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Step Down Training Modules

By:

Regenerative Component (RA)

Sasakawa Africa Association
No. 8, Kura Road, Off Magajin Rumfa Road

2025

Module 1

Concept of Climate Change

Unit 1

45 mins

Introduction to Regenerative Agriculture (RA)?

Objectives

1

To understand what

Climate Change

is all about

2

To know the

causes, effects and solutions.

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What is Climate Change?

Climate change is the change in weather patterns or conditions over a long period.

The facilitator should enquire and discuss the weather history of the designated state/location/ area over the decades or for some time now, as an example.

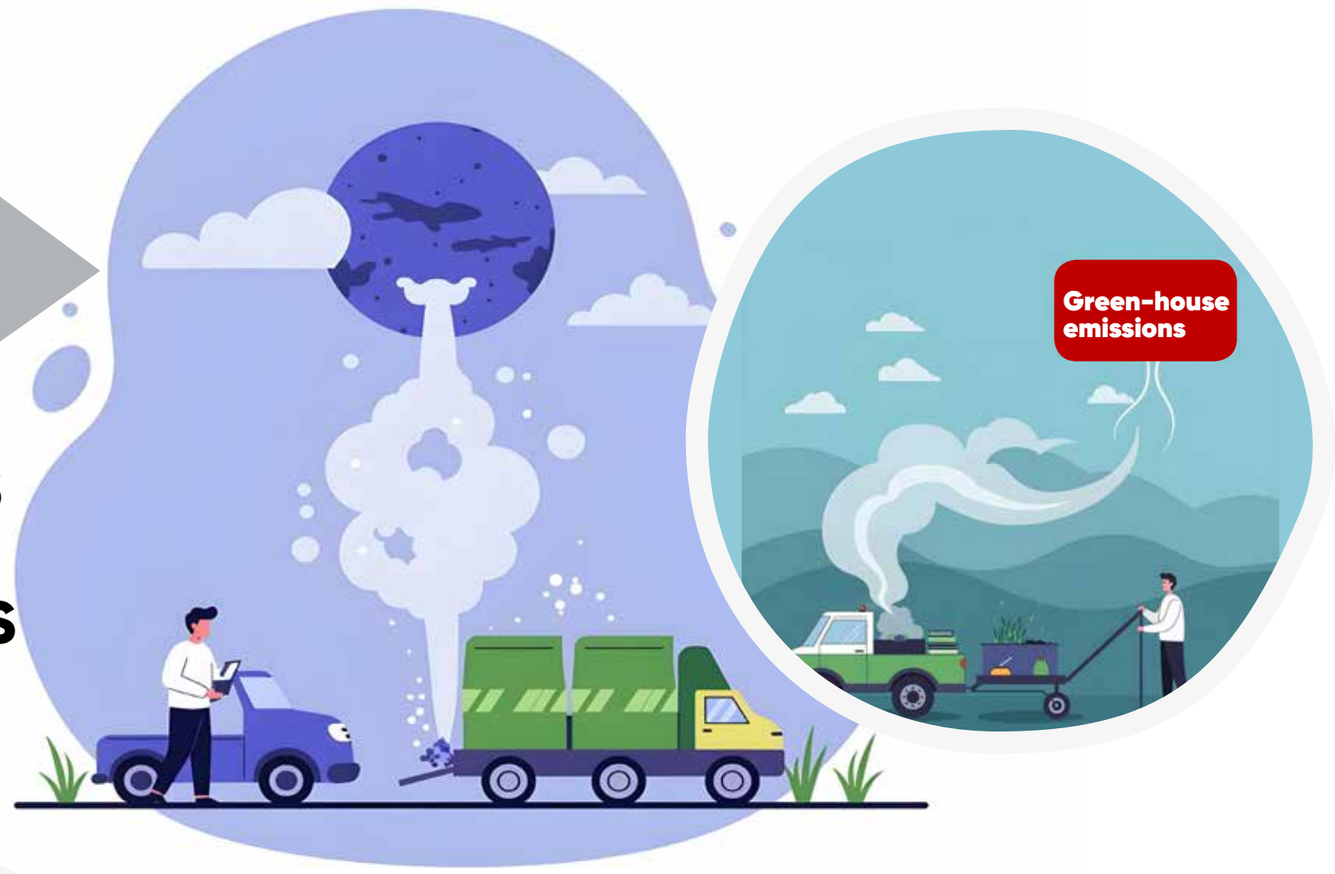
Effect of Agriculture on Climate Change

Agricultural practices

It has been proven that several human agricultural activities contribute to climate change.

