Regional Focus, Experience and Overview

ETH-Soil project Work Plan

May , 2023

Dire International Hotel, Adama

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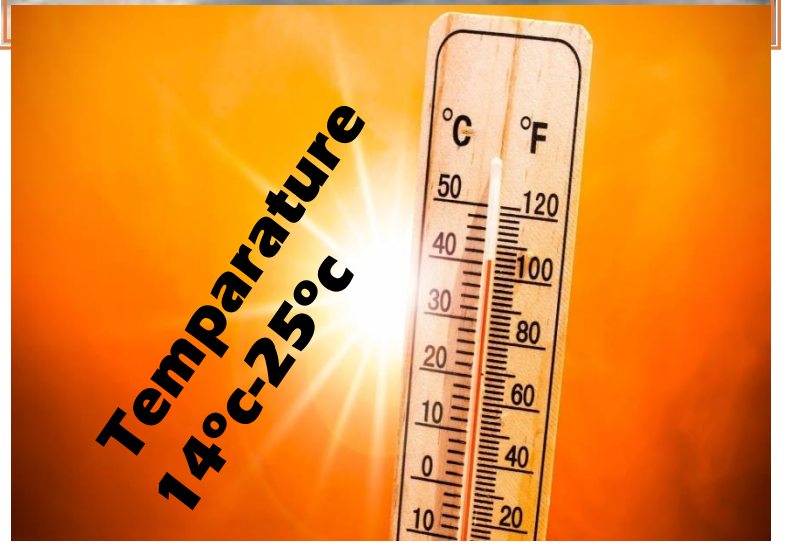
Overview of the Region

Oromia Region :

- 21 Zones
- 291 Woreda 's
- 6447 Kebeles
- 19 Urban

Agro ecology

Rain Fall 200
2600mm



Temparature
14°c-25°c

Frost 0.2 %

High land
14.5 %

Mid High
land 42.3

Low land
43%

Altutude 500-4377 m a.s.l

Introduction

- The agriculture sector remains a dominant sector in the Ethiopian as well as Oromia regional state economy and an important source of economic growth. More than 80% of the Ethiopian population is dependent on agriculture.
- Soil is the most important natural resource for agricultural production.
- Soil fertility and health is very crucial in increasing production and productivity and ensuring food security.

Challenges of Soil Health and Fertility

1. Soil Erosion

Factors like deforestation, improper land use, and intense rainfall events can exacerbate erosion.

2. Soil Degradation

Soil can degrade due to overuse, improper irrigation practices, excessive tillage, and the use of chemical inputs.

3. Loss of Organic Matter

Continuous cultivation without adequate organic matter inputs, such as crop residues and compost, can lead to a decline in soil organic matter. Organic matter is crucial for soil fertility, water retention, and supporting beneficial microbial communities.

Challenges of Soil Health and Fertility

4. Nutrient Depletion

Intensive monoculture and imbalanced fertilizer use can deplete specific nutrients from the soil.

5. Soil Compaction

Heavy machinery and equipment can cause soil compaction, reducing pore spaces and hindering water infiltration, root growth, and the movement of soil organisms.

6. Soil acidity

In large parts of the country high rain fall, application acid-forming chemical fertilizers, removal of crop residues, and parent material of the soil are the causes for soil acidification.

6. Salinization

Over-irrigation in arid regions can lead to the accumulation of salts in the soil, making it unsuitable for most crops.

Management of Soil Health

1. Crop Rotation

Planting different crops in a planned sequence can help break pest and disease cycles, prevent soil nutrient depletion, and enhance soil structure.

2. Cover Cropping

Sowing cover crops during fallow periods or between main crops can protect the soil from erosion, improve organic matter content, and fix nitrogen in the soil.

3. Mulching

Applying organic mulch (e.g., straw, leaves, or compost) on the soil surface helps retain moisture, moderate soil temperature, and enhance organic matter content as it breaks down.

… Management of soil health

4. Composting

Compost is a valuable source of organic matter and nutrients that can be added back to the soil, improving its fertility and overall health.

5. Reduced Tillage

Minimizing or eliminating tillage reduces soil disturbance, prevents erosion, and preserves soil structure.

6. Avoiding Soil Compaction

Reducing heavy machinery use during wet conditions can prevent soil compaction, which hinders root growth and water infiltration.

