Semi-Circle Stone Bunds for olive trees (ICARDA (P.O. Box 5466, Aleppo, Syria))

Semi-circle bunds ( )

Aquas Hajariya, Aquas Hilalia (Half moon) Arabic

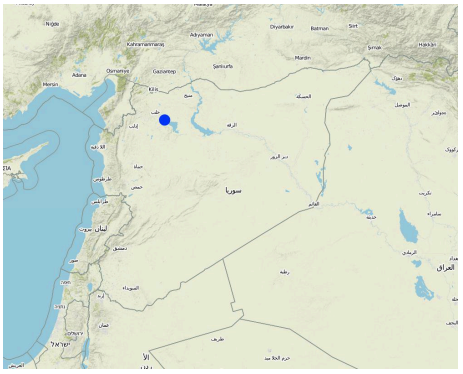
Semi-circle stone bunds are used as soil conservation and water harvesting structures to reduce soil erosion and improve productivity of olive trees.

Semi-circle stone bunds are used as soil and water harvesting structures to improve productivity of trees, especially olive trees, on steep slopes. These are small-scale stone structures, with diameters between 3-5 m, established to catch rainfall and runoff from small micro-catchments covering relatively short slopes. This type of freestanding system (not contour system) is suitable for fields where trees are distributed in a staggered array. The slope steepness ranges from 15-40 degrees. Stones are mined from wasteland and transported to the slopes using tractors. Then the stones are set out in a semi circle (crescent) manually from a down side of the tree. The stone bunds are about 40 cm high with a base width of 30-40 cm. Most of the farmers add soil around the tree trunk and some of them add manure to improve the soil fertility. The technology makes the mechanized tillage difficult because of the layout of the structures. This reduces number of tillage operations and hence reduces erosion since tillage is one of the main causes of soil erosion under these conditions. The structures also reduce runoff velocity, which increases water availability for the plant roots (water harvesting) and also allows for more sedimentation around the trees and less transportation of soil particles and nutrients outside the field (soil conservation).

Purpose of the Technology: Semi-circle stone bunds are used to reduce losses of soil and nutrients and capture runoff water which helps to rehabilitate degraded land and improves the yield.

Establishment / maintenance activities and inputs: For one hectare of land with 100 bunds approximately 50 persons are needed to establish the bunds. The stones are set out in a semi-circle manually. A shovel is needed to prepare and level the stones bed. The costs are about $1950, which includes the price of the stones, transportation, equipment and labours. Then the bunds need maintenance every year, this will cost $54 per hectare. The perennial olive trees are mainly planted in January.

Natural / human environment: The area is dominated by steep slopes in a mountainous area in the north west of Syria. Small holdings are typical for this area with small plot sizes, narrow fields and shallow soil. Annual rainfall is between 400-600 mm. The technology was introduced to the community few years ago. Farmers were trained on how to layout, implement and maintain the structures by ICARDA and local extension services. Individual farmers are applying the technology on their own fields.



: Afrin (Maghara and Khaltan village) And Harem (Betya village), Aleppo, Idleb,

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- 37.39218, 36.12247

: (approx. < 0.1 2 (10))

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(> 50)

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Semi-Circle Stone Bund within Olive Tree Field (ICARDA (P.O. Box 5466, Aleppo, Syria))

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Semi circle technology within olive tree field.

Date: 28/12/2011

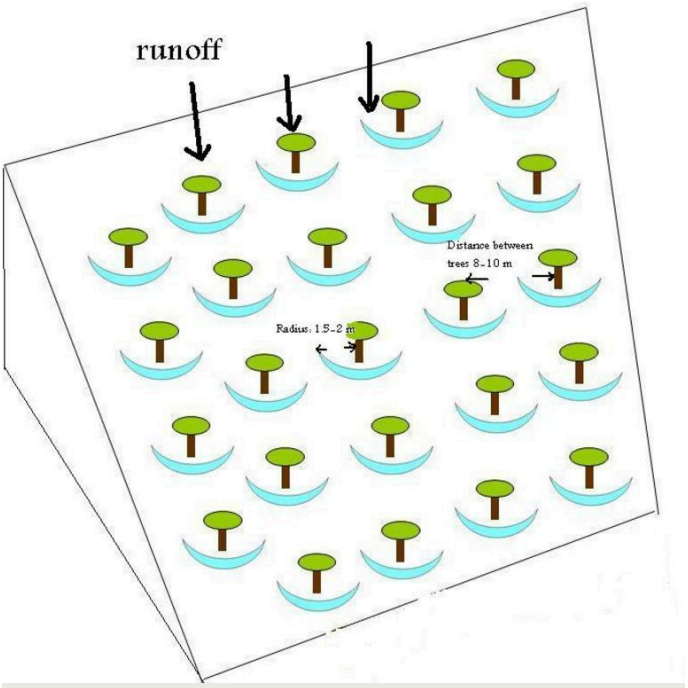
Technical knowledge required for field staff / advisors: high

