Jessour is the plural of a Jessr which is the hydraulic unit comprising a dyke, spillway, terrace (cropping area: fruit trees and annuals), and impluvium (runoff catchment area) (van Delden H.)

Jessour ( )

Jesser, Katra, Tabias (Arabic)

Jessour is an ancient runoff water harvesting technique widely practiced in the arid highlands

Jessour technology is generally practised in mountain dry regions (less than 200 mm annually) with medium to high slopes. This technology was behind the installation of very old olive orchards based on rainfed agriculture in rugged landscapes which allowed the local population not only to ensure self-sufficiency but also to provide neighbouring areas many agricultural produces (olive oil, dried figs, palm dates, etc.).

Jessour is the plural of jessr, which is a hydraulic unit made of three components: the impluvium, the terrace and the dyke. The impluvium or the catchment is the area which collects and conveys runoff water. It is bordered by a natural water divide line (a line that demarcates the boundary of a natural area or catchment, so that all the rain that falls on this area is concentrated and drained towards the same outlet). Each unit has its own impluvium, but can also receive excess water from upstream units. The terrace or cropping zone is the area in which farming is practised. It is formed progressively by the deposition of sediment. An artificial soil will then be created, which can be up to 5 m deep close to the dyke. Generally, fruit trees (e.g. olive, fig, almond, and date palm), legumes (e.g. pea, chickpeas, lentil, and faba bean) and barley and wheat are cultivated on these terraces.

Purpose of the Technology: Although the jessour technique was developed for the production of various agricultural crops, it now also plays three additional roles: (1) aquifer recharge, via runoff water infiltration into the terraces, (2) flood control and therefore the protection of infrastructure and towns built downstream, and (3) wind erosion control, by preventing sediment from reaching the downstream plains, where windspeeds can be particularly high.

Establishment / maintenance activities and inputs: In the Jessour, a dyke (tabia, sed, katra) acts as a barrier used to hold back sediment and runoff water. Such dykes are made of earth, and are equipped with a central and/or lateral spillway (masref and/or manfes) and one or two abutments (ktef), assuring the evacuation of excess water. They are trapezoidal and measure 15-50 m in length, 1-4 m in width and 2-5 m in height. In old units, the dyke is stabilised with a covering of dry stones to overcome the erosive effects of water wave action on the front and back of the dyke. The spillway is made of stones arranged in the form of stairs, in order to dissipate the kinetic energy of the overflow.
This technology is currently encountered in the mountain ranges of Matmata of South Eastern Tunisia where the local agricultural activities are based mainly on rainfed agriculture and livestock breeding. However, high rates of migration to cities may threaten the long-term maintenance of those structures.

: Beni Khedache, Medenine,

:

- 10.114, 33.237

: (approx. 100-1,000 2)

?:

: 50 ( )

(> 50)

/

Jessour is the plura of a Jessr which the hydraulic unit made of of the dyke, the spillway, the terrace (cropping area: fruit trees and annuals), and the impluvium (runoff catchment area). (Ben Zaied M. (Medenine- TUNISIA))

Jessour is an ancient runoff water harvesting technique widely practiced in the arid highlands of southern Tunisia. (Ouessar M. (Medenine, TUNISIA))

- : - , - ( ), - , - , -
- : , figs, (brazil nuts, pistachio, walnuts, almonds, etc.),

: 1

✓

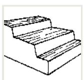
✓
✓

- Wt: , Wg:

SLM

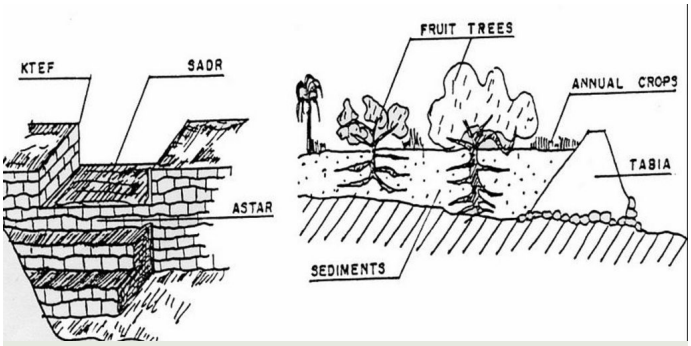
-
-
- ( )

