



IIT KHARAGPUR



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CERTIFICATION COURSES

Organic Farming for Sustainable Agricultural Production

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Lecture 21 : Introduction to Organic Crop Management

Land preparation

Tillage

- Practicing conservation tillage, zero tillage, minimum tillage techniques to prepare the land.
- Tillage operation is confined to areas where crop is to be planted leaving rest area undisturbed.
- Through this the soil environment is least disturbed thus maintaining the soil flora.
- This provides drainage, proper root movement to obtain the necessary water and nutrients, and aeration.



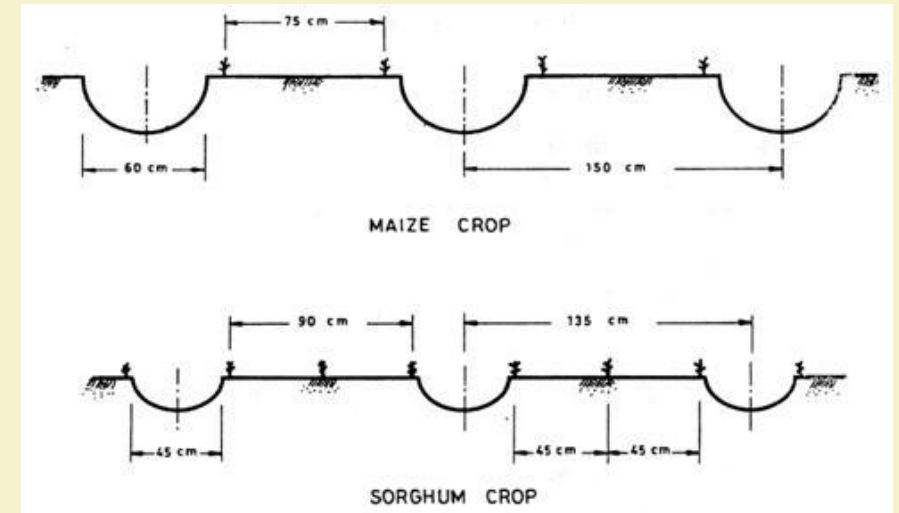
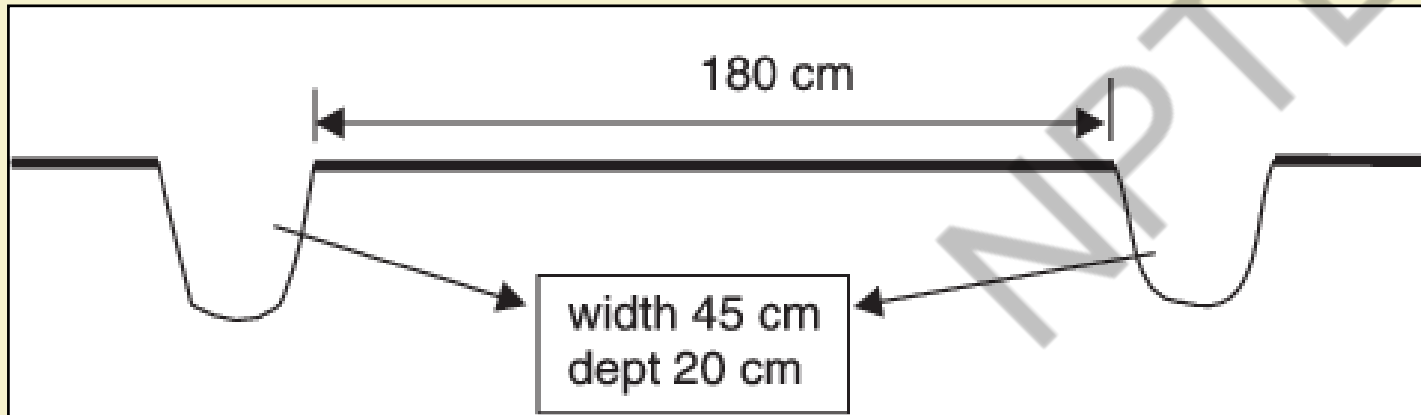
Planting Technique

