SKILLING Eco-VET

Skilling VET ecosystem: enhance enable environments for private and public VET key actors in Ghana and Senegal

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VOLONTARIATO INTERNAZIONALE PER LO SVILUPPO

Insieme, per un mondo possibile

TRAINING MODULE 1

Organic agriculture with a focus on Bio-entomology and Green house technology in Ghana

Dates: 12- 14 February 2024

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Training contents

- General introduction on the role/competencies of the mentor farmer;
- Teaching modalities; Andragogical Principles and Practice
- How to organize localized training for mixed population profiles
- Green House Farming and Modern farming techniques – importance and challenges
- Organic Agriculture and Environmental sustainability
- Preparation of compost and fertilizer;
- How to become a TVET provider;
- How to enable mentor farmers to host trainees and apprentices to create job opportunities.

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01 Mentor farmer

the role/competencies of the mentor farmer

02 The Modalities

Teaching modalities; Andragogical Principles and practices
How to organize Training for a mixed taret group (target group with mixed profile)

03 Organic Agriculture

Green House Farming and Modern farming techniques – importance and challenges

-Organic Agriculture and Environmental sustainability

Preparation of compost and fertilizer;

-How to become a TVET provider;

How to enable mentor farmers to host trainees and apprentices to create job opportunities.

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Mentor farmer

A mentor farmer is an individual (preferably, young or female) who having received adequate training and being committed in promoting environmentally friendly agriculture production systems (Organic), practicing and training others (young/women) in his/her environment (informally & formally).

The mentor farmer must ;

1. Be adequately trained in organic methodologies
2. Operates his/her own farm with organic methodologies
3. is willing to share his/her knowledge with other farmers/young people
4. can train others in reasonably systematic manner

The roles of the mentor farmer includes:

1. Practice organic farming techniques
2. Open up his/her farm to others who wish to learn the organic techniques
3. Organise formally and informally training sessions for other interested farmers or a set of trainees referred to him/her for training
4. Evaluate trainees after training
5. Where necessary provide on-field assistance to graduands or referred individuals/groups.

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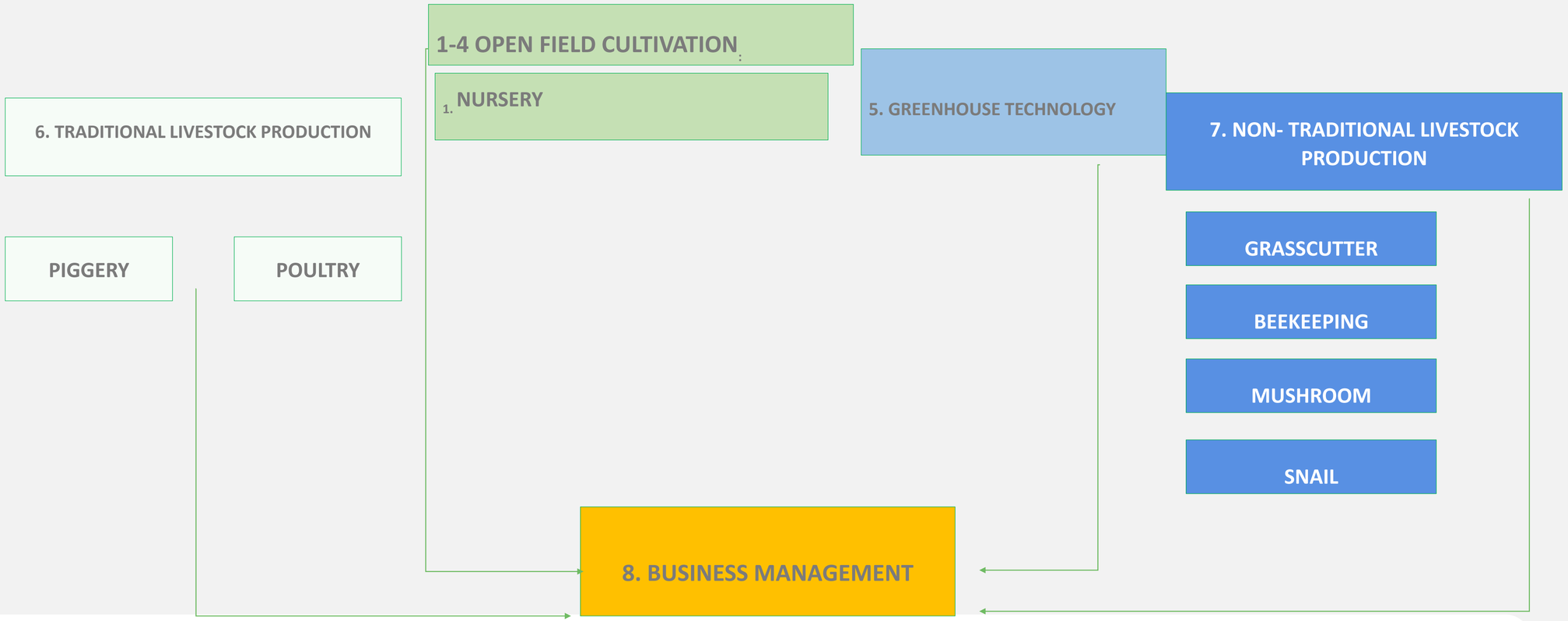
The Curricula



