Large semi circular stone bunds on hillside (Eyasu Yazew (Mekelle University, P.O.Box 231, Mekelle, Ethiopia))

Large semi circular stone bunds ( )

Abiy nay emni firki werhi

These consist of stone embankments built in the shape of a semi circle with the tips of the bund on the contour and are arranged in staggered orientation in rows so that overflow from one row will run into the next downslope.

Large semi circular stone bunds are constructed by excavating a foundation of 0.1 - 0.2 m following the semi circle and building of the embankment using stones with a decreasing height at the tips to evacuate excess runoff. 1 - 3 pits are excavated within the semi circle for for planting trees.

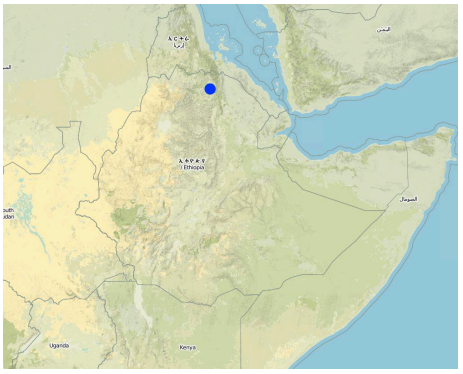
Large semi circular stone bunds (Large half moons) are constructed with a diameter of 6 m and corresponding perimeter/length of 9.42 m. The spacing between the tips of adjacent bunds within a row and between the base bund and tip of adjacent rows is 3 m. The height of the embankment varies from 0.5 - 0.75 m at the base bund to 0.4 - 0.5 m at the tip while the corresponding width varies from 0.4 - 0.5 m to 0.2 - 0.3 m. The planting pit has a diameter and depth of 0.3 m.

Purpose of the Technology: Large semi circular stone bunds assist in decreasing slope length, runoff velocity and soil loss; and improving runoff harvesting, soil moisture and groundwater recharge.

Establishment / maintenance activities and inputs: The establishment of large semi circular stone bunds involves collection of stones, alignment of a contour and the semi circle, excavation of foundation, construction of the embankment and digging of planting pits and runoff harvesting ditch. The maintenance includes re-enforcing the embankment and dredging sediment from runoff harvesting ditch during the dry season.

Natural / human environment: Large semi circular stone bunds are implemented in foot (5 - 8%) and hill (8 - 16%) slopes and in medium and light soil types of shallow to moderate depth (0.2 - 0.8 m). It reduces runoff amount and velocity thereby decreasing soil loss and desertification/land degradation. It also improves soil moisture availability and groundwater recharge.

It is mostly constructed using communal labour and there is a moderate trend of spontaneous adoption. The technology is witnessed to be increasing fruit and fodder production thereby improving the livelihood of the land users. It, however, demands high labour especially during establishment.



: Kilte Awlaelo, Tigray,

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- 39.5, 13.75

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(> 50)

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Large semi circular stone bunds on gentle slopping terrain (Eyasu Yazew (Mekelle University, P.O.Box 231, Mekelle, Ethiopia))

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Large semi circular stone bunds are stone embankments built in the shape of a semi circle with the tips of the bund on the contour and are arranged in staggered orientation in rows so that overflow from one row will run into the next downslope.

Location: Tigray. Kilte Awlaelo

Date: 10/10/2014

Technical knowledge required for field staff / advisors: moderate

Technical knowledge required for land users: low

Main technical functions: control of dispersed runoff: retain / trap, reduction of slope length

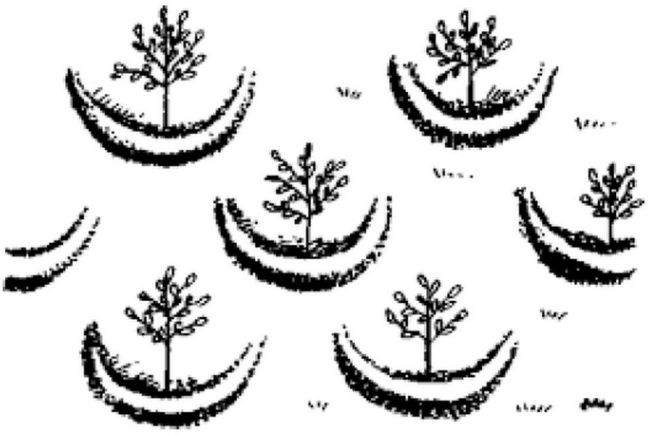
Secondary technical functions: increase of infiltration, increase / maintain water stored in soil, increase of groundwater level / recharge of groundwater, sediment retention / trapping, sediment harvesting, increase of biomass (quantity)