… Management of soil health

7. Balanced Fertilization

Applying fertilizers based on soil tests and crop needs ensures that essential nutrients are replenished without causing imbalances or excesses that could harm soil health.

8. Bio char Application

Bio char, a form of charcoal produced from organic waste, can be incorporated into the soil to improve water retention, nutrient availability, and microbial activity.

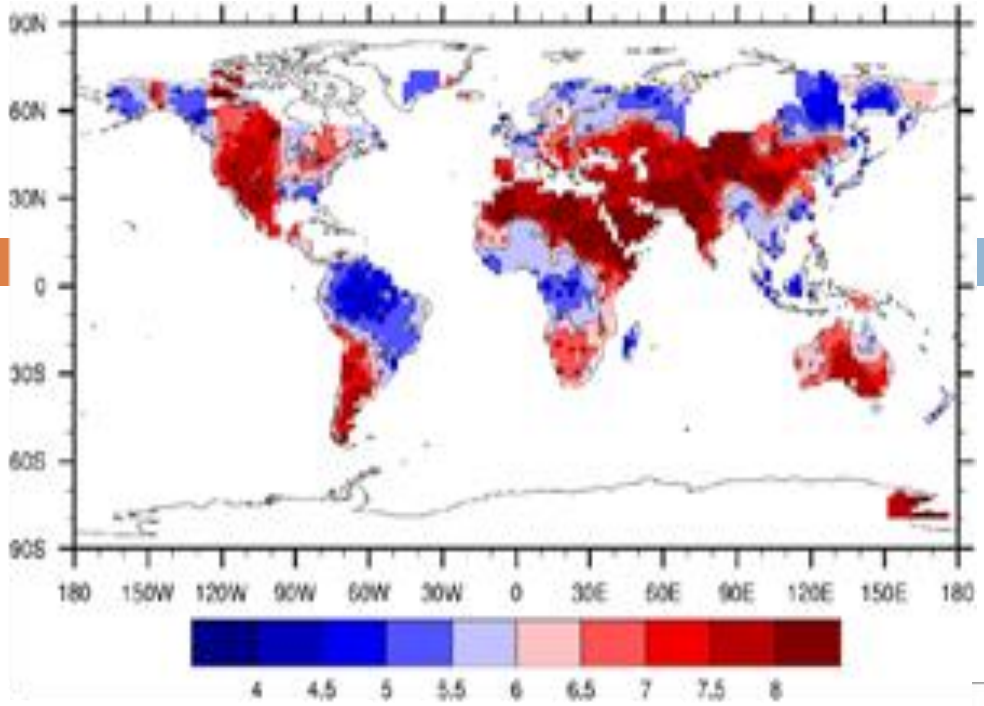
9. Conservation Practices

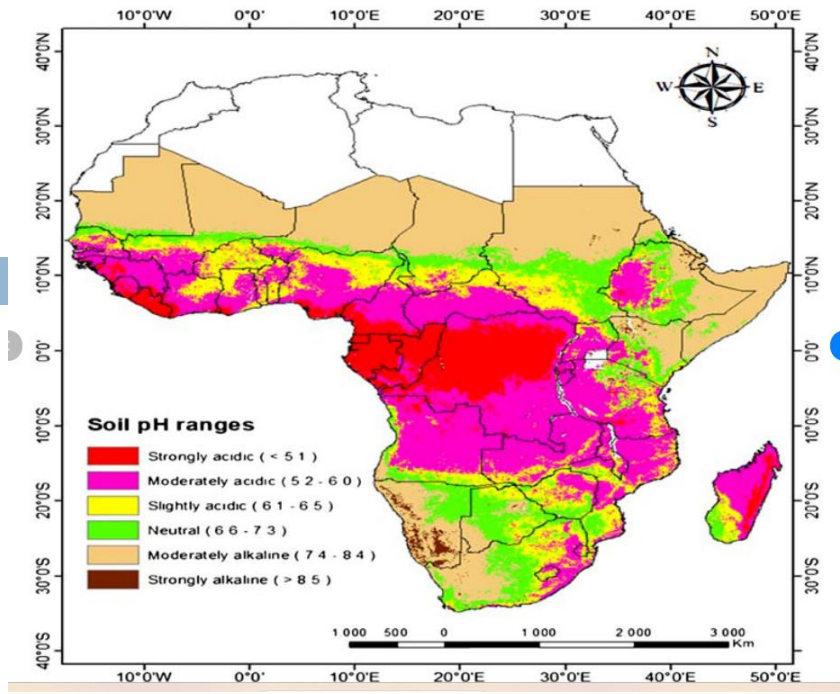
Implementing contour plowing, terracing, and buffer strips can control erosion and protect soil from degradation.

