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CERTIFICATION COURSES

Organic Farming for Sustainable Agricultural Production

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Lecture 24 : Organic Field Crop Management (Cereals)

Rice (*Oryza sativa*)

Family: Poaceae

Origin: South-east Asia

Climatic Requirements

- Rice cultivation in India extends from 8 to 35⁰N altitude and from sea level to as high as 3000 meters.
- It needs a hot and humid climate.
- It is best suited in regions which have high humidity, prolonged sunshine and an assured supply of water.
- The average temperature required through out the life period of the crop ranges from 21 to 37⁰C. At the time of tillering, the crop requires a higher temperature.
- Temperature require for blooming is in the range of 26.5 to 29.5⁰C. At the time of ripening the temperature should be between 20-25⁰C.
- Rice is a short-day plant.

Soil

- Rice can be grown in any type of soil.
- The major soil groups where rice is grown are alluvium, red-yellow, red loamy, laterite, costal alluvium, red sandy, mixed red and black and medium and shallow black soils.
- optimum pH range for rice is 5.5-6.5.

Land Preparation

1. Upland rice/ Direct seeded Rice:

In this method, the soils are not puddled and there is no free standing water in the field. It requires less water and is effective for soil aeration.

STEPS:

i) Construct bunds:

- 50 cm x 30 cm bunds, around the field.
- Bunds should be well compacted and properly sealed, with no cracks, holes, etc. This will minimize water losses through seepage (particularly in sloping lands).

ii) Primary Tillage:

- Primary tillage is normally undertaken when the soil is wet enough to allow the field to be plowed and strong enough to give reasonable levels of traction.
- This can be immediately after harvest or at the beginning of the next season, depending on soil moisture and water availability. Summer ploughing is preferred.

ii) Secondary Tillage Operations

- Harrowing and rotavating the soil to loose the soil.

iii) Levelling the field

iv) Sowing of seeds

2. Lowland Rice/ Puddled Transplanted Rice

i) Construct Bunds

ii) Impound water

iii) Puddling: Tillage operation in standing water

iv) Level the field

Systems of Rice Intensification

- Young seedling (15 days)
- Wider spacing (25 cm × 25 cm)
- One seedling per hill
- Saturation water maintenance

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Nutrient Management

i) Green Manure Cultivation

- Green Manure crop of *Sesbania aculeata* and *Crotalaria juncea* can be taken. The 60-day-old crop can contribute approximately 100 kg N/ha, 25-30 kg P/ha and 75 kg K/ha and these can meet the requirement of organic rice crop.
- A seed rate of 25-30 kg/ha of *Sesbania* should be used.
- Sowing from last week of April to first fortnight of May
- Incorporated around 55-60 days after sowing

ii) FYM

If available, well decomposed FYM should be applied @15-20 t/ha, which can supply about 75-100kgN/ha, 35-40 kg P₂O₅/ha and 75-100 kg K₂O/ha. FYM should be decomposed by adding *Trichoderma* powder.



Green manure in field



Incorporation of green manure crop

iii) Enriched compost

Various methods of composting for nutrients enrichment through rock phosphate, pyrite and micro-organism have better quality with respect to N, P, K and S content.

iv) Azolla

- Inoculation of Azolla bio-fertilizer at 7 days after transplanting of rice crop @ 2 t/ha in standing water and its growth during the rice crop adds organic matter and nitrogen to the soil.
- The Azolla incorporation at the time of puddling of rice soil @ 6t/ha can also provide about 25-30 kg N/ha to the rice crop in organic farming system.

v) Vermicompost

- Application of Vermicompost @ of 5 tonnes /ha can meet the nutrient requirement of organic rice partially.

NUTRIENTS MANAGEMENT

Chemical Properties	Conventional VC (%)	Microbial Enriched VC (%)	Rock enriched VC (%)	FYM
Total N	1.3-1.5	1.8-2.4	1.4-1.5	0.5
Total P	0.8-1.0	0.9-1.3	2.9-3.5	0.2
Total K	1.0-1.1	1.1-1.60	2.8-3.5	0.5

SOURCE	DOSE, Based on N content
Conventional VC	7 tonnes/ha.
Microbial Enriched VC	4 tonnes/ha
Rock enriched VC	7 tonnes/ha
FYM	20 tonnes/ha
Chemical fertilizer	100-50-60 kg of N:P ₂ O ₅ :K ₂ O