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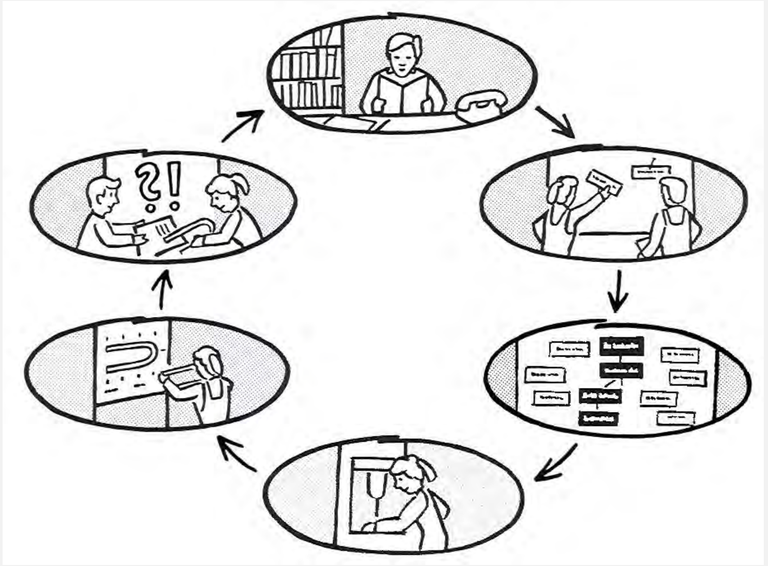
Principles of Andragogy & Presentation techniques

- Adults are **autonomous** and **self-directed**.
- Adults **bring knowledge** and **experience** to each learning activity.
- Adults need learning to be **relevant and practical**.
- Adults are **goal-oriented**.
- Adults are **problem-oriented** and want **to apply** what they've learned
- Adults are **motivated** by intrinsic and extrinsic factors
- Adults are **pressed for time**.
- Adults have **different learning styles**.



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Andragogical Practices

Project Method macro-technique

Farmer field school

Demonstration farms

Mentor farms

Some titbits on control and educate

Project Method macro-technique

A project method involves a specific and achievable goal. It includes purposeful and realistic activities that promote learning. Students are responsible for planning and executing their learning activities. It emphasizes learning through practical application.

Usage in lesson

- **Projects in the narrower sense**
  Creating a complex, ready-to-use and/or functional object, e.g. a power supply, sorting machine, steam engine, solar-powered car

- **Projects in the broader sense**
  Solving a specifically defined, complex and practice-related task, e.g. a model, drawing, analysis

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Characteristics of the project method

Practical relevance	Practical areas of the selected occupation.	Trainee based approach
Product based approach	Action based approach	A holistic-integrated learning process
Self-organization	Collective implementation	Interdisciplinary nature

How the project method can be applied

An interactive process between learning and occupational activity	Detailed and precise planning of the steps to be followed	Complementing the projects idea with other methods
A diversity of learning methods	The result of a whole pedagogic tradition	Adapting to new skills training demands
Focused towards a real product	Holistic learning	Self-organization

