ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY
AUTONOMOUS INSTITUTION
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CROP PRODUCTION TECHNOLOGY

UNIT I – Agriculture And Crop Production

- It has a definite influence on crop growth
- The OM is derived from dead and decaying roots of plants and living organisms present in the soil
- Dry leaves, twigs, dead plants and animals added to the soil

Soil organisms:

- The raw organic matter in the soil is decomposed by different micro organisms which in turn releases the plant nutrients
- The different kinds of MOs are

o Flora –macro flora-roots of higher plants micro flora- Algae, bacteria, fungi and actinomycetes,

o Fauna- Macro fauna- Earthworms, Burrowing vertebrates (moles, rats)

Soil Reaction

Soil reaction(pH):pH is defined as the negative logarithm of H ion concentration in the soil solution.

The soil should have neutral pH. Most of the plant nutrients are available freely to the plant when the pH is around seven.

- Soils may be acidic, neutral, saline and alkaline
- When pH >7 very few elements like Fe, Al, Mn are available freely.Soil should have neutral pH which is suitable for crop production.
- Neutral soils are best for growth of most of the crops
- Soils with low pH are injurious to plants due high toxicity of Fe and Al.
- Low pH also interferes with availability of other plant nutrients.

BIOTICFACTORS

Beneficial and harmful effects caused by other plants and animals on the crop plants

Plants

- competitive and complementary nature among field crops

- Competition between plants occurs when there is demand for nutrients, moisture and sunlight particularly when they are in short supply or when plants are closely spaced
- When different crops of cereals and legumes are grown together, mutual benefit results in higher yield (synergistic effect)
- Competition between weed and crop
- plants as parasites eg; strig a parasite weed on sugarcane crop

Animals Harmful organisms

- Insects and nematodes cause considerable damage to crop yield.

Beneficial organisms

- Honey bees and wasps help in cross pollination and increases yield
- beetle pollination is necessary in oil palm
- Burrowing earthworm facilitate aeration and drainage of the soil. Ingestion of organic and mineral matter results in constant mixing of these materials in the soils.
- Large animals cause damage to crop plants by grazing(cattle, goats etc)

PHYSIOGRAPHIC FACTORS:

- Topography: the nature of surface earth (levelled or sloppy) is known as topography. Topographic factors affect the crop growth indirectly
- Steepness of slope: it results in run off of rain water and loss of nutrient rich top soil
- Exposure to light and wind: a mountain slope exposed to low intensity of light and strong dry winds may results in poor crop yields (coastal areas and interior pockets)

SOCIO-ECONOMIC FACTORS

- When the bulk density of the soil is higher it is more compact. It has less chance to hold the moisture. An appropriate Introduction of new varieties by human beings
- The economic condition of the farmers greatly decides the input/ resource mobilizing ability (marginal, small, medium and large farmers)

CROP MANAGEMENT THROUGH ENVIRONMENTAL MODIFICATION

Adaptation – defined as any feature of an organism which has survival value under the existing condition.

Growth environment of a crop / plant / any organism is unique. Whenever the environment is different, then the crop in question may not perform to its potential due to so many factors.

It is the management which provides the congenial atmosphere for the crop / variety by modifying the existing condition. Here are some of the important points to be borne in mind before taking any modification. They are:

1. Selection of crop suitable for the locality

a. Identifying best season for potential production

• Potential yield a crop yielding can't be ensured in all the seasons with which it is being grown due to so many factors, predominantly due to weather

• Fitting appropriate variety for the season and the location is a way of management.

2. Designing cropping pattern / cropping system by integrating the crop and variety suitable for the location / season/ soil.

a. Adoption of appropriate crop rotation for the crops and variety will enhance the yield potential and as well correct the soil problem arising out of depletion of nutrients

3. Providing adequate soil related environment for better crop growth.

a. It is one among the most important modification which ensures crop establishment.

• Providing /making micro-climatic suitable for crop cultivation by:

1. Alley-cropping

2. Mixed-cropping

3. Proving growth chambers / green house / protected cultivation etc

4. Mulching the soil to ensure soil moisture retention and micro-climate.

Alley Cropping

Multiple Cropping

Mulching

4. Adopting appropriate stand establishment techniques

a. Land preparation and configuration

• It is the major management factor deciding the crop stand establishment. It will be discussed in detail later exercise

b. Method of stand establishment

• Whether direct seeded or transplanted; sown and then irrigated or irrigated and then sown or planted etc are all will be crop establishment success. Is is also to be studied in detail in this course.

c. Irrigation techniques

• Water is the prime input for the seed to trigger the germination, followed by its growth needs li evaporation.

. The availability of soil moisture is ensured via irrigation management strategies followed in a farm and the crop in question. This subject is also to be studied in detail later in this course.

d. Weed management practices

• Growing environment means ‘conglomeration of so many fauna and flora’ living together by involving themselves for the better atmosphere. A fauna or flora if considered not necessary to go-exit for a particular environment is called as weed or unwarranted existence in that community. This has to be managed efficiently to provide growing environment. This subject is also dealt later in detail.

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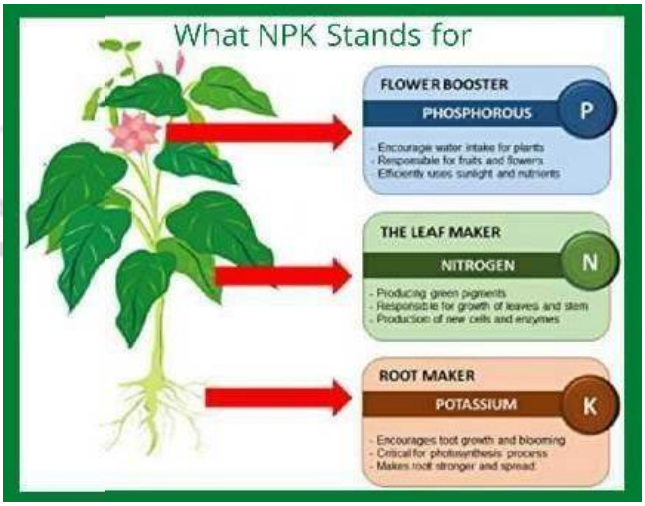

e. Nutrition management

Healthy crop growth and ultimate economic produce depends upon the soil fertility and plant elements in need. Nutrition is the term related to the plant elements supply by the soil to the plant through systemic way.

f. Pests and disease management

•Ecosystem is one in which all living organisms have some role to play in it. Pests and disease are part of any ecosystem. It is up to the need and objective to consider the pest disease in

the system to be protected or controlled. Hence it is another interesting management factor which decides the ultimate crop management strategy which decides the control mechanism for a particular pest / disease.

5 Protected cultivation

Protected cultivation is the modification of the natural environment to achieve optimum plant growth. Modifications can be made to both the aerial and root environments to increase crop yields, extend the growing season and permit plant growth during periods of the year not commonly used to grow on open field