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Artificial soils for urban greening and urban farming

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Amount of precipitation in arid zone: < 150-200 mm a year

(< 1 liter a day) http://koeppen-geiger.vuwien.ac.at/



Date Palm (Phoenix dactylifera) requirements in water: 7-11 liters a day)

https://www.csbe.org/date-palm-phoenixdactylifera

Transport of irrigation water



Examples of solution migration in native layered soils



A large amount of water can be lost during irrigation of native soils due to preferential water flow. As a result upper layer of soil is not moistened, and water migrated to lower layers.

Example of possible substrates and materials for sustainable soil construction in drylands

SOIL SUBSTRATES Preventing peat degradation

Saving high water retention and available water content

Lowing thermal conductivity Preventing evaporation losses Leveling of daily thermal shifts

Preventing drainage losses Preventing salinization during irrigation

NA PO

PEAT

SAND



Increasing water retention ability

The studies of soil constructioning





Biomass growth on different artificial soils



native

layered

mixed

mixed constructions

Cellulolytic fungi in different soils













The main factors of artificial soils' development and usage

Initial data for design

- Understanding the purposes of using artificial soils (urban farming, urban greening etc.).
- Researching and estimating the environmental parameters and soil substrates characteristics to design artificial soils with precise properties.

Complex approach • The complex of modern investigation methods from different fields of study such as agrophysics, microbiology, agrochemistry, climatology, computer simulation and modeling, etc. is used to design, control and correct the artificial soils' optimal behavior is necessary to use.

- Possible risks in drylands
- Salinization as a result of irrigation
- Biological pollution
- Degradation of different artificial soil's properties

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Thank you for attention!