ETH-Soil Project

In Collaboration with Oromia Agricultural Research Institute and DBFZ

Asella Agricultural Engineering Research Center

Bio-char Production from Invasive plant and Timber production Factory byproduct Waste

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Presentation outlines;

- Introduction
- Selection of potential biomass for biochar production
- Kon-tiki fabrication
- Biochar production
- Biochar Drying, Packing, and Storing

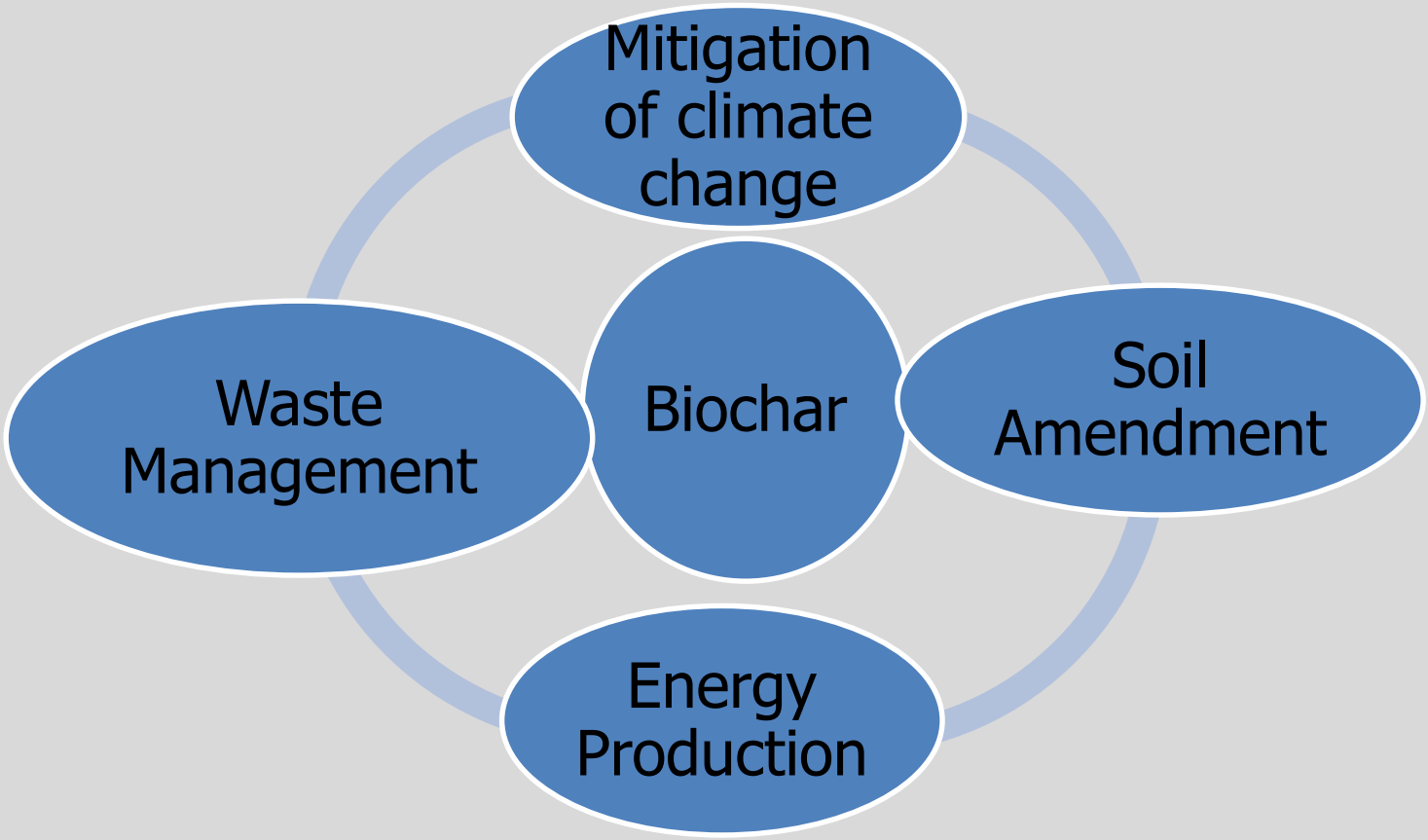
Introduction

- Biomass: living or once-living material, which is the feedstock (starting material) for making biochar
- Biochar: the carbon-rich product obtained when biomass, such as wood, manure or leaves, is heated in a closed container with little or no available air
- In more technical terms, biochar is produced by so-called thermal decomposition of organic material under limited supply of oxygen (O2),and at relatively low temperatures (<700°C)

Properties of Bio char

- High soil organic matter
- Enhanced cation exchange capacity (nutrient holding capacity)
- Improved water retention
- Beneficial soil microbial activity
- Enhanced fertility
- Stable (“aromatic”) carbon structure

Why do we need bio char?