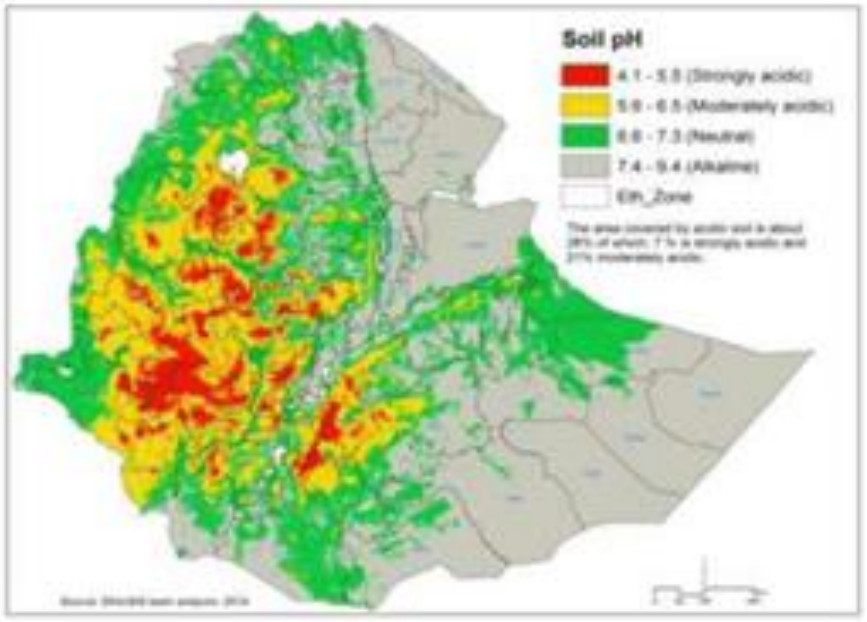
Soil acidity status and Management

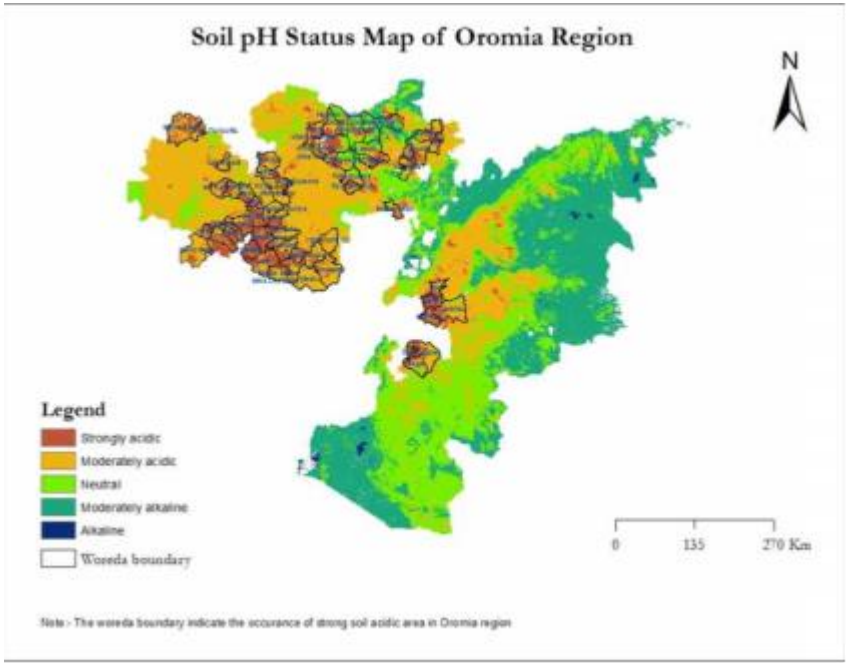
Soil acidity is a pressing issue in Ethiopia, more than **43%** of Ethiopian farmland is affected by soil acidity problem where major **staple food crops are grown**, and it leads to significant crop yields **reduction and in severe cases**, may resulted in complete crop production loss and thereby contributed to **food insecurity.**

- **50% of the world's** agricultural land
- **22% to the African** Continent
- As a **country of 43%**
- Oromia Region **28% or 1.79** mill hectares of agricultural land is affected by the soil acidity.


