.

Limitations of organic farming in India

- Small land holding
- Poor infrastructure facilities
- Lack of technology knowledge
- Convert organic farm
- Neighbouring farmer well co-operate
- Organic material such as animal dung and other crop waste used for fuel purpose
- Organic material are bulky in nature very difficult store and high price
- City garbage contain heavy metal, plastic bags, stones and needles.
- Bio control agent are available only few selected insect pest.
- Complicated organic certification process and high fees cost
- Higher human population of India.


FEEDING
THE SOIL
RATHER
THAN
FEEDING
THE PLANT