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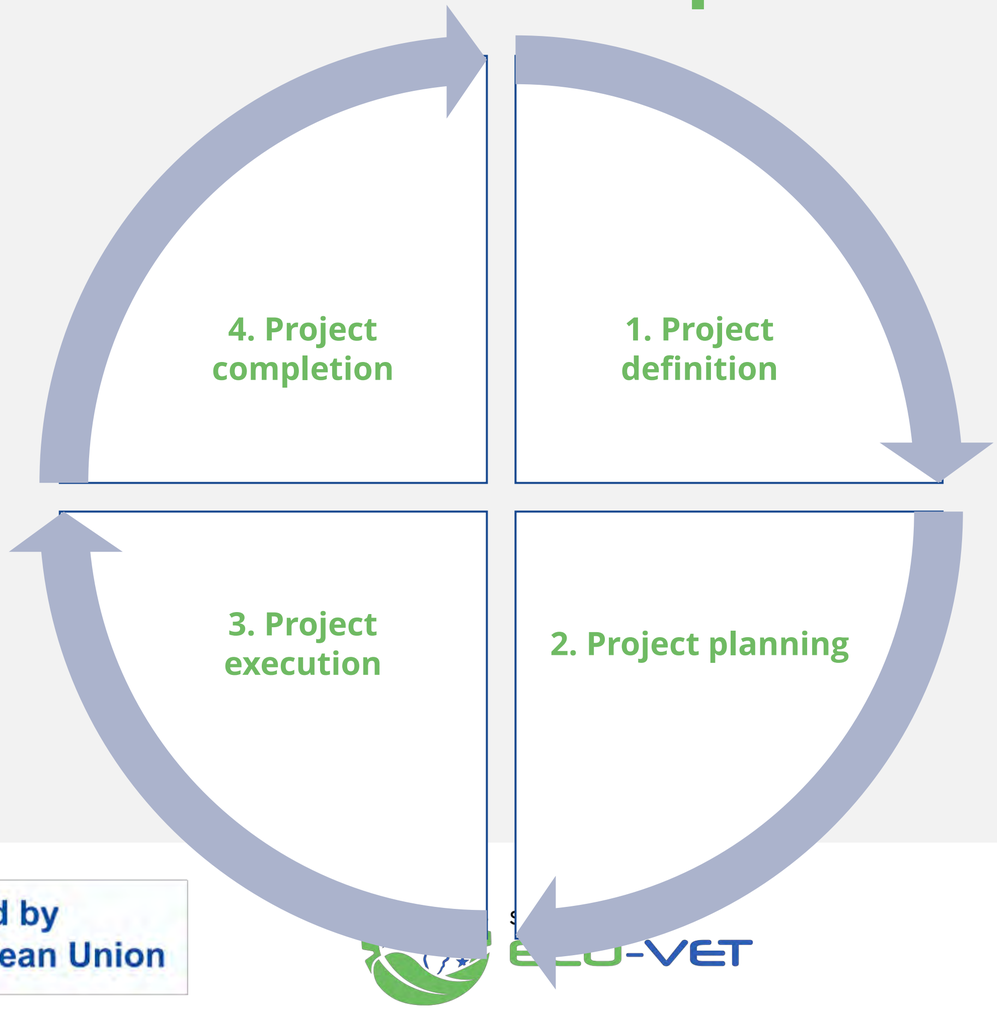
Insieme, per un mondo possibile

Action steps



Farmer field school

Farmer Field School (FFS) is a participatory education approach that brings together a group of small-scale food producers to solve production problems through sustainable agriculture. Farmer Field Schools (FFS) is a group-based adult learning approach that teaches farmers how to experiment and solve problems independently.

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Demonstration farms

A demonstration farm, or model farm, is a farm which is used primarily to research or demonstrate various agricultural techniques, with any economic gains being an added bonus. Demonstration farms are often **owned and operated** by educational institution or government ministries.

Mentor farms

Farm is owned and managed by a local farmer of approachable characteristics and discipline.

