Climate Smart Agriculture Training
(May 14-18, 2025)

Training report presented by the CNTA

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Introduction

The increasing effects of climate change on the global environment and particularly on agricultural productivity has caused a major stir in several societies especially in Sub-Saharan Africa including The Gambia. This has called for the attention of major stakeholders, institutions and foundations in making attempts to curb the current situation to ensuring food security, wealth creation and enhanced livelihoods for the people. The Safe Hands for Girls (SHG) is one of such institutions aimed at promoting sustainable agriculture as a means of ensuring decent life for the people for the longer term through the creation of a Regenerative Hub in the Gambia.

Climate Smart Agriculture (CSA) plays a fundamental role in the battle to ensuring food security through its technologies and practices. The Centre for No-Till Agriculture (CNTA) at Amanchia in Ghana was asked by the SHG to train 24 participants (21 Farmers and 3 Agric. officers, including one Senior officer) to offer a CSA training from the 14th to 18th of May 2025 at the Agricultural Training Centre at Jenoi in the Central River Region of The Gambia.

The training presented to farmers and field officers the concepts, principles and practices of CSA through interactive lectures, videos/pictures and hands-on activities.

The goal of the training was to educate the participants on the importance to change from the conventional/traditional system of farming to a more sustainable farming method through the adoption of CSA. The training was focused on:

1. Concepts, principles and practices of CSA
2. Land preparation and planting
3. Soil health and soil cover
4. Weed control

The discussion of the concept and principles centered on the productivity of the fallow land and it was stressed that CSA aimed at replicating the fallow land conditions on the continuously cropped land so that the arable land could be nearly as productive as the fallow land.

1. Crops grown and production practices

Participants came from different districts in the Northern Bank Region, Central River Region and the Lower River Region and so a formal introduction had to be made. The self-introduction exercise was also used to outline the crops grown and the major production practices of the farmers.

Below is a summary of the crops grown by participants.

Region	Major crops grown
Lower River Region	Onion, Okra, Sweet Pepper, Tomato and Cabbage
Northern Bank Region	Rice, Groundnut, Lettuce, Cassava and Sweet potato

Central River Region	Rice, Garden eggs, Maize, Early millet and Fruit trees (Mango, Oranges and Lime)

It was interesting to note that put together, the three regions produce all the three basic food items ie, Vegetables, Food crops and Fruit trees.

Participants were made to list their major production practices because that in most cases determine the sustainability of their production enterprises and more importantly to give us a sense of the major areas of focus in our discussions during the training. Three key areas were mentioned:

Land preparation
- Clearing
- Burning
- Ploughing
- Ridging
- Mounding

Soil amendments
- NPK and Urea
- Compost
- Soil from refuse dump

Weed control
- Manual (hand picking and hoe weeding)
- Chemical

2. Major production problem

The major production problems identified by all the participants was declining crop yields and the main causes of the declining yields across all the regions were:

1. Manual land preparation leading to limited farm sizes
2. Flooding – restricting accessibility and washing away of farmlands
3. Difficulty in rice harvesting due to lack of appropriate harvesting tool
4. Insect pests and disease
5. Lack of water for the gardens
6. High weed pressure
7. Poor use of agrochemicals
8. Alkalinity in rice fields
9. High postharvest losses

Thus, all presentations, discussions and hands-on practices were scheduled and undertaken on the premise of the above-mentioned production practices and problems and how CSA practices could help reduce the negative impacts of the identifiable factors contributing to the declining agricultural productivity and the low incomes for the rural folks who are mostly farmers.

1. Training:

Training activities were structured into two - an indoor classroom discussion and hands-on field practices. (fig 1a&b).



Fig.1a &b. Discussions led by facilitator b. led by a participant

The training covered the concepts, principles, practices and benefits of CSA. It also included discussions on land preparation and planting practices, soil health and management practices, soil cover and weed control measures.

2. Introduction to the concept and principles of CSA

This session began with the discussion of a slide showing why shifting cultivation is no more a viable option for natural soil regeneration due to the longer cropping periods and shorter or no fallow periods. It therefore became evident that there was the need to find ways of enhancing soil regeneration to sustain the productivity of continuously cropped arable lands to support food security for the increasing human population.