90N
60N
30N
0
30S
60S
90S
180 150W 120W 90W 60W 30W 0 30E 60E 90E 120E 150E 180
4 4.5 5 5.5 6 6.5 7 7.5 8


10°0'W 0°0' 10°0'E 20°0'E 30°0'E 40°0'E 50°0'E
40°0'N 30°0'N 20°0'N 10°0'N 0°0' 10°0'S 20°0'S 30°0'S 40°0'S
N
W E
S
Soil pH ranges
Strongly acidic (< 5 1)
Moderately acidic (5 2 - 6 0)
Slightly acidic (6 1 - 6 5)
Neutral (6 6 - 7 3)
Moderately alkaline (7 4 - 8 4)
Strongly alkaline (> 8 5)
1 000 500 0 1 000 2 000 3 000
Km


Soil pH
4.1 - 5.5 (Strongly acidic)
5.6 - 6.5 (Moderately acidic)
6.6 - 7.3 (Neutral)
7.4 - 9.4 (Alkaline)
Eth_Zone


Soil pH Status Map of Oromia Region
N
Legend
Strongly acidic
Moderately acidic
Neutral
Moderately alkaline
Alkaline
Woreda boundary
0 135 270 Km
Note - The woreda boundary indicate the occurance of strong soil acidic area in Oromia region

Management of Soil Acidity

Liming

Lime (oxide and hydroxide of Ca and Mg) application has been recognized and used as the main practice for ameliorating strong acidity which curtails the availability of nutrients required at high amounts in soils for maximum yield.

Organic fertilizers

Organic fertilizer which can supplies multiple nutrient elements to the crop and at the same time, **maintains soil organic matter content.**

...Management of Soil Acidity

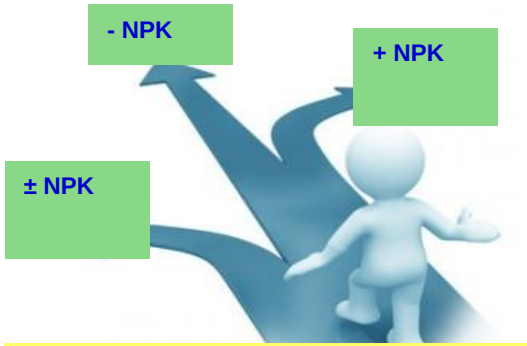
Selecting or Using Acid Tolerant Crop Varieties

Selecting and/or using acid tolerant crop varieties on acidic area can reduce the impact of soil acidity.

Integrated soil Fertility Managements

An integrated organic, inorganic, and improved germplasm amendment with different material of plant and animal origin which is more or less decomposed and can be added to the soil to improve soil physical, chemical, and biological properties as well as reinforce the diversity and function of soil microorganisms.