Some human agricultural activities that contributes to climate change are:

1 Fertilizer application method

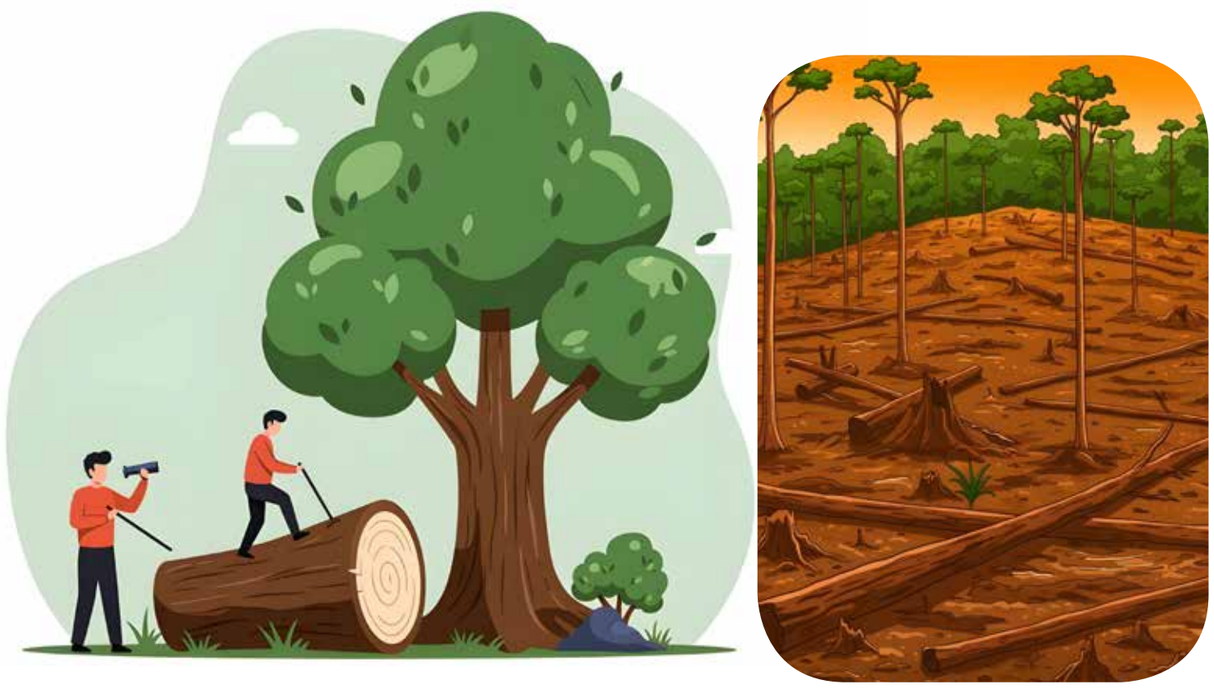


Broadcasting fertilizers leading to increased Green-house emissions (nitrous oxide)

2 Rigorous tilling

Tilling rigorously tends to disrupt the soil properties like soil structure and exposes useful soil microbes.

3 Deforestation



Cutting down trees without a proper plan to replace another tree contributes to climate change

4 Bush Burning

This had been the practice of some farmers. It destroys useful soil microbes and leads to reduced soil fertility.

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Intensive Mechanization

5

Similarly to vigorous tilling, using heavy machines like tractors on the soil leads to soil compaction and soil disruption.