Technical knowledge required for land users: moderate

Main technical functions: reduction of slope length, increase / maintain water stored in soil, water harvesting / increase water supply, sediment retention / trapping, sediment harvesting

Secondary technical functions: control of dispersed runoff: retain / trap, control of dispersed runoff: impede / retard, reduction of slope angle, increase in organic matter, increase in nutrient availability (supply, recycling,...), increase of infiltration

Bund/ bank: semi-circular/V shaped trapezoidal
Height of bunds/banks/others (m): 0.3-0.5
Width of bunds/banks/others (m): 0.3-0.4



Author: ICARDA, P.O.Box 5466, Aleppo, Syria

- stone availability field accessibility
- **Syrian pound (SYP)**
- ( ) 1 USD = 50.0 Syrian pound (SYP)

1. Stone mining (/ : Dry season)
2. Distributing stones and building (/ : Dry season)
3. Equipment (/ : Dry season)

			(Syrian pound (SYP))	(Syrian pound (SYP))	%
Distributing stones and building	ha	1,0	753,0	753,0	
Machine use	ha	1,0	184,0	184,0	
Stone	ha	1,0	1029,0	1029,0	
				1'966.0	
				39.32	

1. Reforming the stone bunds (/ : Dry season)
2. Reforming the stone bunds (/ : Dry season)

			(Syrian pound (SYP))	(Syrian pound (SYP))	%
Reforming the stone bunds	ha	1,0	54,0	54,0	
				54.0	
				1.08	

☐ < 250
☑ 400-650 dry season May-October (6 months)
Thermal climate class: subtropics

- [x] 251-500
- [x] 501-750
- [ ] 751-1,000
- [ ] 1,001-1,500
- [ ] 1,501-2,000
- [ ] 2,001-3,000
- [ ] 3,001-4,000
- [ ] > 4,000

- [x]

Thermal climate class: temperate

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

- [ ]
- [x]
- [x]
- [ ]
- [ ]

- [ ] 0-100
- [x] 101-500
- [ ] 501-1,000
- [x] 1,001-1,500
- [ ] 1,501-2,000
- [ ] 2,001-2,500
- [ ] 2,501-3,000
- [ ] 3,001-4,000
- [ ] > 4,000

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(> 20

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- [ ] (0-20)
- [ ] (21-50)
- [x] (51-80)
- [x] (81-120)
- [ ] (> 120)

- [ ] / ( )
- [x] (,)
- [x] / ( )

- [ ] / ( )
- [ ] (,)
- [ ] / ( )

- [ ] (>3%)
- [ ] (1-3%)
- [x] (<1%)

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- [ ] < 5
- [x]
- [ ] 5-50
- [ ] /
- [ ] > 50

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- [ ] (
- [ ])
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- [x] ( )
- [x] (/)
- [ ] /

- [ ] 10%
- [x] 10-50%
- [ ] 50%

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- [x]
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- [x]
- [x] /

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- [x]

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- [ ]
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- [ ] < 0.5
- [x] 0.5-1
- [x] 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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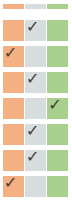

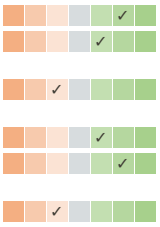

Tillage

Harvesting

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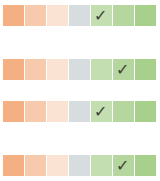

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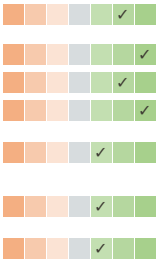

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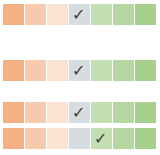

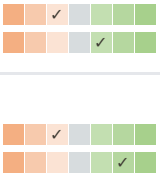

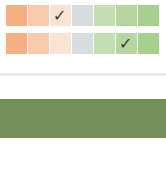

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1-10%
11-50%
> 50%

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0-10%
11-50%
51-90%
91-100%

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52

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:
- Reducing soil erosion
- Iincreasing soil moisture
- Increasing yield

:
- Reducing soil erosion

  How can they be sustained / enhanced? Starting implementation at fields located at top of mountains and then down the slopes (need cooperation among farmers)
- Increasing soil depth and moisture around the tree

  How can they be sustained / enhanced? Provide enabling environment (such as micro credit system, proper extension and technical back stopping)

/ / :
- High cost (stone mining)
- High knowledge (extension service, training, guidance)
- Retard traditional tillage operation and harvesting

/ / :
- High cost (stone mining) consider the long-term benefit, it is feasible
- None Look for closer/ cheaper source of stones

Editors

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https://qcat.wocat.net/km/wocat/technologies/view/technologies_1549/

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- International Center for Agricultural Research in the Dry Areas (ICARDA) -
- Japan international research center for agricultural science (JIRCAS) -
-

- Brochure, ICARDA, 2011:
- Movie, ICARDA, 2011:

- Poster: http://meetingorganizer.copernicus.org/EGU2010/poster_programme/2499 file number EGU2010-9237