

Why studying traditional irrigation?

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Summary

Sustainable agriculture and «*minima*» of the landscape

On the cultural meaning of traditional irrigation

Conclusions



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Sustainable agriculture

Sustainable agriculture develops a perspective of *integral sustainability*, in fact:

1. It cannot leave the economic and social sustainability out of consideration;¹
2. It is an ecosystem and landscape agriculture;²
3. It is founded on traditional agriculture³ as well as on modern technology;²
4. It defends the soil;⁴
5. It therefore provides a relevant ecosystem spin-off because it contributes to mitigate the climate change⁵ and the hydrogeological hazard.

Sustainable agriculture contributes to move the sustainability paradigm to the paradigms of *sympiosis and coevolution*.

¹UE Agriculture Directorate-General (2001) *A Framework for Indicators for the Economic and Social Dimensions of Sustainable Agriculture and Rural Development*.

²FAO (2018) *Transforming Food and Agriculture to Achieve the SDGs: 20 interconnected actions to guide decision-makers*. Technical Reference Document. Rome. 132 pp.

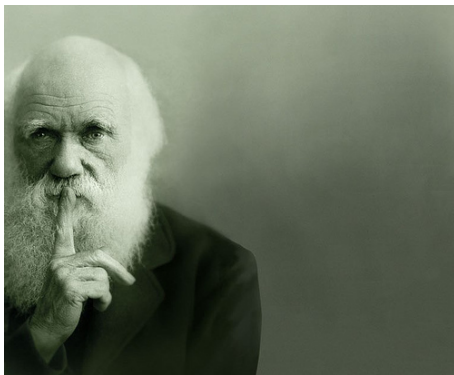
³UNCCD (2005) *Revitalizing Traditional Knowledge. A Compilation of Documents and Reports from 1997—2003*. UNCCD, Bonn, Germany.

⁴EU (2006) *Thematic strategy for soil protection* Documents SEC(2006)1165, SEC(2006)620.

⁵IUSS, Vienna Soil Declaration (December, 7th, 2015)



«*Minima*»



Darwin (1882) *The formation of the vegetable mould through the action of worms, with observations on their habits*:

The subject may appear an insignificant one, but we shall see that it possesses some interest; and the maxim «de minimis lex non curat,» does not apply to science.



Which is the role of irrigation?

Starr, 2013, p.37, on Central Asia:⁶

... an important positive force made possible the development and maintenance of civilization and a high culture across Central Asia. Again, the agent was not nature but humankind, specifically, people's gradual mastery of the arts and technologies of irrigation. It was irrigation, and only irrigation, that made possible the rise of civilization on some of the otherwise barren land of Central Asia. In this sense it is fair to call Central Asia a "hydraulic civilization"...

Ancient and traditional irrigation is therefore an hydraulic «minimum» of the landscape, in the sense introduced by Darwin.



⁶Starr, S.F. (2013). *Lost Enlightenment: Central Asia's Golden Age from the Arab Conquest to Tamerlane*. Princeton University Press

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From ancient to traditional irrigation

An hypothesis of classification on the basis of the principal contributing resource:⁷

1. Groundwater: *qānāt, foggara, khettara, karez, mkayel, wells*
2. Air humidity: *dry-stone walls and cob walls, tu'rat, fog-collection*
3. Precipitations and runoff: *zai, wadi, barrages, jessour, reservoirs, terraces, microbasins*
4. Lifting systems: *shadouf, saqiyya, naoor*
5. Distribution systems: *channels, flumes, basins, furrows*

⁷Barontini S., Boselli V., Louki A., Ben Slima Z., Ghaouch F. E., Labaran R., Raffelli G., Peli M., Al Ani A. M., Vitale N., Borroni M., Martello N., Bettoni B., Negm A., Grossi G., Tomirotti M., Ranzi R., Bacchi B. (2017) Bridging Mediterranean cultures in the International Year of Soils 2015: a documentary exhibition on irrigation techniques in water scarcity conditions, *Hydrology Research* Jun 2017, 48 (3) 789—801



So, why studying traditional irrigation? I

Eight conjectures:

1. Traditional irrigation in water scarcity is a cultural and identity heritage;
2. However it should not only be preserved, by protecting its most relevant artefacts. In fact it innervates the landscape and provides an important key to understand historical and anthropogenic landscapes, and to reconnect the comprehension of important fluxes of mass, energy and labour;
3. It allows the arid agriculture being performed. It is therefore an axle for oases and a defence against desertification;
4. It is adaptive and coevolutive with the surrounding environment, and it proved of being able to react to climatic changes;