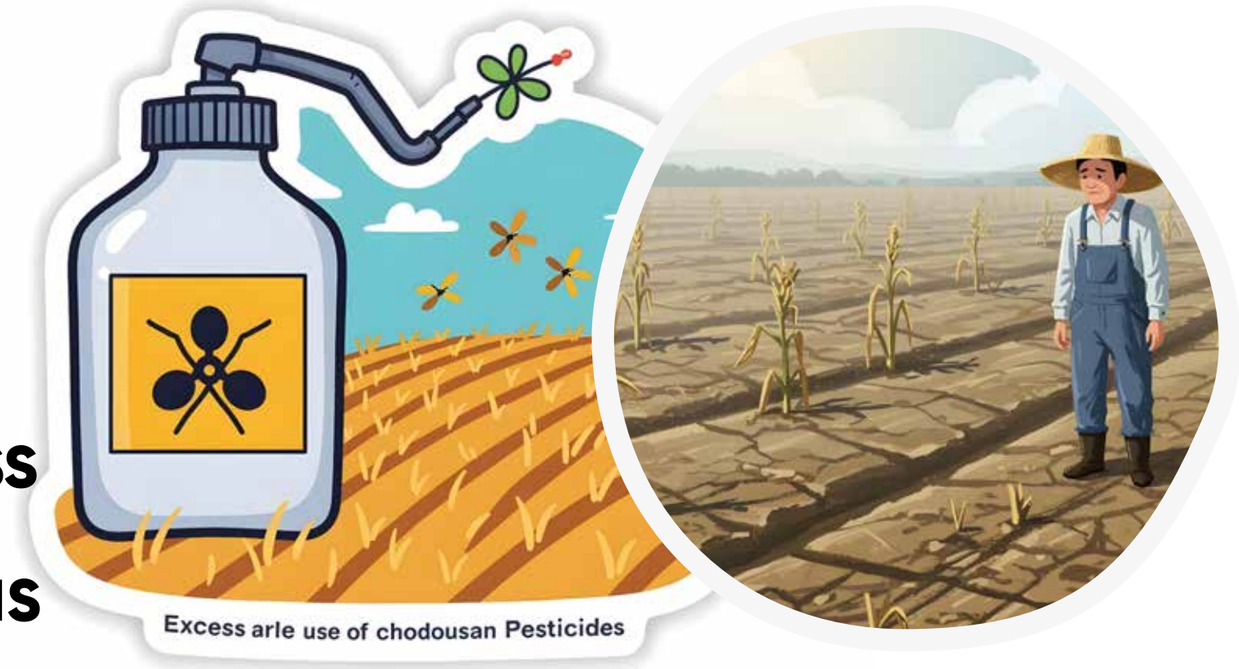
6

Animal Manure

Animal waste emits methane, which also contributes to greenhouse gas accumulation.

Excess use of pesticides

7



It has been proven that excess or overuse of pesticides also contributes to greenhouse gas emissions, leading to climate change. Farmers should observe the appropriate usage of pesticides.

8

Other practices that cause climate change is industrial activities, which emit heavy and toxic gases that contribute to greenhouse gas emissions.

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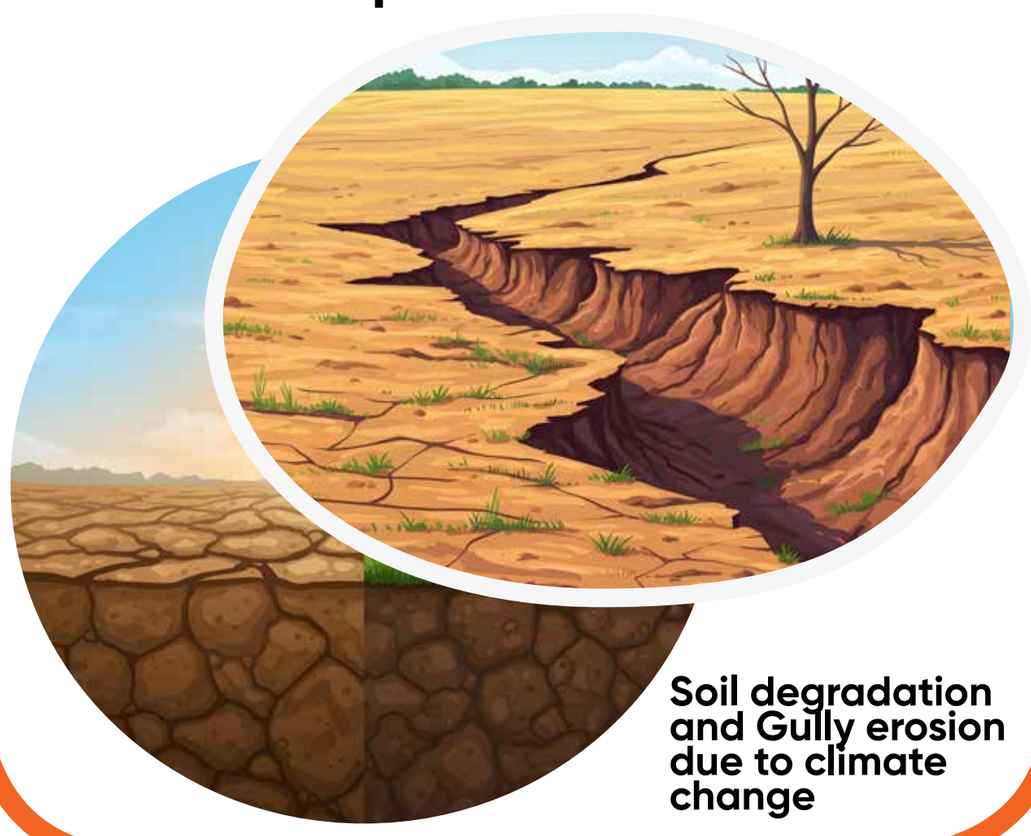
Effect of climate change on agriculture

