Restoration of degraded agrosilvopastoral site in Central Tunisia using the forage legume "Sulla" (Hedysarum coronarium) (Mounir Louhaichi - Research Team Leader of Rangeland Ecology and Forages)

Native Drought-Tolerant Forage Species for Enhanced Dryland Pasture Restoration ( )

The technology utilizes a drought-tolerant native forage legume, Hedysarium coronarium, to restore degraded soils by covering the soil, fixing nitrogen, improving biodiversity and increasing water infiltration while fodder quality and availability is improved.

In the semi-arid areas of Tunisia, drylands are prone to a harsh environment combining high temperatures and limited annual rainfall (350 - 600mm). Nevertheless, many marginal farmers depend on these drylands for income through grazing their livestock. However, due to worsening climatic conditions and mismanagement, the land is becoming seriously degraded. This results in a degradation cycle: overgrazing results in less land available to graze and therefore more rapid degradation on those areas. To break the cycle, an innovative approach is needed.
The International Centre of Agricultural Research in Dry Areas (ICARDA) recognized the problem and developed an approach, together with national parties Office de l'élevage et des pâturages (OEP), Office du Développement Sylvo- Pastoral du Nord -Ouest (ODESYPANO), and Direction Générale des forêts (DGF). They focused on native species which are adapted to the harsh environmental conditions. They selected leguminous species, because these enhance the soil's nutrient status through nitrogen fixation. Additionally, legumes improve the diet of livestock. The perennial Hedysarum coronarium or "Sulla" provides the soil with cover, reducing erosion and increasing water infiltration: rainfall is intercepted by the vegetation cover, resulting in less runoff. The cover also provides shade, which decreases evaporation. Then, the roots of the vegetation improve soil porosity, hence the infiltration capability of the soil. All these benefits improve biophysical and socio-economic resilience.
A degraded field was planted with Sulla in 2017. The land was ploughed before manual seeding. To prevent overgrazing, grazing was managed according to guidelines formulated by ICARDA and national parties. In the initial year, twenty-five smallstock (sheep/goats) graze one hectare for thirty to sixty days. In subsequent years, forty smallstock graze one hectare for thirty to sixty days, since the vegetation is then better rooted and developed. To maintain optimal production, a field needs reseeding after three years, hence the activities and related costs shown in this documentation are recurrent every three years.
This technology has had several positive impacts in the area. The productivity was increased from approximately 2310 kg (dry matter: DM) per hectare to approximately 5330 DM kg per hectare. The technology also increased water productivity from 9.5 DM kg per mm rainfall to 11.8 DM kg per mm rainfall. Hedysarum coronarium improved the quality of fodder, thus benefiting local land users. In addition, the soil was less prone to erosion and water better retained in the soil.
Land users also stated that they benefited from the improved fodder availability because this decreased the costs of feed import. Also, since Sulla is suited to the local climate, few inputs are required, reducing costs and work.

: Zaghouan Governorate,

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- 9.99224, 36.27779

: (approx. < 0.1 2 (10))

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: 2017

(> 50)

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"Sulla" or "French Honeysuckle", Hedysarum coronarium L. (Mounir Louhaichi)

Sampling Sulla (Mounir Louhaichi)

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- (pastoralism)
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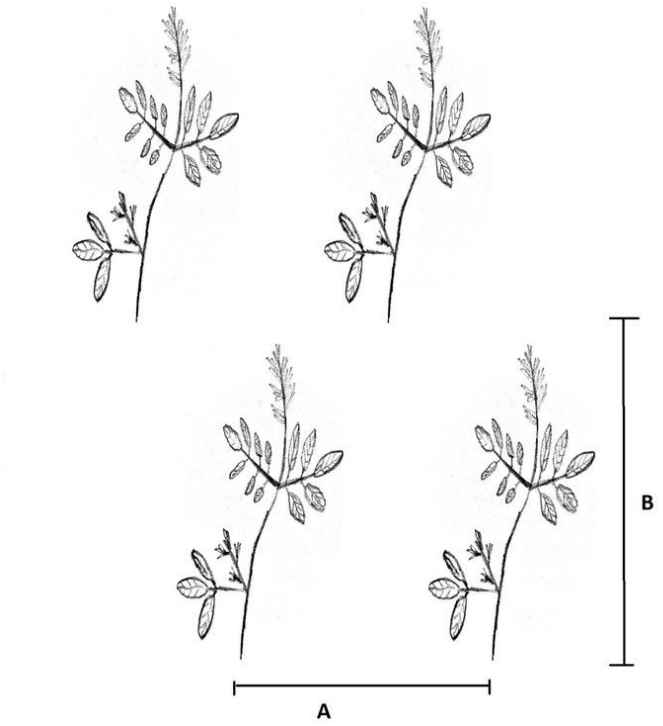
- A1: / , A5:

- V2:

2

- M2: /

The average plant density is 120 per square metre. This relates to the following spacing:
Space within rows (A) = 9 centimeter
Space between rows (B) = 9 centimeter



Author: Joren Verbist

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- ( ) 1 USD =
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1. Land Preparation (/ : None)
2. Seeding (/ : None)

			( )	( )	%
Manual Seeding	Person-Hours	10,0	0,875	8,75	100,0
Plough	Machine-Hours	0,75	15,0	11,25	100,0
Sulla Seed	Kilogram	30,0	1,5	45,0	
				65.0	
				65.0	

n.a.

< 250

- [x] 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

- [x]

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

- [x]
- [x]

- [ ] 0-100
- [x] 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)
- [x] (21-50)
- [x] (51-80)
- [ ] (81-120)
- [ ] (> 120)

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

(> 20
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- [ ] / ( )
- [x] (,)
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- [ ] (>3%)
- [x] (1-3%)
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- [ ] < 5
- [x] 5-50
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SLM

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

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- [x] /

- [x]

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

- [x]

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

- [ ] < 0.5
- [ ] 0.5-1
- [x] 1-2
- [x] 2-5
- [ ] 5-15
- [ ] 15-50
- [ ] 50-100
- [ ] 100-500
- [ ] 500-1,000
- [ ] 1,000-10,000
- [ ] > 10,000

- [x]

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

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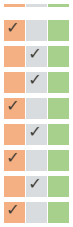

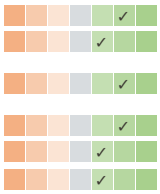

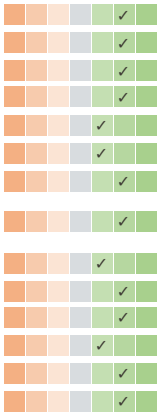

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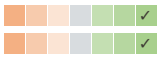

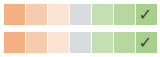

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0-10%
1-10%
11-50%
11-50%
> 50%
51-90%
91-100%

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- Decreased costs of feed import
- Better year-round availability of fodder
- Less risk of drought damage

/ / :

- Grazing management Grazing management ensures sustainable fodder production hence it is a necessary sacrifice.

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- Enhanced soil conditions such as improved soil moisture and fixed nitrogen
- Improved economic situation of local land users
- Restoration of degraded land

/ / :

Editors

Joren Verbist

Rima Mekdaschi Studer
William Critchley

: 2 2021 : 22 2022

Mounir Louhaichi - Research Team Leader of Rangeland Ecology and Forages
Slim Slim - Associate Professor

https://qcat.wocat.net/km/wocat/technologies/view/technologies_5919/

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- International Center for Agricultural Research in the Dry Areas (ICARDA) -
- ICARDA Institutional Knowledge Management Initiative

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- Slim Slim, Mounir Louhaichi, Mouldi Gamoun, Serkan Ates, Sawsan Hassan, Oumeima Rhomdhane, Azaiez Ouled Belgacem. (17/2/2021). Assessment of soil surface scarification and reseeding with sulla (Hedysarum coronarium L.) of degraded Mediterranean semi-arid rangelands. African Journal of Range and Forage Science.: https://hdl.handle.net/20.500.11766/12618
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