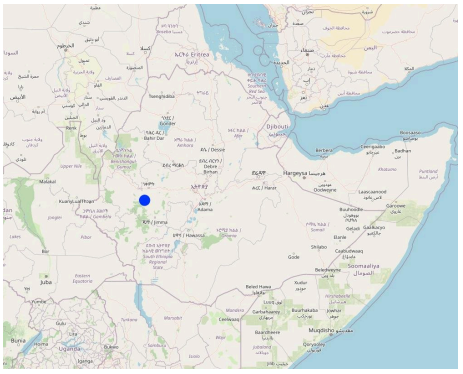
Maize stover retained on farmers field (GERBA LETA)

Crop Residue Management ( )

Hafte Midhani

Crop residue management involves leaving stover and other trash from cereal crops (including tef, wheat and maize), as well as haulms of legumes, in the field. Crop residues keep the soil covered, retain organic matter and moisture in the soil, and help to ensure better production.

Crop residue management involves leaving stover and other trash from cereal crops (including tef, wheat and maize), as well as haulms of legumes, in the field. Crop residue (CR) management is integral to soil health: it yields multiple benefits such as mitigating the risks of soil loss to water erosion, reducing the decomposition of organic matter and storing extra carbon. It also increases the fertility status of degraded soils and helps to improve soil structure and moisture properties. Degraded soils are at risk of tillage, water, and wind erosion. Soils degrade quickly when not covered and when no effort is made to increase organic matter levels or improve soil structure. Crop residue management plays an important role in arresting soil degradation and improving soil properties, and eventually increasing crop production. Therefore, it has positive economic and ecological functions. The aim of applying this technology is to improve soil fertility, reduce soil acidity and demands for synthetic fertilizers. Overall, crop residue management allows land users to sustainably use their land over a long period without losing its productive potential. In this part of Ethiopia, land users used to leave maize and millet stover in the fields but this is challenged by the prevalence of free (open access) grazing. Thus, controlling grazing is one prerequisite to ensuring adoption of the technology. Monocropping also reduces biomass production. Land users appreciate the extra grain yields from crop residue-rich farms. CR management also retains moisture and enables early tillage operations. In summary, the application of appropriate CR management provides multiple benefits. It mitigates the risks of erosion, reduces excessive mining of CR, reduces the rate of decomposition of organic matter, increases the fertility status of degraded soils, and increases crop production and sustainable productivity.



: Oromia,

: 10-100

- 36.33893, 8.50204

: (approx. 0.1-1 2)

?:

: 2015; 10 ( )

(> 50)

/

Tef straw harvested 30 cm high to retain crop residue on the farm. (GERBA LETA)

✓
✓ , ,
✓
/

✓ /

/

✓

- : - ( ), - , - , cereals - Tef : 1
?
? /

✓

- Wt:

- Cn: ( ), Ca:

- Pc: , Ps:

- Bc: , Bq: / , Bs: / , Bl:

✓
✓ /

SLM

- /

SLM

- A2: / , A3: (A 3.3: Full tillage (< 30% soil cover)), A6: (A 6.4:), A7:

- M2: /

- (**4 sanga** = 1ha)
- **ETB**
- ( ) 1 USD = 53.12 ETB
-

Change of the cost is related to the inflation and economic instability.

1. Mowing the crop by leaving some proportion on the ground. (/ : Harvesting)
2. Keep of livestock grazing (/ : Dry season)
3. Plow over the crop residue early on. (/ : Late in the dry season.)

1. Keep the farm with crop residue intact from livestock (/ : During off-season.)

( )

2500,0

< 250
251-500
501-750
751-1,000
1,001-1,500
☑ 1,501-2,000
2,001-3,000
3,001-4,000
> 4,000

☑

1947.0

The area received summer maximum rainfall.

Bedele

The uniform distribution of rainfall is helpful to incorporate the residue in time.