SLM



- S2:

Left: Cross-section of dyke (locally called tabia) and terrace (cropping area).
The Jessour ensure the collection of both runoff water and sediments allowing creating very deep 'artificial' soils (terrace) which form a very good reservoir for water and nutrients to be used by fruit trees and annual crops.
Right: The spillway allows the overflow to the other Jessour downstream. It also represents the symbol of water sharing equity between different farmers in the same watershed. (Drawing adapted from El Amami (1984))



Author: Ouessar M., IRA, Medenine, Tunisia

Location: Mountainous zone near Beni Khedache. Medenine

Date: 1984

Technical knowledge required for field staff / advisors: moderate

Technical knowledge required for land users: moderate

Main technical functions: increase of infiltration, sediment retention / trapping, sediment harvesting, harvesting of runoff water / water trapping

Secondary technical functions: control of concentrated runoff: retain / trap, improvement of ground cover, increase / maintain water stored in soil, increase of groundwater level / recharge of groundwater, increase of biomass (quantity)

Spillway
Height of bunds/banks/others (m): 2-5
Width of bunds/banks/others (m): 0.4-0.6
Length of bunds/banks/others (m): 2-6

Dam/ pan/ pond
Vertical interval between structures (m): 2-3
Spacing between structures (m): 30-70
Height of bunds/banks/others (m): 2-6
Width of bunds/banks/others (m): 1-5
Length of bunds/banks/others (m): 10-40

Construction material (earth): Main dyke

Construction material (stone): Spillway and in some cases the dyke (external coating)

Construction material (concrete): Occasionally for consolidation of the spillway.

Lateral gradient along the structure: <1%

Specification of dams/ pans/ ponds: Capacity 300-1000m3

Catchment area: 1-10ham2

Beneficial area: 0.01-1ham2

For water harvesting: the ratio between the area where the harvested water is applied and the total area from which water is collected is: 1:5

-
- **TD**
- ( ) 1 USD = 1.3 TD
- 10.00

Found in inaccessible and even remote areas, labour is the most determining factors affecting the costs of this system.

1. Dyke construction (/ : None)
2. Plantations (/ : None)
3. Spillway construction (/ : None)

				(TD)	%

			(TD)		
Labour	ha	1,0	1200,0	1200,0	100,0
	ha	1,0	800,0	800,0	100,0
	ha	1,0	1000,0	1000,0	100,0
				3'000.0	
				2'307.69	

1. Crop and trees maintenance (/ : Annually)
2. Dyke and spillway maintenance (/ : None)
3. Repairs (/ : None)
4. Tillage (against soil sealing) (/ : None)
5. Tillage (against soil sealing) (/ : Annually and after rainy events)

			(TD)	(TD)	%
Labour	ha	1,0	400,0	400,0	100,0
	ha	1,0	200,0	200,0	100,0
	ha	1,0	300,0	300,0	100,0
				900.0	
				692.31	

- [x] < 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

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

Thermal climate class: subtropics

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

- [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

- [ ]
- [ ]
- [ ]

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

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

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

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

( )
?

< 5
[x] 5-50
> 50

/

( )

( )

/

/

SLM

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

10%
10-50%
[x] 50%

/

/
/
(,)

< 0.5
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

( )
( )
( )
( )

(.)