The effects of poor land preparation (burning and ploughing) leading to bare fields at the time of planting were discussed together with the negative impacts of climate change on such bare lands. It was noted that to simulate natural conditions on the arable lands, the soils needed to be covered throughout the year and tillage needed to be reduced or eliminated wherever possible in addition to ensuring the planting of diversified crop species on the farmland. This paved the way for a thorough discussion of the three interlinked principles of regenerative conservation agriculture as required by climate smart farming ie:

1. Continuous no or minimal soil disturbance
2. Permanent soil cover
3. Diversified cropping systems

Crop-Livestock integration was noted to be very crucial in building synergy at the farm level and the need for enhancing the value of CSA with other complimentary and enabling factors such as integrated nutrient and pest management and timely execution of farm operations.

Participants were made to appreciate the differences between conventional farming and regenerative agriculture with regards to the key aspects of tillage, crop residue management and crop diversity. They got to understand that:

1. Ploughing in the long term destroys soil structure and contributes to declining soil organic matter and fertility.
2. Crop residues improve soil structure and that cover crops protect soil from erosion and limit weed growth and so the extensive removal of mulch as done by the farmers should stop.
3. Crop diversity helps to maintain fertility and breaks cycles of pests and diseases so they should rotate the crops in the gardens and must do intercropping wherever feasible to reduce the use of agrochemicals.

The key impact point from this session was that farming has to be sustainable and economical and that farmers have to create suitable conditions to support plant growth as it happens in the natural forest or fallow lands.

3. Evidence of the benefits of CSA

Pictorial evidence gathered over the years was shown to participants to build their confidence that the CSA technology really works. The pictures showed the variety of field situations and the various crops that had been planted over the years at the CNTA farm.

4. Land preparation and planting

Gathering and burning of residue and hoe ploughing were identified as the main land preparation practices undertaken by the farmers. These practices were identified among the major contributors of the problem stated earlier. An introduction to CSA highlighted these practices and their adverse effects on the land and soil properties.

Participants were made to demonstrate how they prepare their fields for planting (fig 2.) This involved slashing the existing vegetation and setting fire to the resultant mulch (fig. 3) to derive a clean seedbed completely devoid of cover. We demonstrated the right way of slashing to ensure uniform mulch cover through which planting can be done directly (fig 4). Planting directly on the mulch covered field was noted to be the No-Tillage planting.

Fig.2 Participants slashing.

Fig.3 Resultant heaped mulch.

Fig.4 Uniformly spread mulch

On crusted soils and soils with hard pans, participants were introduced to the use of the pickaxe and hoe for loosening the planting rows instead of ploughing the entire land area (fig. 5).

Fig. 5 Loosening just the planting rows with the hoe

Participants were shown videos of the operation of eco-friendly equipment from the CNTA farms that makes it possible to crop larger acreages. This was done to dispel the notion held by some of the participants that CSA could not be done on larger land areas. The roller crimper (fig.6) is used to kill and flatten the existing vegetation to form a carpet of protective mulch on the soil surface. The ripper (fig.7) is used to break crusted soils and hard

pans to increase the rooting volume and the no-till planter (fig. 8) used to plant directly on the mulch covered field.

Fig. 6 Roller crimper

Fig. 7 Ripper

Fig 8 No-Till planter

A video of the jab planter as a non-engine mechanical hand-held planter was also shown to the participants. It was stressed that row planting helps to ensure good crop population and makes it easy for in-crop management whilst leading to better crop yield. They were advised to refrain from planting by broadcasting the seeds.

5. Soil health and soil cover

The key impact point stressed during this session was that CSA seeks to keep soils alive and that it is only a living and healthy soil that can support good crop growth. Household food security is assured through the positive impacts on good crop growth when CSA is adopted. The causes of a sick soil were discussed and these included the following:

1. Mining agriculture – continuous harvest without replenishment of soil nutrients
2. Soil erosion – very clean seed bed preferable to most farmers leads to bare soil prone to accelerated erosion.
3. Bush burning leading to loss of organic matter and soil life
4. Breakdown of soil structure resulting from frequent and excessive ploughing
5. Soil compaction
6. Soil contamination

Participants were made to know that when a soil is healthy, it possesses the following characteristics:

1. It has higher number of soil organisms in it
2. It is high in organic matter
3. It is rich in soil nutrients
4. It is deep enough to accommodate large volume of plant roots
5. It has a good mixture of sand, silt and clay
6. It is not compacted