Bund/ bank: semi-circular/V shaped trapezoidal
Vertical interval between structures (m): 0.2 - 0.3
Spacing between structures (m): 3
Depth of ditches/pits/dams (m): 1
Width of ditches/pits/dams (m): 1
Length of ditches/pits/dams (m): 1
Height of bunds/banks/others (m): 0.5 - 0.75
Width of bunds/banks/others (m): 0.4 - 0.5
Length of bunds/banks/others (m): 9.42

Construction material (stone): The embankment of the semi circular bunds is constructed by the stones.

Slope (which determines the spacing indicated above): 6.5 and 12%

Lateral gradient along the structure: 0%



Author: Eyasu Yazew, P.O.Box 231, Mekelle University, Mekelle, Ethiopia

- Labour, slope, stone availability and size.
- **Birr**
- ( ) 1 USD = 18.0 Birr
- 2.50

1. Collection of stones, contour and semi circle alignment, excavation of foundation, construction of bunds and excavation of planting pits and water storage ditch. (/ : January - May)

			(Birr)	(Birr)	%
Labour	ha	1,0	3667,0	3667,0	60,0
Tools	ha	1,0	75,0	75,0	
				3'742.0	
				207.89	

1. Replacement of displaced stones and dredging of planting pits and storage ditch (/ : January - May)

			(Birr)	(Birr)	%
Labour	ha	1,0	117,0	117,0	100,0
				117.0	
				6.5	

Average rainfall of 450-550 mm, Main rainy season from Mid-June to August
Thermal climate class: subtropics

- < 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

- ✓

- (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)

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- ✓ (,)
- / ( )

(> 20)

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- (>3%)
- (1-3%)
- ✓ (<1%)

- < 5
- ✓ 5-50
- > 50

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- ✓ ( )
- (/)
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- ✓ 10%
- 10-50%
- 50%

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

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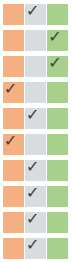
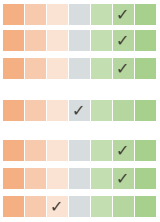
Mobile communication





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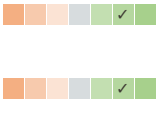

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Improved livelihoods and human well-being

decreased increased

Increased investment in health care as a result of increased income.

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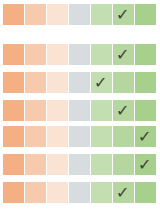

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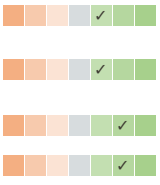

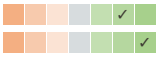

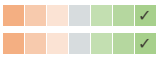

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- 1-10%
- 11-50%
- > 50%

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

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2820

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- Increased vegetation coverage and fruit and fodder production

  How can they be sustained / enhanced? Continuous maintenance of the structure.
- Reduced soil erosion and increased soil moisture

  How can they be sustained / enhanced? Continuous maintenance of the structure.
- Increased spring discharges downstream

  How can they be sustained / enhanced? Continuous maintenance of the structure.

:

- Decreased slope length, reduced runoff amount and velocity and soil erosion

  How can they be sustained / enhanced? Maintenance of bunds and runoff harvesting ditch.
- Increase in rainwater harvesting, soil moisture and groundwater recharge

  How can they be sustained / enhanced? Maintenance of bunds and runoff harvesting ditch.
- Increase in fruit and fodder production

  How can they be sustained / enhanced? Proper agronomic management
- Reduced maintenance requirement compared to bunds made of soils

  How can they be sustained / enhanced? No action needed, as is inherent to technology

/ / :

- Damage to structures constructed at foot slopes if the hillside is not well conserved Conserve the upper catchment first.
- Increase labour requirement Mass mobilization and/or increased incentives to households.
  Reducing the size of the structure.

/ / :

- Poor design approach (the same diameter and spacing for different slope ranges) Improve the design approach.
- Increased labour demand Mass mobilization and improving the design.
- Reduced farm land Increasing the spacing and reducing the dimension of bunds without compromising their effectiveness.

Editors

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: 11 2012 : 9 2019

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https://qcat.wocat.net/km/wocat/technologies/view/technologies_1546/

SLM

- Mekelle University (Mekelle University) -
-

- Staff members of the Kilte Awlaelo Wereda Office of Agriculture and Rural Development:
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