(/)

Reduced grazing lands

/

SLM /

(
)

(
)
/

(-springs)
( )
(
)
/
Runoff

decreased increased

Reduced available runoff for downstream users

( )

( )

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

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

?
/

?
/
( )

:

- Well known technique by the local population

How can they be sustained / enhanced? training of new generations

/ / :

- Productivity of the land is very low Development of alternative income generation activities.
- Land ownership fragmentation New land access

- This technique allowed a expansion of cropping lands in the mountain area

  How can they be sustained / enhanced? encourage maintenance of existing structure
- Allows crop production in very dry environments (with less than 200 mm of rainfall)

  How can they be sustained / enhanced? encourage maintenance of existing structure
- Collects and accumulates water, soil and nutrients behind the tabia and makes it available to crops

  How can they be sustained / enhanced? encourage maintenance of existing structure
- Reduced damage by flooding

  How can they be sustained / enhanced? encourage maintenance of existing structure
- Well adapted technology for the ecological environment

  How can they be sustained / enhanced? ensure maintenance works

- Risks related to the climatic changes It needs to be combined with supplemental irrigation
- Risk of local know how disappearence Trainig of new generations
- Land ownership fragmentation Agrarian reform

Editors

Mongi Ben Zaied

Deborah Niggli
Alexandra Gavilano

: 3 2011 : 21 2019

Sghaier Mongi - SLM
Chniter Mongi - SLM
Mohammed Ouessar - SLM

https://qcat.wocat.net/km/wocat/technologies/view/technologies_1013/

SLM

Approaches: Collecte des eaux pluviales dans des citernes https://qcat.wocat.net/km/wocat/approaches/view/approaches_4153/
Approaches: Conservation des eaux et des sols suivant la technique des « Jessour »
https://qcat.wocat.net/km/wocat/approaches/view/approaches_4151/
Approaches: Dryland watershed management approach https://qcat.wocat.net/km/wocat/approaches/view/approaches_2422/
Approaches: Projet d'Aménagement et de Développement Intégré du Territoire (PADIT)
https://qcat.wocat.net/km/wocat/approaches/view/approaches_6593/
Approaches: Observatoire Territorial de Gestion des Ressources Naturelles
https://qcat.wocat.net/km/wocat/approaches/view/approaches_6642/
Approaches: Territorial Natural Resource Management Observatory https://qcat.wocat.net/km/wocat/approaches/view/approaches_6642/
Approaches: Projet d'Aménagement et de Développement Intégré du Territoire (PADIT)
https://qcat.wocat.net/km/wocat/approaches/view/approaches_6593/

- Commissariats Régionaux au Développement Agricole (CRDA) -
- Institut des Régions Arides de Médenine (Institut des Régions Arides de Médenine) -

- Book project: Water Harvesting – Guidelines to Good Practice (Water Harvesting)
- DESIRE (EU-DES!RE)

- El Amami, S. 1984. Les aménagements hydrauliques traditionnels en Tunisie. Centre de Recherche en Génie Rural (CRGR), Tunis, Tunisia. 69 pp.: ENGREF - Tunis
- Ennabli, N. 1993. Les aménagements hydrauliques et hydro-agricoles en Tunisie. Imprimerie Officielle de la République Tunisienne, Tunis, 255 pp.: INAT - Tunis
- Ben Mechlia, N., Ouessar, M. 2004. Water harvesting systems in Tunisia. In: Oweis, T., Hachum, A., Bruggeman, A. (eds). Indigenous water harvesting in West Asia and North Africa, , ICARDA, Aleppo, Syria, pp: 21-41.: ICARDA
- Genin, D., Guillaume, H., Ouessar, M., Ouled Belgacem, A., Romagny, B., Sghaier, M., Taamallah, H. (eds) 2006. Entre la désertification et le développement : la Jeffara tunisienne. CERES, Tunis, 351 pp.: IRA; IRD
- Ouessar M. 2007. Hydrological impacts of rainwater harvesting in wadi Oum Zessar watershed (Southern Tunisia). Ph.D. thesis, Faculty of Bioscience Engineering, Ghent University, Ghent, Belgium, 154 pp.: IRA
- Sghaier, M., Mahdhi, N., De Graaff, J., Ouessar, M. 2002. Economic assessment of soil and water conservation works: case of the wadi Oum Zessar watershed in south-eastern Tunisia.TRMP paper n° 40, Wageningen University, The Netherlands, pp: 101-113.: IRA