a Soil Degradation

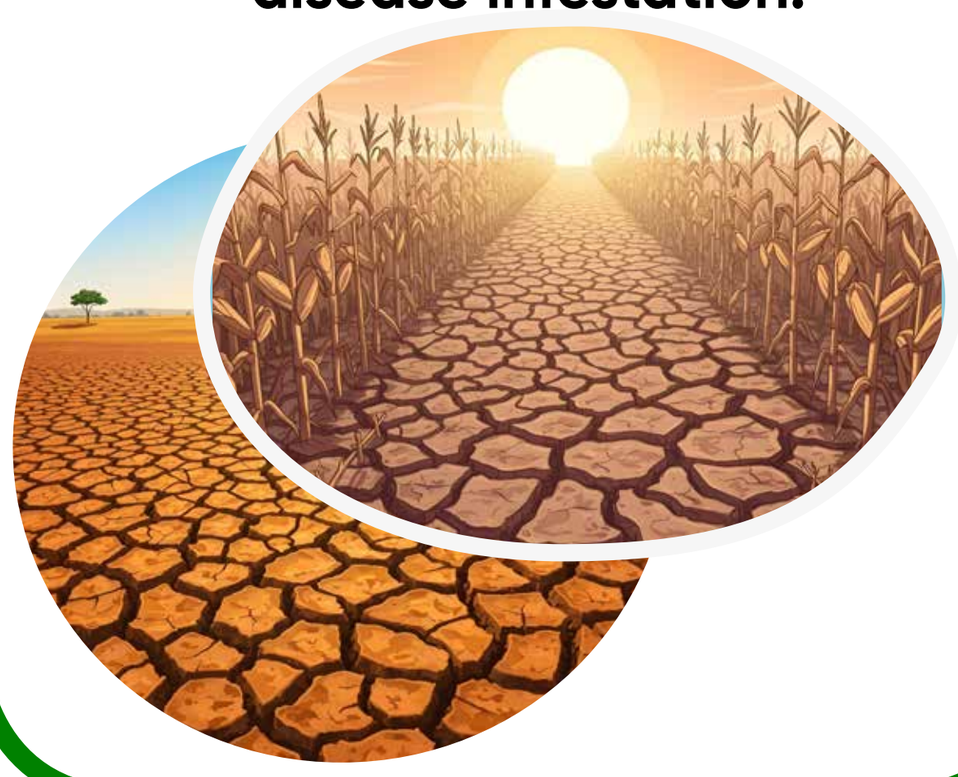
Several lands are destroyed due to soil degradation due soil erosion, Indiscriminate use of fertilizers, over exploitation year in year out, lack of proper soil fertility management practices causing poor crop growth, reduced soil fertility and generally poor soils.



