MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMIANTION BOARD, PUNE

SEMESTER END THEORY EXAMINATION

B.Sc. (Hons) Agriculture

Semester	: IV(New)	**Academic year**	: 2018-2019
Course No.	: Agro-248	**Title:**	Principles of Organic Farming
Credits	: 2(1+1)	**Time**	: 2 hrs
Day & Date	:	**Marks**	: 40

Note:
1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

marks

Q.1. Write advantages and disadvantages of organic farming. 4

Ans. Advantages : (Any four) **2**

1. It helps to maintain environment health by reducing the level of pollution
2. It reduces the human and animal health hazards by reducing the level of residues in the product
3. It helps in keeping agricultural production at a sustainable level.
4. It reduces the cost of agricultural production and also improves the soil health.
5. It ensures optimum utilization of natural resources for short – term benefit and helps in conserving them for future generation.
6. It not only saves energy for both animal and machine, but also reduces risk of crop failure
7. It improves the soil physical properties such as granulation, good tilth, good aeration, easy root penetration and improves water holding capacity and reduces erosion.
8. It improves the soil's chemical properties such as supply and retention of soil nutrients, reduces nutrient loss into water bodies and environment and promotes favorable chemical reactions.
9. Organically grown crops are believed to provide more healthy and nutritionally superior food for man and animals than those grown with commercial fertilizers.
10. It encourages and enhances the biological cycles within farming system
11. It maintains and increases the long-term fertility of soils.

Disadvantages :- (Any four)

1. Yields in organic farming are less than chemical farming.
   In case of chemical farm converting to organic however, there is often a loss in yield and it takes a few years to attain higher productivity. (Fear of drop in productivity) **2**
2. We cannot supply enough nutrients by using composts / organic amendments.
3. Difficult to achieve food production target.
4. No consistency in implementing organic farming.
5. Quality of organic resources is many times remains doubtful, further no control on marketing of industrial organic manure.
6. No guidelines available for organic policy, establishment of organic farms, certification, marketing of organic produce, standards etc.
7. Pest control through organic means is another challenge in farming.
8. Difficulties in obtaining reliable information on domestic and international market for organic products are another obstacle.

Q.2. Define organic farming and write its concepts in detail. **4**

Ans. "Organic Farming is a holistic production management system, which promotes and enhances agro-ecosystem health, including biodiversity, biological cycle and soil biological activity" **1**

OR

"Organic Farming is production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives"

Concepts of organic Farming can be described as

1. Organic Farming is considered to be a self-sustaining system of agriculture and also attractive alternative to high input chemical based production system. **3**
2. This system maintains the soil productivity and controls the pest and diseases by enhancing natural process and cycles in harmony with natural environment.
3. This production system avoids or largely excludes the use of synthetic fertilizers, growth regulators; livestock feed additives and genetically modified crops (G.M.O.).
4. Organic farming system solely depends on the use of on – farm and off – farm crop residues, organic wastes, animal manures, green manures, crop rotations, incorporating legumes and biological pest and disease controls to maintain soil productivity.
5. The philosophy is to feed the soil rather than the crops to maintain soil health.
   So the objective of environmental, social and economic sustainability lies at the heart of organic farming.

Q.3. Describe the Biological weed management in organic farming. **4**

Ans. Natural enemies of weed plants are used as to attack them, reduce number below economic level. Biological agents like insects, fungus, fish, mammals,

snails, mites and plants can be used for management of weeds under organic farming. 1

1,**Fungus as mycoherbicides:**

e.g. *.Fusarium oxysporum* controls Orabanche
Alternaria helianthi contols *Xanthium strumarium*

2. **Insects as bioagent:**

e.g. *Zygograma bicolarata* (Mexican beetle) controls Parthenium weed
Flea Beetle controls Aligator weed. 1

3. **Fish**

e.g. Common carp and Chinees carp feed on Aquatic weed

4. **Mammals:**

e.g. Manatee/ Sea cow effective against water hyacinth. 1

5.**Snails :**

e.g. Marisa spp. And other fresh water snails feed on submerged weeds like Coontail and algae.

6. **Mites:** 1

e.g. Spider mites feed on Prickly pear

7. **Plants:**

e.g. Cow pea in sorghum crop.

Q.4. Enlist different types of compost and oilcakes. 4

Ans. Following are the organic sources of plant nutrients 2

I) Bulky organic manure:

i) Farm Yard Manure	ii) Rural Compost and Urban Compost
iii) Bio compost	iv) Vermi -compost
v) Night soil	vi) Sewage and sludge manure
vii) Sheep folding	viii) Green manuring
ix) Poultry manure	x) Biogas slurry
xi) Fly ash	xii) Sewage irrigation

II) Oil cakes:

a) Non-edible oil cakes

i) Cottonseed cake	ii) Castor cake
iii) Mahua cake	iv) Neem cake
v) Safflower cake (undecordicated)	vi)Karanj cake

b) Edible oil cakes: 2

i) Cottonseed cake(decordicated)	ii) Coconut cake
iii) Groundnut cake	iv) Neem cake
v) Safflower cake (decordicated)	vi) Soybean cake
vii) Linseed cake	viii) Niger cake
ix) Rapeseed cake	x) Sesamum cake

Q.5. Discuss the export potential of organic products? 4

Ans.