The following were noted as some useful visual indicators for farmers to tell if a soil is healthy:

1. Darker green colour of plants
2. Vigorous plant growth
3. High water infiltration (no ponding after rainfall)
4. Numerous earthworms, worm holes and, worm casts
5. Darker soil colour

Participants were taken through a thorough discussion of the key *agro-ecological practices* to achieve the required conditions of a healthy productive soil. The discussions centred on:
Crop diversification

- Multiple cropping
- Crop rotation
- Agroforestry

Soil management

- Cover cropping
- Green manures
- Mulching
- Compost application
- No-Tillage

Soil conservation

- Contour farming
- Grass stripping/living barriers
- Use of trash lines
- Check dams along gullies
- Tied ridging

The take home message was that the combined effects of several of these practices implemented simultaneously lead to a healthy soil capable of sustaining good crop growth.

Participants were introduced to the two main types of soil cover
Cover obtained from living plant materials - food/cash crops and cover crops and cover obtained from mulch or dead plant materials (crop residues and pruning from trees and shrubs). Participants were made to appreciate that this will also include all plant-based household refuse. It was noted that returning such household refuse to the farm for soil cover will instantly turn the waste into an asset for the soil.

Participants were encouraged to aim at using a combination of living plant and dead mulch to keep the soil permanently covered. This will mean that weeds that are slashed or uprooted within the farm are left in-between the crop rows to cover the soil. In the case of weeds uprooted by hand or with the hoe, the soil at the base would have to be shaken off to quickly dry the roots to prevent them from re-sprouting.

Pictures of several cover crop seeds were shown to the participants and their suitability for the different cropping systems discussed. The more aggressive ones such as Mucuna pruriens and Lablab dolichos were noted to be more suitable for short fallow systems as well as for relay planting into cereal crops such as maize, sorghum and millet. The less aggressive ones like Bush mucuna, Canavalia ensiformis and Green gram were note to fit well into the intercrop systems.

6. Weed control

Participants appreciated the fact that weeds are normally classified as plants growing where they are not wanted. However, some plant species are normally labelled as weeds.
Participants were advised to take weed control seriously because:

1. Weeds compete with crops for soil nutrients, water and light
2. Weeds host pests and diseases

3. Weeds contaminate crop yields and farmer's income
4. Controlling weeds could be a lot of work and can also be very costly

The cultural, physical and chemical weed control measures were discussed. The discussion focused on:

Cultural weed control

- Proper crop stand
- Intercropping
- Minimal soil disturbance
- Crop rotation
- Cover crops and mulch

Physical weed control

- Hand pulling
- Surface scratching with a hoe
- Slashing with a cutlass

Chemical weed control

- Judicious use of appropriate herbicides

Safe and efficient use of herbicides was discussed. Of particular importance was the ability of farmers to identify the level of toxicity of the various chemicals just by looking at the label and how to protect themselves in case they must use agrochemicals.

The Pongamia field

We visited the Pongamia clonal seed garden and as already noted by Mr. Konate and his group, the soil is very alkaline as traces of salt could be seen on the soil surface. For Pongamia this is not a problem as it exhibits the following properties

1. Wide Soil Tolerance
    - Considered a versatile plant that can adapt to diverse soil conditions, including those with high pH (alkaline)
2. Saline Tolerance
    - It also exhibits moderate to high tolerance to salinity, making it suitable for areas with salty soils.
3. Drought Tolerance
    - Known for its high drought tolerance, further enhancing its adaptability to various environments
4. Deep Root System
    - Its taproot system can reach significant depths, allowing it to access nutrients and moisture from deeper soil layers.

It was realized that the farm attendant needed to water the seedlings every day to get them to establish but there were concerns about the volume of water that could be stored in the overhead tank due to some problems with installation. It was therefore recommended that the seedlings be mulched to prevent excessive evaporation and to reduce the frequency of watering so that the attendant could have time for other field operations.

It was suggested that a pocket moisture meter be procured to help the attendant to know when the seedlings need to be watered to prevent over watering.