Success or failure will be understood as doable within the context

Is capable to explain to peers and neighbouring farmers of the practices and challenges

Mentor farms

Some titbits on control and educate

Some titbits on control and educate

- You are a facilitator NOT a teacher
- You are coach or learning mentor
- Make the participants the centre of the process
- Do not promote only technical competence but also social and inter-personal competences including collaborative learning
- Use collective and collaborative evaluation system for both formative and summative assessments.

Green House Agriculture

Why Green House?

Types

Makeshift greenhouses?

Green house and organic farming

Importance and challenges

Why Green House?

A greenhouse is a safe haven for plants. It reduces the accessibility of insects and animals that have the potential to damage or destroy your plants. This greenhouse environment reduces exposure to extreme weather conditions such as torrential rain and droughts.

The main purpose of greenhouses is to provide favorable growing conditions and to protect crops from unfavorable weather and various pests.

Why Green House?

Greenhouse farming is the unique farm practice of growing crops within sheltered structures covered by a transparent, or partially transparent, material.

https://youtu.be/eQSNKrigiOM?si=mryh5sfm_M4k3tTD

Types

Types include on the basis of **Shape**

- ✓ Gable,
- ✓ Flat arch,
- ✓ Raised dome,
- ✓ Sawtooth,
- ✓ Skillion,
- ✓ Tunnel.

Material
Shade houses
Screen houses
Crop top structures

Makeshift greenhouses?

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi7waCprfGDAxXBZ0EAHeDtC90QFnoECEEQAw&url=https%3A%2F%2Fm.youtube.com%2Fwatch%3Fv%3DnZeOQRBjp-g&usg=AOvVaw0DRYlI9-ULE-PlN9nrbDIi&opi=89978449

Green house and organic farming

Green house farming are not in themselves organic but can be used as a tool to organicalization of food production. It offers:

1. Controlled environment
2. Reduces pest infestation
3. Prevents disease spread and infections

Importance and challenges

- Greenhouse farming can increase crop production because you can create the optimal climate conditions needed for plant growth and grow more plants per square foot than growing crops in an open field. Land management solution

DISADVANTAGES OF GREENHOUSE TECHNOLOGY

1. HIGH INITIAL AND MAINTENANCE COSTS
2. INCREASED ENERGY CONSUMPTION
3. RELIANCE ON FOSSIL FUELS AND NON-RENEWABLE ENERGY SOURCES
4. POTENTIAL FOR PESTS AND DISEASE OUTBREAKS
5. LIMITED CROP DIVERSITY

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ADVANTAGES OF GREENHOUSE TECHNOLOGY

1. IMPROVED CROP YIELDS AND PRODUCTIVITY
2. YEAR-ROUND CROP PRODUCTION
3. PROTECTION OF CROPS FROM EXTREME WEATHER CONDITIONS
4. GREATER CONTROL OVER THE GROWING ENVIRONMENT
5. REDUCED USE OF PESTICIDES AND HERBICIDES

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Organic Agriculture

What is Organic Agriculture?

Circular Economy

Environment and Organic farming

Importance of Organic farming

What is Organic Agriculture?

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

Circular Economy

The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. (EU Parliament)

Circular agriculture constitutes a self-contained food production system that emulates natural regeneration, minimizing waste

Environment and Organic farming

- **Sustainability over the long term**. Many changes observed in the environment are long term, occurring slowly over time.
- **Soil**. Soil building practices such as crop rotations, inter-cropping, symbiotic associations, cover crops, organic fertilizers and minimum tillage are central to organic practices.
- **Water**. In many agriculture areas, pollution of groundwater courses with synthetic fertilizers and pesticides is a major problem.

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Environment and Organic farming

Air and climate change. Organic agriculture reduces non-renewable energy use by decreasing agrochemical needs (these require high quantities of fossil fuel to be produced). Organic agriculture contributes to mitigating the greenhouse effect and global warming through its ability to sequester carbon in the soil. Soil. Soil building practices such as crop rotations, inter-cropping, symbiotic associations, cover crops, organic fertilizers and minimum tillage are central to organic practices.

Environment and Organic farming

Biodiversity. Organic farmers are both custodians and users of biodiversity at all levels. At the gene level, traditional and adapted seeds and breeds are preferred for their greater resistance to diseases and their resilience to climatic stress.