- The world demand for organic product is growing rapidly in developed countries like Europe, USA, Japan and Australia. 4
- Worldwide, Food trends are changing with a marked health orientation.

Since organic foods are free from chemical contaminants, the demand for this product is steadily increasing.

- Organic agricultural export market is one of the major drivers of organic agriculture in India.
- India exports 31 organic products. It is estimated that more than 85% of total organic production excluding wild herbs from UP and MP, is exported. India is best known as exporter of organic tea and also has great export potential for many other products.
- Other organic products for which India has a niche market are spices and fruits. There is also good response for organic rice, vegetable. Coffee, cashew, oil seed, wheat and pulses.
- Among the fruits crop banana, Mango and Orange are the most preferred organic products.
- The Organic food industry has been growing remarkable for the past several years.
- Against the 2 to 3 % growth in conventional food industry, the Organic food industry has been experiencing an annual growth of between 17 and 22% over the past several years.
- The Major markets of organic food products are in the United States, The European Union (Germany, France, Italy, Belgium and the United Kingdom) and Japan.
- The burgeoning European and U.S. organic markets provide enormous scope for Indian exporters.
- The US retail sale for organic products has gone 20 to 24% per year for the past 12 years and the same growth trends are expected to continue for future. Europe is the second largest market of organic produces in the world and consumes around half of the world organic produce.
- Japan is the largest organic food market in Asia. Other global markets for organic products are Saudi Arabia, UAE and South Africa.

Q.6. How pest management is done in organic farming? **4**

Ans. Integrated pest management : " The suitable combination of all preventive, mechanical, cultural and biological methods for minimizing infestation below the level of economic injury" **1**

In organic farming pest management is done by integrated approach. For this suitable cultural practices, crop husbandry methods and bio-control agents, bio-pesticides, Pheromones, Trap crops, Bird perches are used.

Integrated approach consist of : **3**

1. Follow the preventive measures for minimizing introduction and further spread.
2. Deep ploughing of soil during summer.
3. Always keep the orchards/farm clean and avoid crowding of trees.
4. Follow the good crop rotation.
5. Use well decomposed fym / compost
6. Adopt intercropping of suitable crop as per planting season
7. Adopt mulching of organic mulch material/polythene

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8. Adopt all cultural and mechanical methods to control weed/pest/diseases like hand weeding, digging, sickling, burning, tillage operation, summer fallow, solarization, water management etc.
9. Remove and destroy the affected fruits/plants.
10. Remove flowering weeds specially of composite family.
11. Bagging of fruits with muslin cloth, paper or polythene papers with sufficient aeration provision.
12. Avoid water logging and keep soil aerated.

Q.7. Describe in detail on the various recyclable organic wastes used in organic farming. **4**

Ans. The recycling of various forms of organic residues has the advantage of converting surplus farm wastes into useful products. Organic recyclable includes – crop residues, animal wastes, farm industrial wastes, municipal and sewage wastes. **1**

1. Crop Residues: Residues left out after the harvest of the economic portion and incorporation of green manuring crops.
   It includes
   A) Sugarcane Trash Compost
   B) Biogas Slurry
   C) Industrial Wastes
   D) Agro Industrial wastes
   E) Sugar Industrial wastes
   F) Rice husk
   G) Fruits and Vegetables produce waste
   H) Residues or biological wastes
   I) Plantation crop wastes etc. **3**
   J) Municipal and Sewage Wastes
   Besides above vermin-compost, bio fertilizers are also treated as recyclable material used in organic farming.

Q.8. Define bio-fertilizers and describe its types in detail. **4**

Ans. Biofertilizer are cultures of micro-organism used for inoculating seed, seedlings and soil" **1**

Microbial Biofertilizers are biologically active inputs and contain one or more types of beneficial micro-organisms such as bactireia, algae or fungi" Biofertilizers are ecofriendly, low cost inputs playing a significant role in improving quality of agricultural produce and sustaining the productivity over a longer period of time.

Biofertilizers mobilize plant nutrients from unavailable form to available form through biological process.

Thus they increase the availability of plant nutrients.

They also improve the crop growth, yield and quality by producing harmones.

Different forms of bio fertilizers are

1. *Rhizobium : Rhizobia* is a group of bacteria that fixes nitrogen in association with the roots of leguminous crops.