Soil degradation and Gully erosion due to climate change

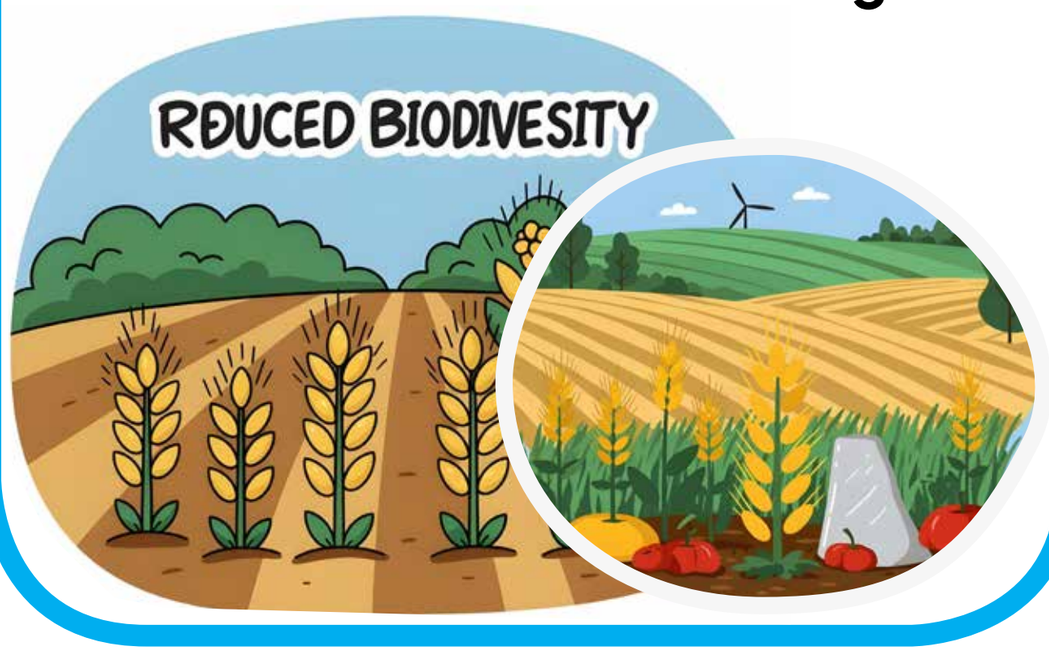
b Irregular Temperature/ Rainfall

Climate change has caused excess rainfall, reduced rainfall, early rain cessation, dry spells, drought, excess temperature (heat or cold) and reduced temperature (heat or cold). This leads to reduced yield, poor crop growth, increased pest and disease infestation.



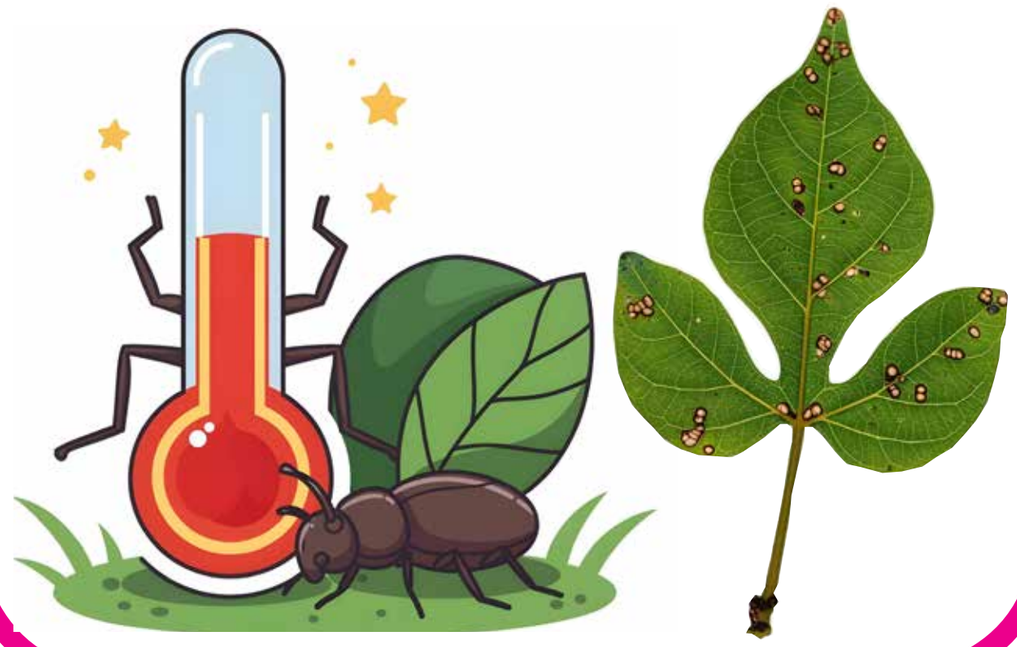
c Reduced Biodiversity

Climate change has led to reduced crop diversity, i.e. having several crops on a field due to shorter or longer temperatures or rainfall. Vital insects like butterflies, aiding pollination, are gradually being reduced in the field due to climate change.



d Pest and Disease Occurrence

Irregularities in temperature due to climate change have resulted in new and increased pest and diseases which increases cost of production.



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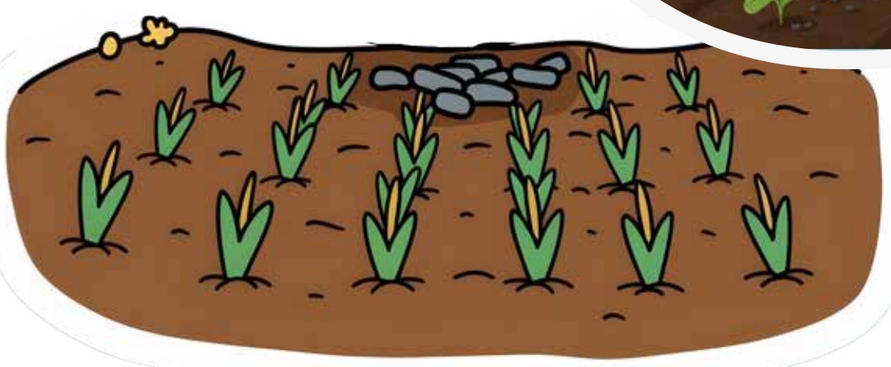
Solutions to the effects of Climate change in Agriculture

1 Fertiliser Application

Burying fertilizers instead of broadcasting them reduces GHE.