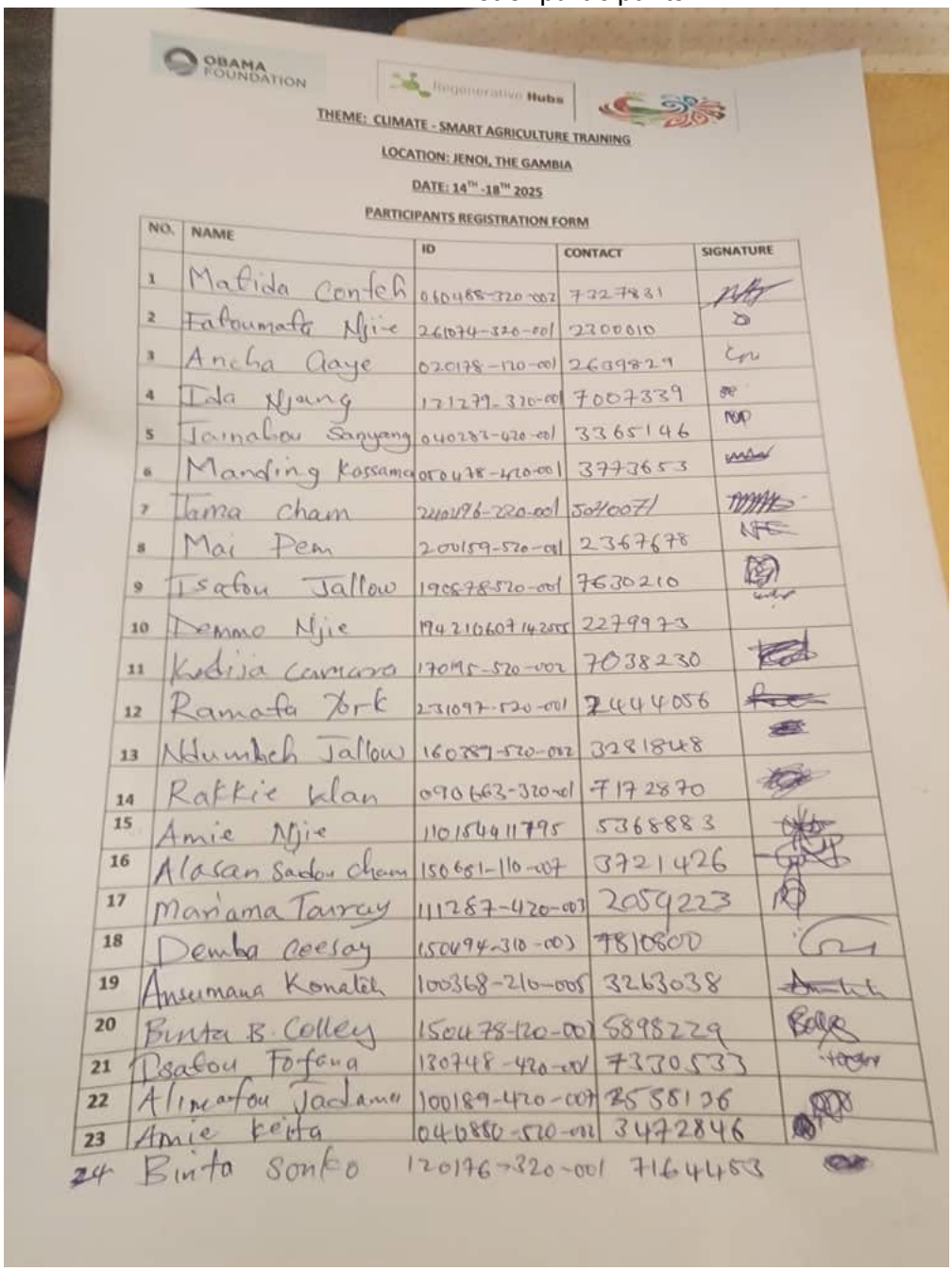
There were some stands with dead scions and those ones need to be carefully and permanently identified and either replaced or left to established and grafted in-situ.

The way forward

1. A select group of the participants to visit the CNTA in June to observe the field practices discussed during the training
2. Participants to organize community meetings to create awareness about the lessons learned during the training.
3. Participants to use their plots in the gardens to demonstrate the key practices learned during the training.
4. The formation of a WhatsApp platform to enable the sharing of ideas and experiences

Appendix A

List of participants



OBAMA FOUNDATION

Regenerative Hubs

THEME: CLIMATE - SMART AGRICULTURE TRAINING

LOCATION: JENOI, THE GAMBIA

DATE: 14TH -18TH 2025

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