Importance of Organic farming

- ✓ Maintain and improve fertility, soil structure and biodiversity, and reduce erosion.
- ✓ Reduce the risks of human, animal, and environmental exposure to toxic materials.
- ✓ Fine-tune farming practices to meet local production conditions and satisfy local markets.

Organic Fertilizers

Phyto-fertilizers

Farmyard Manures

Composting

Liquid fertilizer preparations

Fertilizer applications

Phyto-fertilizers

Plant-based fertilizers can be in various forms

- Liquid micro-nutrient rich fertilizers – neem leaves preparation.
- Compound form – Compost
- Mulches and green manures
- Cover cropping

Farmyard Manures

Manures from animal droppings are very rich.

- Poultry manure
- Rabbit manure
- Pig manure
- Cattle, Goat, Sheep manure
- Compost

Composting

Most composite nutrient source in varied nutrients and available form.

How to prepare compost

- Materials
- Procedure
- Testing

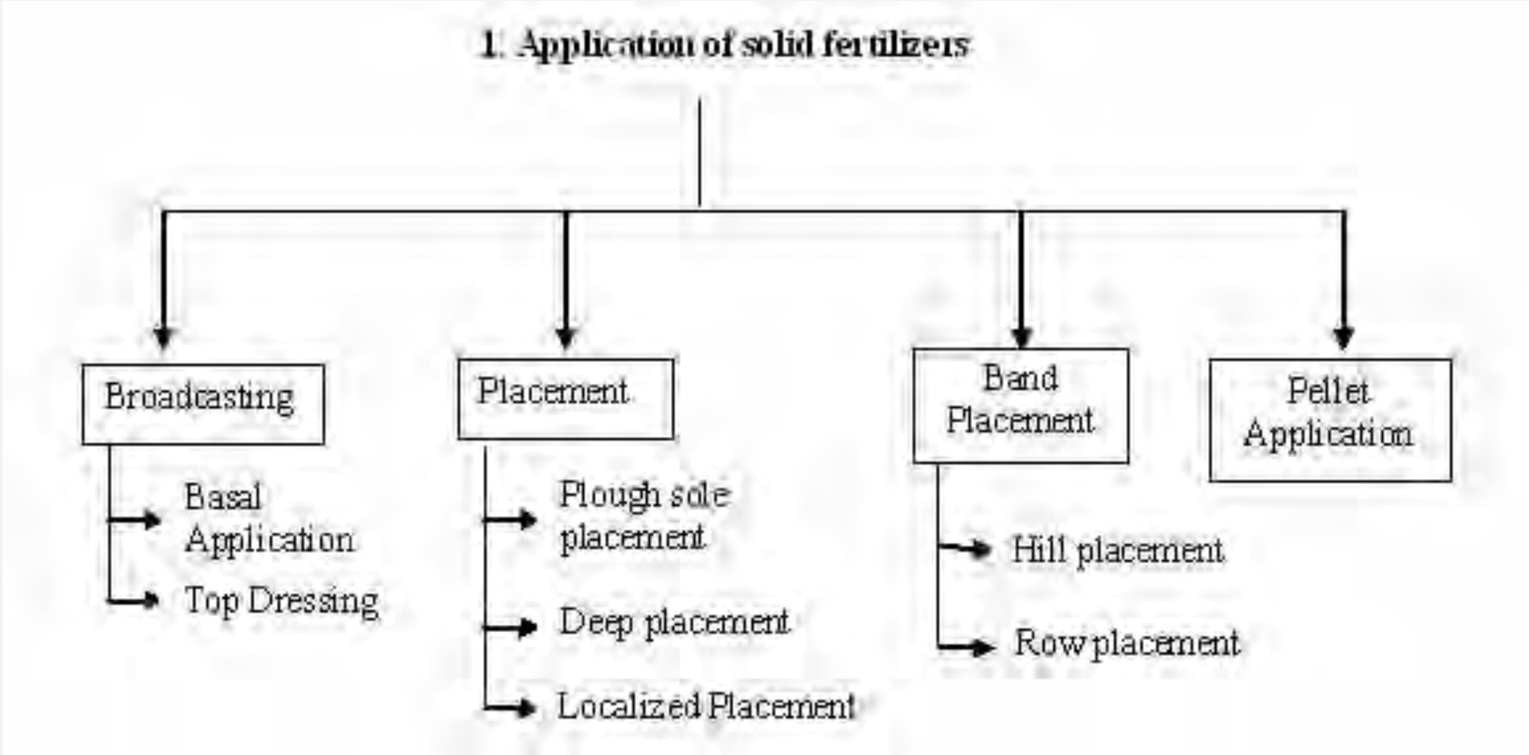
Liquid fertilizer preparations

Animal manure-based liquid fertilizer preparation

Plant-based liquid fertilizer preparation.