Burying fertilizer when applying

2 Afforestation

This involves re-planting or replacing trees after cutting them off. This would help in carbon sequestration and help balance the ecosystem.

Re-planting trees after cutting down

3 Minimized soil disturbance

This involves reducing tilling on the field and replacing heavy mounted tractors with a simpler one. This helps reduce the impact on the soil.

Replacing heavy-mounted tractors with simpler tractors for tilling.

4 Manure management

Proper storage of manure and incorporating it thoroughly with the soil reduces methane emissions compared to when it's dumped on the field. Also note that dried manure left on the field reduces its nutrients, like moisture and microbes, as it's been exposed to harsh environmental conditions.

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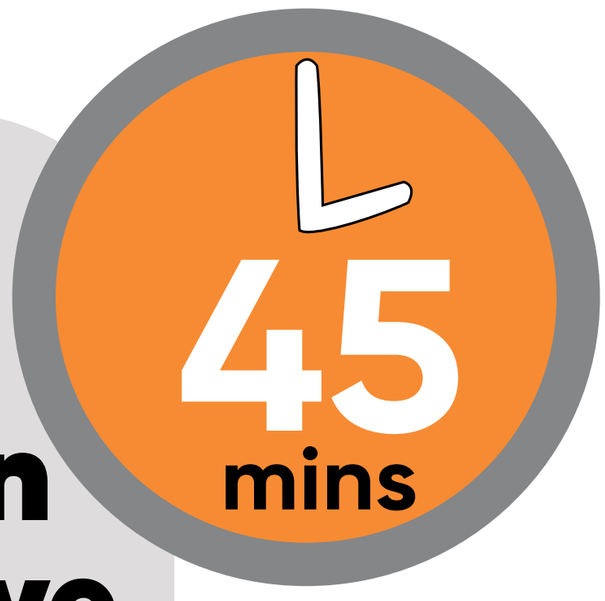
Unit 2

Introduction to Regenerative Agriculture (RA)?



Objectives

1

To know the difference between regenerative agriculture (RA) and Traditional/ conventional agriculture.

2

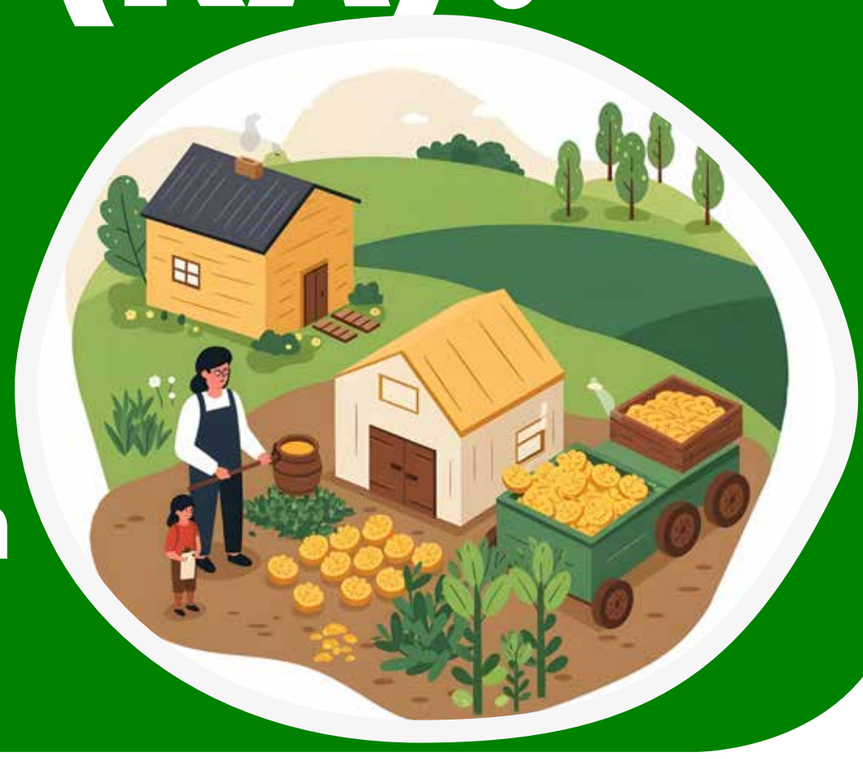
To understand the importance of RA between RA over Traditional/ conventional agriculture.