ISFM principles and component technologies



Fertilizer Decision Support Tool

Reduced Cow Dung Burning

Reduced losses of Cow Urine

Efficient Use of Resources

Biological N

Fuel Efficient Stove

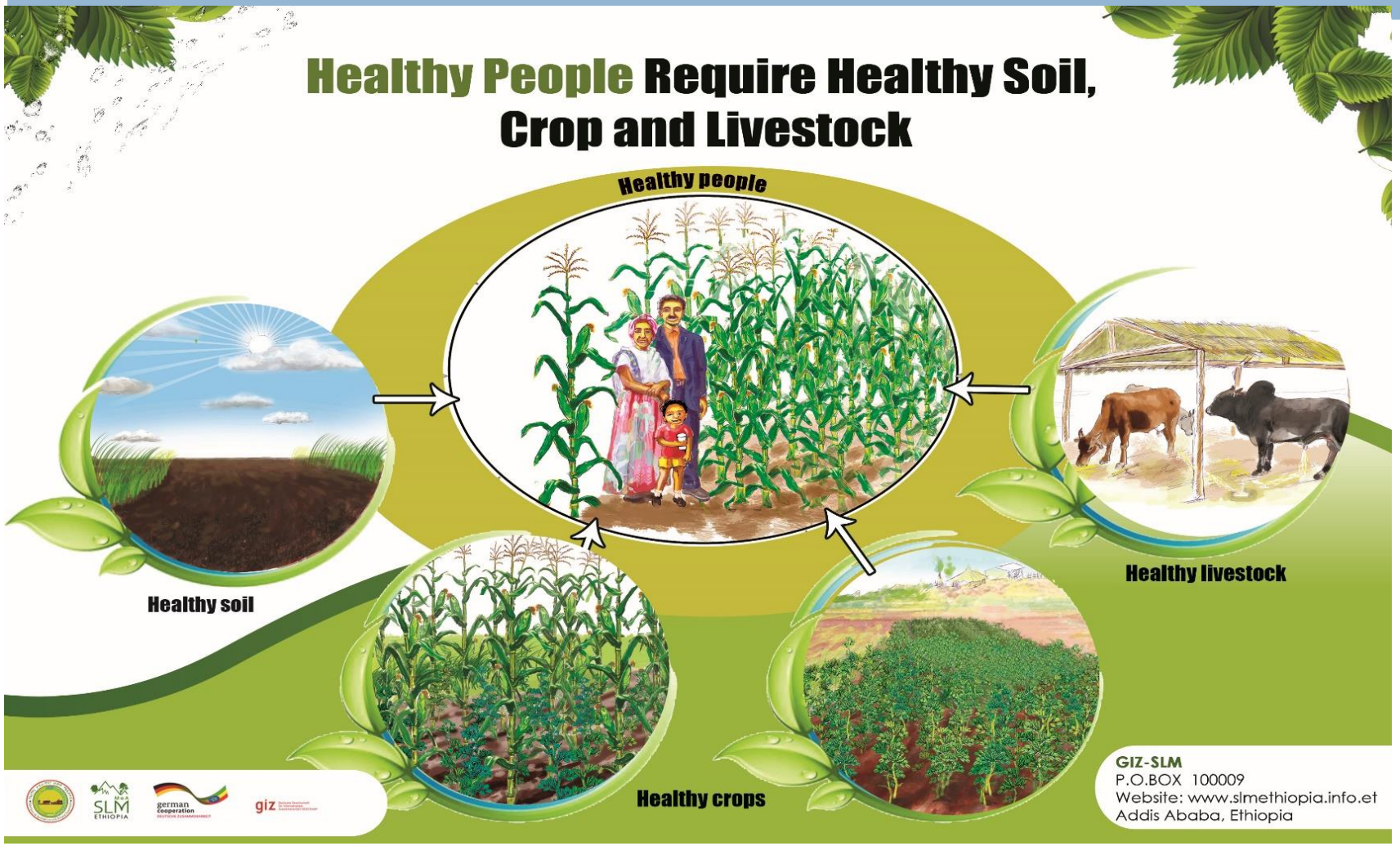
Targeted fertilizer placement

Awareness Raising on ISFM

- **Human nutrition starts in the soil!**

- **Low nutrients in soil ⇨ in plant ⇨ in food can cause severe deficiencies in humans**

ETH-SOIL


Healthy People Require Healthy Soil, Crop and Livestock
Healthy people
Healthy soil
Healthy livestock
Healthy crops
GIZ-SLM
P.O.BOX 100009
Website: www.slmethiopia.info.et
Addis Ababa, Ethiopia

Guder Lime Factory

Lime application

Lime Production and transportation

Lime transportation from Gudar

Experience Sharing and Mega Field day (2023)

Demonstration

Vermi compost production

Vermi compost production by female farmers

Compost preparation

Different Demonstration on green manuring

Green Manuring

M/Kegna Woreda

Sokoru Woreda

Improved seed Multiplication of lupine

G/Bila Woreda

Beddelle Woreda

Conservation Agriculture Practice

L/Dulecha Woreda

Conservation Agriculture Practice

Gachi Woreda


TECNO
POP 3

Verm culture distribution as a Region

Verm culture and composting technology; from one farmer reach out to;

- ✓ **21 Zones**
- ✓ **275 woreda's**
- ✓ **2854 kebeles**
- ✓ **1197 FTC**
- ✓ **371 nursery sites**
- ✓ **399,140 farmers as regional aspects .**
- ✓ **265 Big Vermi culture center will be constructed.**