2. *Azotobacter* : They are free living nitrogen fixers and can be used for all types of upland crops but connot survive in wetland condition. 3
3. *Azospirillum* : They are not free living and live inside plant roots where the fix nitrogen and can be used in wetland conditions.
4. *Acetobactor* : Endophytic N2 fixer mainly used in sugar rich crops like sugarcane, sugarbeet.
5. Blue–Green Algae : These are free – living, nitrogen fixing photosynthetic algae that are found in wet and marshy conditions.
6. Azolla :Azolla is a free-floating water fern that fixes nitrogen in association with a specific species of *Cyanobacteria.*
7. Phosphate Solubilizing micro-organisms (Bacteria) (PSB) : These are a group of bacteria and fungi, capable of breaking down insoluble phosphates to make them available to crops i.e. for increasing the availability of phosphorous PSB @ 2.5 kg ha / are utilized.
8. Vasicular – Azbuscular Mycorrhiza (VAM) : Mycorrhiza is a sweeping term for a number of species of fungi which form a symbiotic association with the plant root system

Q.9 . What is organic certification? Write in brief requirements for organic certification. 4

Ans. Certification :

Certifications are a process that validates the claim of producer. The process of certification has essentially three components

- Accreditation body that defines and lays down the standards 1
- Certification body that inspects and certifies the project
- Project proposal that ensures that the said project is as per indicated standard.

Minimum requirement for organic certification :

- A certain degree of documentation for a clarity and consistency of farm 3
- Soil fertility has to be maintained viz. crop rotation adapted cultivation techniques and nutrient cycles.
- Pest and disease attacks must be minimized by the means of healthy soil natural enemies and adapted crop varieties.
- Only certified organic seeds should be used.
- All farm activities must be documented at every stage.
- Conventional units must be clearly separated from organic units (Conventional and organic products must not be mixed at any stage).
- Farms converting to organic farming have to undergone 3 years of transition period.

Every farm, processor or exporter producing or handling organic produce needs to be inspected and certified once a year by an accredited certification agency.

Q.10. Write short notes on (Any two) 4

Ans. a) **Pheromone traps** : 2

- The concept of using pheromone traps is to monitor the pests for their appearance the incidence.
- To attract male and female insects to each other, insects naturally generate hormones called pheromones.
- A special capsule of pheromones are used to trap male or female which attracts each other and kill them to decrease population of next generation.

Presently capsule of pheromones for *Helicovpraarmigera i.e.* Hexalure (tomato, okra, gram, redgram), *spodoptra i.e. spodalure*(Soybean), shoot and fruit borer (Brinjal) i.e. leucilure, pink bollworm i.e. gossylure (cotton) are available in market (PCI)

b) **ii) Accreditation in organic farming**

- In India, the agriculture and processed food products export development authority, ministry of commerce, GOI, is the key accreditation agency 2
- All certifying agencies are accredited by APEDA for carrying out the inspections and certifications according to the National standards for organic production under the national programme for organic production.
- APEDA works in close co – ordination with the national accreditation body and National steering committee for NPOP.

With these reorganization, Indian organic products duly certified by the accredited certification bodies of India are accepted by the importing countries.

c) **iii)Quality parameters for organic certification**

- Maximum residue level (mg/kg).
- General appearance (color, shape). 2
- Flavor, texture, taste
- Damage caused by pests / diseases
- Abnormal external moisture
- Visible trace moulds
- Size (mm / cm)
- Weight (kg / g.)
- Total soluble solids.
- Sugar/ acid ratio.
- Skin defects
- Keeping quality
- Nutritional status.

SECTION "B"

Q.11 Define the following terms 4

1. **Bio-pesticides** : "Bio-pesticides are formulated products using pest pathogenic microbes which intervene in the life cycle of the insect pests 1

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and kill them by causing diseases"

2. **Crop rotation** : Growing sets of crops in recurrent succession over the same field with a specified period of time 1
3. **Vermiwash** : This is drain out fluid of Vermi compost and is used this fluid for foliar spray @ 1 lit in 50 lit of water it will supply the nutrients and also useful for the plant protection purpose.
4. **Composting:** Composting is a process of converting crops/vegetable and animal waste to a quickly utilizable condition for improving and 1 maintaining soil fertility. These are produced through the action of Micr- organisms on wastes. Wastes may be leaves, roots and stubbles, crop 1 residues, straw, hedge clippings, weeds, saw dust, kitchen wastes etc. in this process waste materials undergo intensive decomposition under medium – high temperatures in heaps or pits with adequate moisture. It requires 3 – 6 months.

Q.12 **Do as directed.** 4

Ans. 1) i)**International Federation of Organic Agriculture Movement** 1

2) ii) The National Institute of Organic Farming is located at **Ghaziabad (U.P.)** 1

3) iii) In India **APEDA**is controlling body for organic certification for export. 1

4) iv) **Rock phosphate** is the phosphorous source of fertilizer approved for use in organic farming 1

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