3

To understand the integrated soil fertility management ISFM

What is Regenerative Agriculture (RA)?

Regenerative Agriculture is simply a body that combines different practices (some of which are indigenous) to address the issue of climate change, soil restoration and maximization of yield with minimum inputs. This targets the 4Rs.



R=Right Amount

R=Right Time

R=Right Method

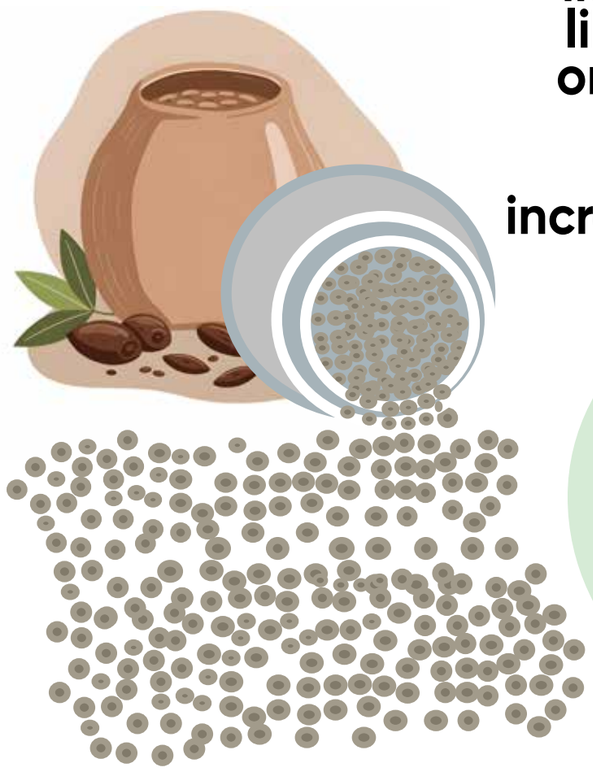
R=Right Quality

It focuses on the impacts of regenerative agricultural activities on ecosystem in general, such as the environment, human health, soil health and economy.

While

Traditional/conventional deals with increasing productivity without proper consideration of the ecosystem, like the environment, soil and human health. This also consists of:

1. **Use of old seeds**



2. **Inappropriate method or Indiscriminate use of inputs (over application) like fertilizers, chemicals or pesticides (herbicides, insecticides). Excess applications lead to increased cost of production.**

3. **Over-cultivation of farmlands year in year out without adopting practices that restore the soil.**

4. **Intensive practice of monoculture farming system hence reduced crop diversity.**

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What is ISFM?

Integrated soil fertility management is simply defined as the combination of practices or approaches that are sustainable in improving and maintaining soil fertility and fertilizer usage for increased productivity. ISFM and RA share common benefits and practices.

Benefits of Regenerative Agriculture (RA)

1. Minimized input, thus reducing the cost of production.
2. Improves yield and ensures sustainable production.
3. Improved food security.
4. More healthy food production
5. Improved soil health and soil fertility
6. Regenerating the environment.

NOTE: In summary, the MAJOR principle of RA is ensuring Soil protection and maximum Soil cover at all times.

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Regenerative Agricultural Technologies

1 Demonstration of innovative soil cover practices:

Minimum soil disturbance

This entails the reduction of vigorous agricultural practices such as intensive mechanization (mounting heavy machinery), which disrupts the soil.

Practices

1 Minimum/ No tillage

Reduced tilling of the farm during land preparation.

2 Mulching

This refers to protecting the topsoil from the direct effects of climatic conditions (sunlight, erosion, evapotranspiration). Using rice husks, tree leaf litters, straws, crop residues to protect the soil surface.

3 Rescue Mulch

Planting indigenous crops that are not palatable or consumable to animals and also tolerate drought over a period of time (This could help protect the soil cover during the dry season). It could also be used as a border crop in some cases.

4 Crop residue

Leaving crop remains after harvest to protect the soil cover.

Importance

- Having soil cover protects soil from harsh climatic conditions such as wind erosion, high temperature, etc.
- Minimum tillage reduces the destruction of soil properties.
- Mulching, when properly done, reduces the cost of labor, cost and amount of herbicide usage.
- These technologies also help improve soil fertility.