Jimma, Gera

Jimma, Shabe Sombo

Jimma, Saka Chokorsa

Vermi culture center

Shashamane

Shalla

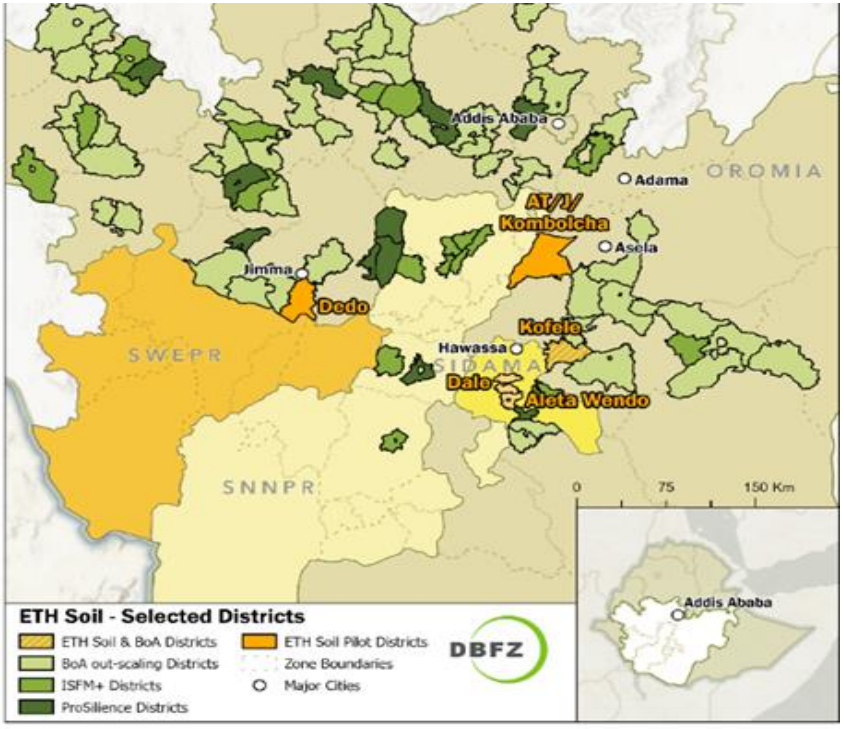
Buno Bedele, Gachi Woreda

ETH-Soil project focuses and Plan of 2024

- The German government has long since supported Ethiopian efforts to build technological capabilities, infrastructures and economic opportunities via the German Federal Ministry for Economic Cooperation and Development (BMZ).
- The German biomass research centre, DBFZ, has been entrusted to contribute its expertise : implementation of the ETH Soil project.
- The ETH-Soil project focuses on the use of residual biomass in pyrolysis, biogas and composting plants. Alongside energy production, the resulting charcoal, nutrient-rich fermentation products and compost shall be used in material form as bio fertilizers and applied to degraded fields.

… ETH-Soil project focuses and Plan of 2024

Organise and implement farmers' trainings on bio char and BBF application in Dedo (100 farmers), AT/J/Kombolcha (80 farmers) and Kofele (100 farmers) by 2024.



Activities of the plan

- Translation of information/training materials for Zonal and Woreda Officials based on DBFZ training materials in English language.
- Elaboration of training materials for farmers.
- Organisation and implementation of a Kick-off event.
- Briefing of Zonal and Woreda officials awareness raising for planned training activities.

… Activities of the plan

- Organization and implementation of awareness raising and pre-training activities in the three pilot Woredas.
- Selection of beneficiaries based on a mutually agreed rating grid (that balances the scale of land holding and farm family composition) for bio char distribution and BBF distribution in the pilot Woredas.
- Facilitate the distribution of high-quality bio char from 3 to 5 selected collection points in the pilot Woredas to volunteering pioneer farmers' composting or bio slurry facilities

… Activities of the plan

- Training on bio char production and BBF formulation and application in all three pilot Woredas of at least 280 persons including both beneficiaries receiving only bio char 130 and receiving BBF (50).
- Follow-up activities and coordination of "troubleshooting"-interventions (Jimma University and IQQO) by agricultural researchers,
- Organization / facilitation of awareness raising campaigns, "Farmers' Days" / exchange visits and the like in the 3 pilot Woredas.

… Activities of the plan

- Organization and implementation of subsequent monthly meetings of a steering committee where minutes are taken on the progress of project implementation
- Data recording of farming plots treated with BBF as well as those of the farming households' houses.
- Overall project coordination / management and reporting.

DBFZ

BIIROO QONNAA OROMIYAA
OROMIA BUREAU OF AGRICULTURE

ETH-SOIL

Galatooma !!!