(0-2%)
☑ (3-5%)
☑ (6-10%)
(11-15%)
(16-30%)
(31-60%)
(>60%)

☑

0-100
101-500
501-1,000
1,001-1,500
☑ 1,501-2,000
2,001-2,500
2,501-3,000
3,001-4,000
> 4,000

☑ (0-20)
☑ (21-50)
(51-80)
(81-120)
(> 120)

( )
/ ( )
☑ (,)
/ ( )

(> 20)
/ ( )
☑ (,)
/ ( )

(>3%)
☑ (1-3%)
(<1%)

< 5
☑ 5-50
> 50

☑
/

( )
☑

( )

/
☑

☑

☑

SLM

( )
☑ (/)
/

☑ 10%
10-50%
50%

☑
☑ /

☑
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☑ /
☐ /
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☐ (,
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☐
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☐

☐
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☐

☐ < 0.5
☑ 0.5-1
☐ 1-2
☐ 2-5
☐ 5-15
☐ 15-50
☐ 50-100
☐ 100-500
☐ 500-1,000
☐ 1,000-10,000
☐ > 10,000

☑
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(.)

Land users are benefited from various financial institutions to access credit and other services. Various credit institutions and revolving funds were mentioned my the land users.

The purpose is to use less of crop residue for soil amendment than as fodder.

The purpose is to reduces

As it improves soil structure, moisture retention capacity, etc., the practice reduces risks of crop failure.

(
/)

/

The health condition is convergent with considerable harvest and food security.

SLM /

/

The health condition is convergent with considerable

harvest and food security.

The ground cover by crop residues inevitably contributes to the reduction of evaporation.

/

Improves on a gradual basis.

/

/

(

)

/

Crop residue may host some insects but obstruct the movement of others.

Increasing the moisture retention capacity of the soil improves crops' resilience to droughts and other adversity.

Accumulation of crop residue increases carbon storage via the reduction of emissions.

(-springs)

No facts are available to support the allegation. Besides, it needs long-term observation and documentation.

( )

(

)

Impact of greenhouse gases reduced with accumulation of crop residues.

Actually, the technology demands only labor costs for the protection of the farmland from grazing the leftover and to avoid illegal burning of crop residues.

:

( )

/

/

- [ ] 1-10%
- [x] 11-50%
- [ ] > 50%

?

- [ ] 0-10%
- [ ] 11-50%
- [ ] 51-90%
- [x] 91-100%

?

/

- [x]

?

/

- [ ]
- [ ]
- [ ] ( )

:

- It improves soil fertility on gradual basis.
- It assists to reduce soil acidity.
- Increases production and productivity.

:

- Absorbs and retain soil moisture for the crop to rely on for growth and grain filling as a coping mechanism to the unpredictable distribution of rainfall.
- It reduces soil temperature and smother the weeds.
- Sequesters carbon, a beneficial for climate change/variability.

/ / :

- Create tillage inconvenience as mechanization is less common among smallholders. Using the excessive residue as trash line support the purpose of soil and water conservation.
- Free grazing system and multiple uses of crop residue challenges retention of crop residue. Institutionalizing controlled grazing system is of paramount important.

/ / :

- Less fodder available for the livestock and other multiple uses of crop residues. Limit the amount of crop residue to be retained on the farm to 15 to 30 percent of the total non-grain biomass produced in the farm.

GERBA LETA

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: 6 2023 : 23 2024

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https://qcat.wocat.net/km/wocat/technologies/view/technologies_6644/

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Approaches: Integrated Soil Fertility Management (ISFM) https://qcat.wocat.net/km/wocat/approaches/view/approaches_6732/

- Alliance Bioversity and International Center for Tropical Agriculture (Alliance Bioversity-CIAT) -
- Soil protection and rehabilitation for food security (ProSo(i)l)

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- IIRR and ACT. 2005. Conservation Agriculture. A manual for farmers and extension workers in Africa. International Institute of Rural Agriculture, Nairobi; African Conservation Tillage Network, Harare.: http://www.act-africa.org ›
- Best management practices: residue management: http://omaf.gov.on.ca/english/environment/bmp/AF179.pdf