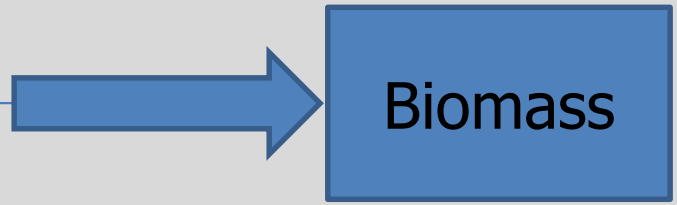
Selection of Potential Biomass for Biochar Production

The kind of biomasses selected and used for biochar production were:-

- Lanthana Camara(local name:- Tukre or Berna)
- Timber Factory byproduct waste(type of biomass:- Eucalyptus)

After selection of biomasses, the following activities were done:-

- Cutting
- Drying
- Collecting
- Transporting
- Sorting



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Kon-tiki type and Fabrication

Truncated square pyramid type kon-tiki		Cone type Kon-tik
Large kon-tiki (2)	**small kon-tiki(8)**	**Large kon-tiki(1)**
Height =35cm	Height =39cm	Height =120cm
Top width = 200cm	Top width = 100cm	Top width = 200cm
Bottom width = 100cm	Bottom width = 50cm	Bottom width = 85cm

- In average 1208 and 362.8 kg of biomass were fed to large and small Kon-tiki in one batch of production respectively
- Metal spade was used to unload the biochar produced in the large kon-tiki, while the small type kon-tiki were self-unloaded(flexible)

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Bio char Production

- We produce bio char twice a day
- We use ten (10) kon-tiki's to produce biochar
- Thirteen human power(9 male and 4 female) were participated per day
- It took 2:30hr in average for one batch of biochar production

Biomass sample preparation and data collection of biochar produced

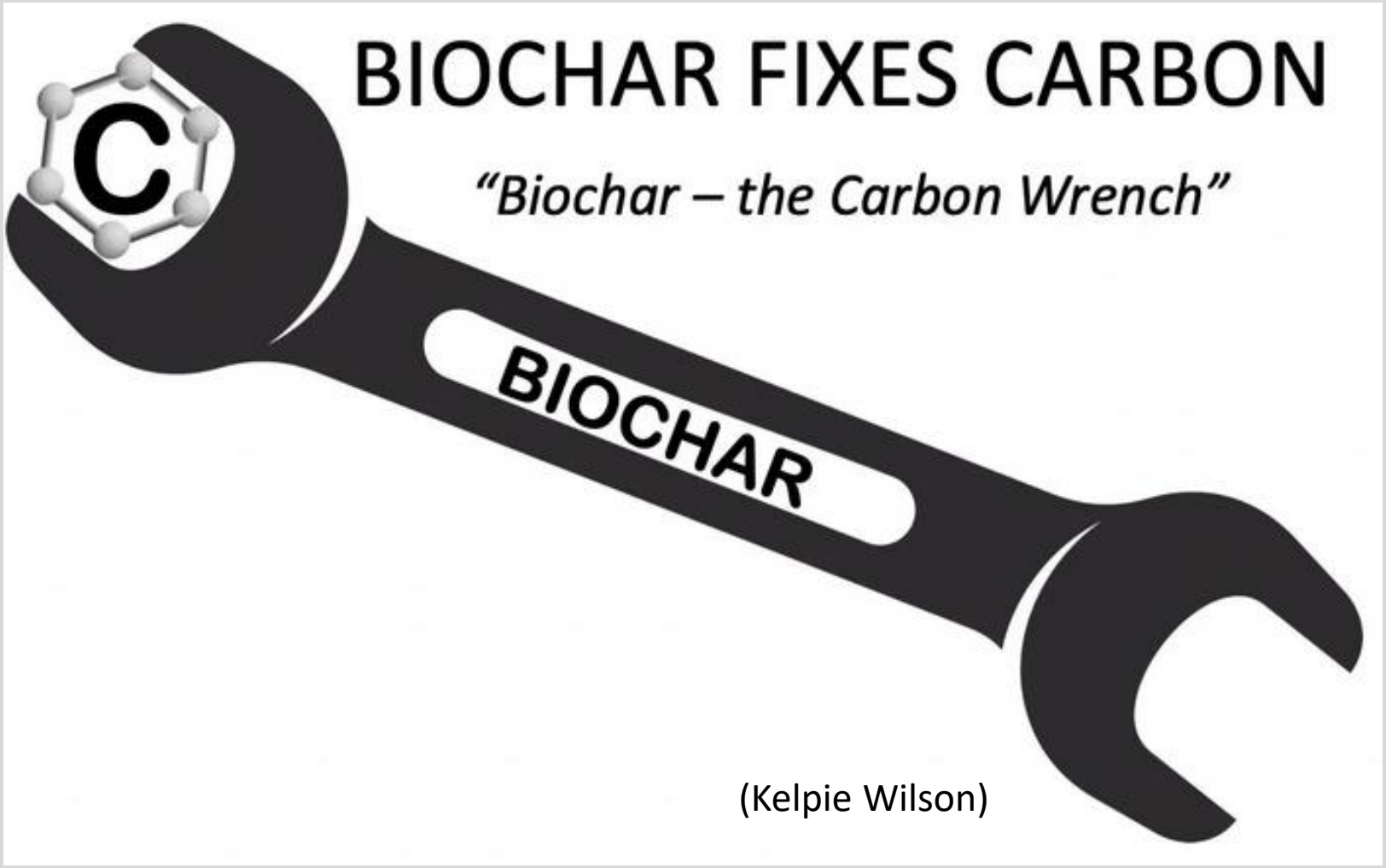
The experimental data collected during biochar production for both kon-tiki	
Large Kon-Tiki	**Small Kon-Tiki**
Biomass =1292.6kg	Biomass =356.25kg
Biochar=323.15kg	Biochar=97.97kg
25%	27.5%

Biomass and bio char moisture content measuring

Heaps of biochar produced

Biochar drying mechanism

Produced Biochar Weighing, Packing, and storing


BIOCHAR FIXES CARBON
"Biochar – the Carbon Wrench"
C
BIOCHAR
(Kelpie Wilson)

Thank You!