Practical Session: *preparing plant-based liquid fertilizers using neem leaves*

Fertilizer applications



Fertilizer applications

Broadcasting

- It refers to spreading fertilizers uniformly all over the field.
- Suitable for crops with dense stand, the plant roots permeate the whole volume of the soil, large doses of fertilizers are applied and insoluble phosphatic fertilizers such as rock phosphate are used.

Broadcasting of fertilizers is of two types.

- Broadcasting at sowing or planting (Basal application)
- The main objectives of broadcasting the fertilizers at sowing time are to uniformly distribute the fertilizer over the entire field and to mix it with soil.

Fertilizer applications

- Top dressing
- It is the broadcasting of fertilizers particularly nitrogenous fertilizers in closely sown crops like paddy and wheat, with the objective of supplying nitrogen in readily available form to growing plants.

Disadvantages of broadcasting

The main disadvantages of application of fertilizers through broadcasting are:
i) Nutrients cannot be fully utilized by plant roots as they move laterally over long distances.
ii) The weed growth is stimulated all over the field.
iii) Nutrients are fixed in the soil as they come in contact with a large mass of soil.

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Fertilizer applications

b) Placement

It refers to the placement of fertilizers in soil at a specific place with or without reference to the position of the seed. Placement of fertilizers is normally recommended when the quantity of fertilizers to apply is small, development of the root system is poor, soil have a low level of fertility and to apply phosphatic and potassic fertilizer.

The most common methods of placement are as follows:

i) Plough sole placement

In this method, fertilizer is placed at the bottom of the plough furrow in a continuous band during the process of ploughing.
Every band is covered as the next furrow is turned.
This method is suitable for areas where soil becomes quite dry upto few cm below the soil surface and soils having a heavy clay pan just below the plough sole layer.

Fertilizer applications

ii) Deep placement
It is the placement of ammoniacal nitrogenous fertilizers in the reduction zone of soil particularly in paddy fields, where ammoniacal nitrogen remains available to the crop. This method ensures better distribution of fertilizer in the root zone soil and prevents loss of nutrients by run-off.

iii) Localized placement
It refers to the application of fertilizers into the soil close to the seed or plant in order to supply the nutrients in adequate amounts to the roots of growing plants. The common methods to place fertilizers close to the seed or plant are as follows:

a) Drilling
In this method, the fertilizer is applied at the time of sowing by means of a seed-cum-fertilizer drill. This places fertilizer and the seed in the same row but at different depths. Although this method has been found suitable for the application of phosphatic and potassic fertilizers in cereal crops, but sometimes germination of seeds and young plants may get damaged due to higher concentration of soluble salts.

Fertilizer applications

b) Side dressing

It refers to the spread of fertilizer in between the rows and around the plants. The common methods of side-dressing are

Placement of nitrogenous fertilizers by hand in between the rows of crops like maize, sugarcane, cotton etc., to apply additional doses of nitrogen to the growing crops and
Placement of fertilizers around the trees like mango, apple, grapes, papaya etc.

c) Band placement

If refers to the placement of fertilizer in bands.

Band placement is of two types.

Fertilizer applications

i) Hill placement

It is practiced for the application of fertilizers in orchards. In this method, fertilizers are placed close to the plant in bands on one or both sides of the plant. The length and depth of the band varies with the nature of the crop.

ii) Row placement

When the crops like sugarcane, potato, maize, cereals etc., are sown close together in rows, the fertilizer is applied in continuous bands on one or both sides of the row, which is known as row placement.

Fertilizer applications

d) Pellet application

It refers to the placement of nitrogenous fertilizer in the form of pellets 2.5 to 5 cm deep between the rows of the paddy crop.