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2 Demonstrating diversified multiple cropping systems to enhance biodiversity and farmers' income

Practices

Diversified Strip cropping/ rotation

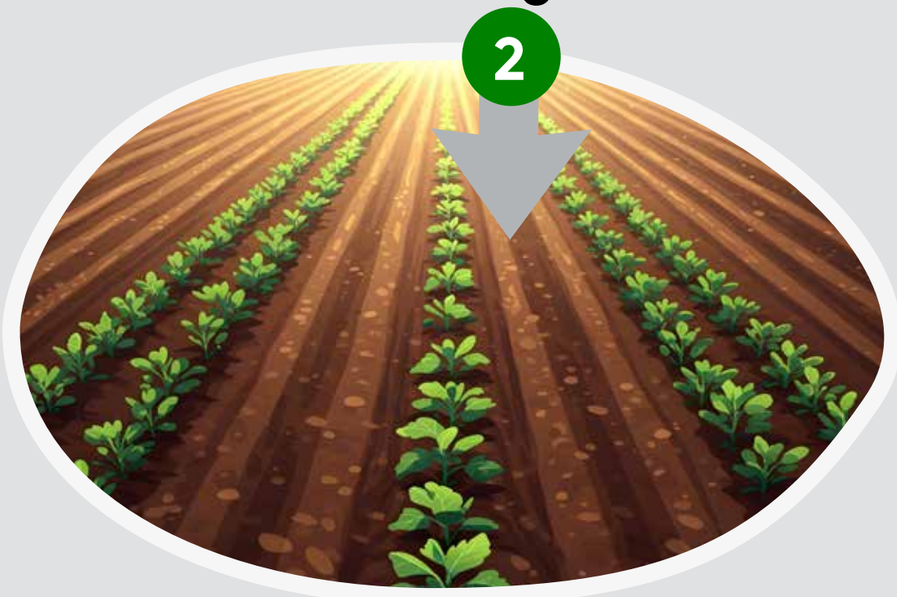
Planting and rotating multiple crops on strips in the same piece of land.

1

Strip cropping

Planting two crops in the same number of rows (mostly 4:4). These ridges are subsequently rotated in the following seasons.

2



Inter cropping

Planting crops in proximity on the same ridge, usually cereal and legume OR planting on different ridges, i.e., one cereal, one legume (1:1).

3

Cover cropping

Planting cover crops like soybean, cowpea, and groundnut to completely cover the soil surface.

4

Relay cropping

Introducing a crop to succeed the previous crop before harvesting it.

5

Importance

- Multiple cropping system in the same field reduces the total loss by a farmer in case one crop fails.
- Rotating cereals and legumes yearly helps regenerate or restore used nutrients. Hence improves soil fertility.
- More Income for the farmer.

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3 Demonstrating Innovations for Reducing Chemical Inputs in Regenerative Agriculture

Practices

1 Judicious application of Agro-chemicals

This includes precise application of chemicals (right application method, quantity, type, time).

2 Agro-chemical reduction by using natural management of pest, disease and weed control- Roselle/ Groundnut (in strips)

Biological method of controlling pest and disease to reduce the cost of chemical.

4 Demonstrating composting technologies

Practices

1 Biochar
Soil Amendment technology made from rice husk used to improve soil health and fertility over time

2 Organic manure
Taking animal waste to farmland to help enrich the soil and aid in retaining soil moisture.

3 Compost Manure
Artificial organic manure made from animal waste, green and dried leaves, and straws.

Importance

- These help to add nutrients, hence improving soil fertility.
- Over time, it reduces the amount of inorganic fertility required.
- Reduces the cost of production for the farmer.

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5 Demonstrating emissions reducing RA practices

Practices

1 Urea Deep Placement

Burying urea super granules to reduce GHG emission.

2 Agroforestry

Planting trees surrounding farm or environment.

Importance

- UDP Reduces emission of nitrous oxide to the atmosphere.
- USG Reduces wastage when compared to prill urea and method of application
- Agroforestry helps to prevent erosion
- Regenerates soil from fallen leaves.

6 Demonstrating Soil erosion

Practices

1 Stone bunds

These are barriers that help reduce or slow down soil runoff/erosion

2 Soil profile pits

This is a practice to showcase a rich fertile soil profile.

Summary

Facilitator is to revise asking the farmers interactively questions on this unit to ascertain the level of understanding of the introduced technology.

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