

Session 2 | Retaining water in the landscape | Protocol

Forest-inspired agriculture in a desert climate

- 🍎 **Date and time:** Monday, 12 October 2026
6.30 pm (ending approx. 8.00 pm)
- 🍎 **Series theme:** Retaining water in the landscape
- 🍎 **Topic of the first session:** Forest-inspired agriculture in a desert climate
- 🍎 **Speakers:** António Coelho, [Terra Sintrópica](#)
- 🍎 **Link to the recording:** <https://www.youtube.com/watch?v=0-8Z34rDsIU>

A look at southern Portugal: Here, António Coelho, an organic farmer and co-founder of the Portuguese initiative Terra Sintrópica, is fighting against advancing desertification in the extremely arid Alentejo region. To do so, he mimics natural forest ecosystems for his fruit and vegetable cultivation. Using humus and mulch, he reduces irrigation by 85 per cent. The system stores moisture like a sponge and effectively retains the scarce rainwater in the landscape.



António Coelho (Image: Terra Sintrópica).

Lessons Learned

Humus and Biomass Accumulation in an Extremely Arid Climate

- 🍎 **Initial input from external biomass:** In heavily degraded, semi-arid ecosystems with very low organic matter content (approx. 0.5–0.6%), external biomass often needs to be introduced at the outset. The project utilized locally shredded green waste and leaves from municipal fire prevention measures (clearing around buildings). Through continuous biomass input, mulching, and the return of clippings, the soil's organic matter content increased from approximately 0.6% to as high as 4.5% to 7%.
- 🍎 **No mineral fertilizers:** Nutrients are supplied exclusively through organic sources such as compost, manure, and organic material; chemical fertilizers are completely avoided.

Retaining and Storing Water (Syntropic Agriculture)

- 🍎 **Permanent soil cover:** To reduce extreme evaporation during summer temperatures exceeding 40 °C, the soil is permanently protected by mulch and dense vegetation.
- 🍎 **Retention structures (swales/drainage ditches):** Depressions in the terrain and swales slow down water flow during heavy rainfall, distribute it over a wide area, and allow it to seep deep into the stony subsoil (slate) (Slow, Spread, Sink & Share).
- 🍎 **Water Savings:** The combination of humus buildup, mulch, and dense root penetration through sponge-like soil structures reduces irrigation needs by up to 85% compared to neighboring conventional farms.
- 🍎 **Targeted drip irrigation:** Vegetable crops and young trees are primarily irrigated via drip irrigation to avoid evaporation losses compared to sprinkler systems. Supporting trees are often watered only sporadically in the summer (e.g., once a month).

Adaptation of Syntropic Principles to the Mediterranean Climate

- 🍎 **Application of tropical principles:** Syntropic agriculture (according to Ernst Götsch) is based on stratification (different light levels) and succession (temporal sequence). These approaches have been adapted to Mediterranean climatic and species conditions.
- 🍎 **Use of poplar, willow, and ash:** Native species such as poplar (*Populus*), willow (*Salix*), and ash (*Fraxinus*) serve as fast-growing companion trees and shrubs.

- 🍎 Regular pruning of trees and shrubs: The companion trees and shrubs are pruned back intensively to produce biomass directly on site, control light, and stimulate root growth in neighboring plants.
- 🍎 Multifunctional land use: Vegetable crops, berries, and fruit trees (e.g., peach, fig) are closely combined with biomass trees and shrubs.

Open Questions

- 🍎 Plant establishment during extreme heat waves: How do plants fare during the extremely hot and dry midsummer months (with temperatures regularly exceeding 40 to 45 °C)
- 🍎 Establishing Plants During Extreme Heat Waves: How to best and most reliably establish plants during the extremely hot and dry midsummer months (with temperatures regularly exceeding 40 to 45 °C).
- 🍎 Careful Species Selection & Companion Trees: Identifying the species best adapted to local Mediterranean conditions (as a replacement for tropical fast-growing species such as eucalyptus or acacia). Strict regulations regarding non-native species apply in the national park, while native fast-growing species (such as poplars or willows) still require additional irrigation during periods of drought.
- 🍎 Balance between planting density and water availability: The precise fine-tuning of the optimal planting density. The goal is to determine the point at which competition for scarce soil moisture outweighs the positive effects of the denser micro-climate.
- 🍎 Timing of planting and pruning: Determining the ideal times for pruning and replanting based on the weather patterns of each year.
- 🍎 High labor requirements vs. limited staff capacity: The syntropic system requires a high level of labor intensity due to regular pruning and mulching. The garden is managed by only two people, which is why additional work steps (such as producing biochar on-site) are currently not feasible in terms of time and logistics.
- 🍎 Reducing External Inputs: How the need for externally supplied biomass, manure, and compost can be further reduced over the long term, and how the system can gradually be maintained in a fully autonomous manner.

Related Links (including those from the chat)

Initiatives and Speakers

- 🍎 Terra Syntropica <https://terrasintropica.pt>

YouTube videos

- 🍎 Video: Affolter in the intense heat: <https://www.youtube.com/watch?v=fYMtbHaeEqA>
- 🍎 Video: Dense planting & reduced vole pressure (Jörg Beuerle): <https://www.youtube.com/watch?v=vrzrnjtyJKk>

Contact for questions and topic suggestions: institute@hochstamm-deutschland.de

About the Cultural Landscapes Lab

Hochstamm Deutschland e.V. is known as a network dedicated to the further development of orchard farming. However, orchard meadows do not stand alone; they are part of a global family of traditional cultural landscapes. They make a significant contribution to nature and to us as humans, but are often not very profitable economically. That is why the [Cultural Landscapes Lab](https://www.hochstamm-deutschland.de/streuobst-bewahren/cultural-landscapes-lab) is being established under the umbrella of Hochstamm Deutschland e.V. Our aim: to combine knowledge from traditional systems with modern solutions in order to develop resilient, sustainable and productive agricultural and food systems.

Contact Cultural Landscapes Lab @ Hochstamm Deutschland e.V.

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