Broad Bed and Furrow System

Bed width of 1.5 to 2.0 m

Furrow width of 45 to 60 cm and depth 15 to 20 cm

- Controls soil erosion and hold moisture for longer period
- Better infiltration of rainwater
- Better aeration and radiation interception of the crops



Nutrient Management

Nutrient management implies managing all nutrient sources – fertilizers, organic manures, waste materials, soil reserves, biological nitrogen fixation, and biofertilizer in such a way that yield is not jeopardized, with a minimum loss of nutrient to the environment with high nutrient use efficiency.

Criteria of essentiality of nutrients:

Arnon (1952) proposed the following criteria of essentiality of mineral nutrients:

- A deficiency of element in question results in failure to complete the life cycle of crop.
- Deficiency of element in question can be corrected by supplying particular nutrient element
- The element must extend its effect directly on growth and metabolism of crops

Plant tissue contains 60-90% water and rest dry matter.

The dry matter:

Carbon: 40%

Oxygen: 40%

Hydrogen: 10%

Inorganic element: <10%

Nutrient Management

Essential element in plant nutrition:

Macronutrients : nutrients needed in concentration of 1000 $\mu\text{g/g}$ dry matter or more.

Micronutrients: Nutrients needed in concentration equal or less than 100 $\mu\text{g/g}$ dry matter.

Essential nutrients and their forms of uptake by plant

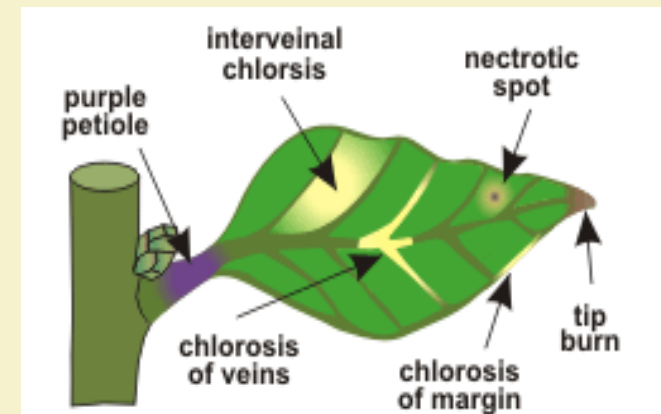
Nutrient	Form of uptake
C	CO_2
H	H_2O
O	H_2O , O_2
Macronutrients:	
N	NH_4^+ , NO_3^-
P	H_2PO_4^- , HPO_4^{2-}
K	K^+
Ca	Ca^{2+}
Mg	Mg^{2+}
S	SO_4^{2-} ,

Micronutrients:

Fe	Fe^{2+}
Mn	Mn^{2+}
Zn	Zn^{2+}
Cu	Cu^{2+}
B	H_2BO_3^-
Mo	MoO_4^{2-}
Cl	Cl^-

Nutrient Management

Nutrient	Functions	Deficiency symptoms
N	Component of many organic compounds ranging from protein to nucleic acid, an integral part of chlorophyll and associated with leaf greenness.	Stunted growth, yellowing of lower leaves, reducing tillering in cereals
P	Energy transfer and protein metabolism. Associated with increased root growth and early maturity	New leaves become dark green, poor root system and stunted growth.
K	Activator of many enzymes. Imparts disease resistance in cereal and drought resistance in many crops.	Marginal burning starting from tip
Ca	Cell division	Growing point die and curl, new leaves become white
Mg	Component of chlorophyll	Interveneal chlorosis of older leaves with veins remaining green
S	Associated with chlorophyll formation and sulphur containing aminoacids	Chlorosis of younger leaves



Nutrient deficiency symptoms