The fertilizer is mixed with the soil in the ratio of 1:10 and made small pellets of convenient size to deposit in the mud of paddy fields.

Advantages of placement of fertilizers

The main advantages are as follows:

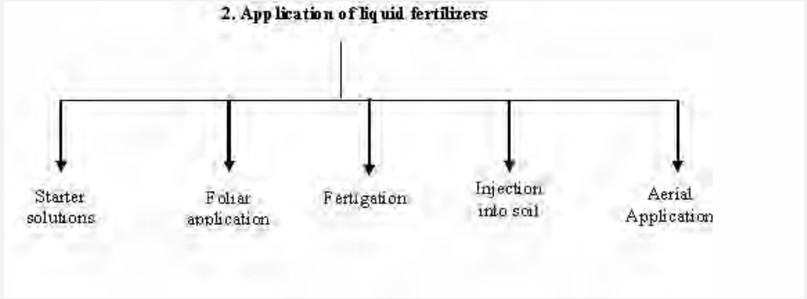
i) When the fertilizer is placed, there is minimum contact between the soil and the fertilizer, and thus fixation of nutrients is greatly reduced.

ii) The weeds all over the field can not make use of the fertilizers.

iii) Residual response of fertilizers is usually higher.

iv) Utilization of fertilizers by the plants is higher.

Fertilizer applications



- iv) Utilization of fertilizers by the plants is higher.
- v) Loss of nitrogen by leaching is reduced.
- vi) Being immobile, phosphates are better utilized when placed.

- Following are the common methods of applying liquid fertilizers

- a) Starter solutions
- It refers to the application of solution of N, P2O5 and K2O in the ratio of 1:2:1 and 1:1:2 to young plants at the time of transplanting, particularly for vegetables.
- Starter solution helps in rapid establishment and quick growth of seedlings.
- The disadvantages of starter solutions are
- (i) Extra labour is required, and
- (ii) the fixation of phosphate is higher.

Fertilizer applications

- b) Foliar application
- It refers to the spraying of fertilizer solutions containing one or more nutrients on the foliage of growing plants.
- Several nutrient elements are readily absorbed by leaves when they are dissolved in water and sprayed on them.
- The concentration of the spray solution has to be controlled, otherwise serious damage may result due to scorching of the leaves.
- Foliar application is effective for the application of minor nutrients like iron, copper, boron, zinc and manganese. Sometimes insecticides are also applied along with fertilizers.

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Fertilizer applications

- c) Application through irrigation water (Fertigation)
- It refers to the application of water soluble fertilizers through irrigation water.
- The nutrients are thus carried into the soil in solution.
- Generally nitrogenous fertilizers are applied through irrigation water.
- d) Injection into soil
- Liquid fertilizers for injection into the soil may be of either pressure or non-pressure types.
- Non-pressure solutions may be applied either on the surface or in furrows without appreciable loss of plant nutrients under most conditions.
- Anhydrous ammonia must be placed in narrow furrows at a depth of 12-15 cm and covered immediately to prevent loss of ammonia.

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Fertilizer applications

- e) Aerial application.
- In areas where ground application is not practicable, the fertilizer solutions are applied by aircraft particularly in hilly areas, in forest lands, in grass lands or in sugarcane fields etc.

How to become a TVET provider

COTVET accreditations

Informal TVET provider

TVET CENTRE collaboration

COTVET accreditations

You take application form and complete it with COTVET

You pay the appropriate application fee (Centre and course)

Inspection and approval by COTVET

Informal TVET provider

TVET provider can be formal or informal

Proficiency certification possible for informal TVET providers

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TVET CENTRE collaboration

One important strategy to use to surmount some of the requirements is to have an effective collaboration with TVET Centre already accredited.

Hosting trainees

Basic principles for success

Trainee control

Effective training results for informal settings

Basic principles for success

Planning to host trainees

Plan Training content and deliverables

Plan training activities and the desired results

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Trainee control

Consider trainees demography – age, culture

(taboos & pecking order, social/ community status,

Set ground rules and consequences/reward system

Collective adjudication of issues

Effective training results for informal settings

Motivation

Self evaluation

Participatory approaches

Use of local strategies

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Thank you!