So, why studying traditional irrigation? II

5. Water scarcity conditions may be regarded to as proxies of climatic and hydrological changes also in nowadays humid areas of the Northern Mediterranean basin;
6. Traditional irrigation is seldom endogenous. Its capability to diffuse, and to adapt to and to root in different environments, **requires to consider each case both in a local and in an ecumenical perspective**;
7. It furthermore poses **an interesting epistemological question**, i.e. whether similar techniques in different contexts were diffused by skilled-labour's migration or treatises, or autonomously developed;
8. Finally, it allows to develop **labour-intensive landscapes** also in marginal and abandoned areas, thus **stimulating biodiversity, protecting slopes and mitigating the hydrogeological hazard**.



UNCCD recalls on traditional irrigation

UNCCD Secretariat (2005, p.51):⁸

15. *One of the most successful techniques for the rehabilitation of strongly degraded land in the Sahel is the improved traditional planting pit or “za”. This traditional technique was improved in the early 1980’s by a farmer in the Yatenga region of Burkina Faso. He increased the diameter and the depth of the traditional pits and put manure in them during the dry season. (...)*

16. *The most widespread system characteristic of the Mediterranean area is the terracing system that can be found in the Middle East, Greece, Italy and Portugal. (...) The aesthetic qualities, the beauty of natural materials, the comfort of architecture and spaces, the organic relationship with the landscape that the ancient towns of the area boast are especially due to the qualities of traditional techniques and to the search for symbiosis and harmony intrinsic in local knowledge. The survival of traditional societies in the whole Mediterranean area depends on the effective, economic and sustainable management of natural resources. In the Mediterranean area, which is characterised by intensive settlement, the environment is not only the result of natural processes, but rather represents a cultural landscape where historical centres are the crystallization of knowledge appropriate to environmental management and maintenance.*

⁸UNCCD (2005) *Revitalizing Traditional Knowledge. A Compilation of Documents and Reports from 1997—2003.*



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The Ptolemaic Ecumene



Central Northern Ecumene in the Leinhart Holle (1482) edition of Ptolemy's *Geography*
(Source: <https://commons.wikimedia.org>, checked 12/12/2018)

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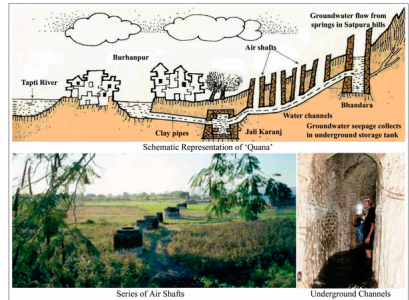
└ On the cultural meaning of traditional irrigation

Landscape innervation



Kariz in Iran

(Source: Web, original not found)



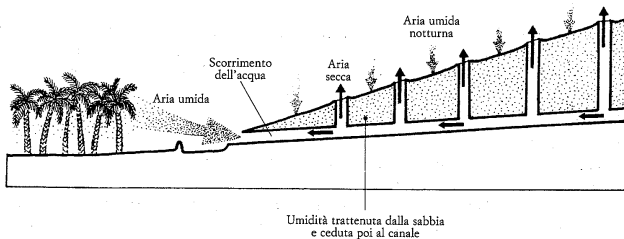
Khooni bandhara in Madhya Pradesh

(Source: Web, original not found)



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Principal and ancillary resources I



Functioning scheme of a *foggara* (qānāt, source: Laureano, 1995, 2013)

Functioning scheme of a *foggara*:

- ▶ Principal resource: groundwater
- ▶ Ancillary resource: condensation of lifting vapour

Principal and ancillary resources II



Citrus garden in Pozzallo (Sicily). Courtesy: N. Vitale

Water harvesting in a typically Pantescue citrus garden:

- ▶ Principal resource: **rainfall**
- ▶ Ancillary resource: **condensation of humid air, inhibition of soil evaporation**



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Terraces, soil protection and climatic resiliency I



Terraced olive orchard in Peschiera Maraglio (Montisola, Northern Italy, 6 September 2015)



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Terraces, soil protection and climatic resiliency II



Lemonhouse La Malora in Gargnano (Northern Italy, 6 June 2016, Courtesy: Marco Peli)



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Conclusions I

- ▶ By considering all these conjectures, we might probably conclude that **the future of traditional irrigation is yet to be written**
- ▶ The study and the adaptation of the traditional irrigation to modern issues might still deserve **important applications to develop agroecosystems in a sustainability perspective**



Conclusions II



Zavřel, The last tree, 1975

