



Water management in Organic Fruit and Vine Growing

Post Graduate Specialization Programme

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Summary

Introduction

Evapotranspiration (ET)

Previous remarks before talking about irrigation in organic farming

- Theoretical trees needs for water and the crop choice
- Aim to have the best soil organo-biological fertility
- let the roots go as deep as possible
- how to limit water losses per erosion and evaporation
- how to limit plants transpiration

choice of irrigation system : is there any irrigation system more adapted to organic farming?

Water control in the soil and on the plant

- The tools
- Some examples of our experiences

IAM plot visit and observations on irrigation system, soil hydrous profile

Water availability evolution

- the world's use of water has increased six-fold over the last 100 years
- water usage will rise by 50 percent over the next 30 years.
- 3 billion people will live in countries that will have less than 1,700 m³ water per capita by 2025

Hydrous deficit

97,5 % salty water and 2,5 % fresh water

Climate Change

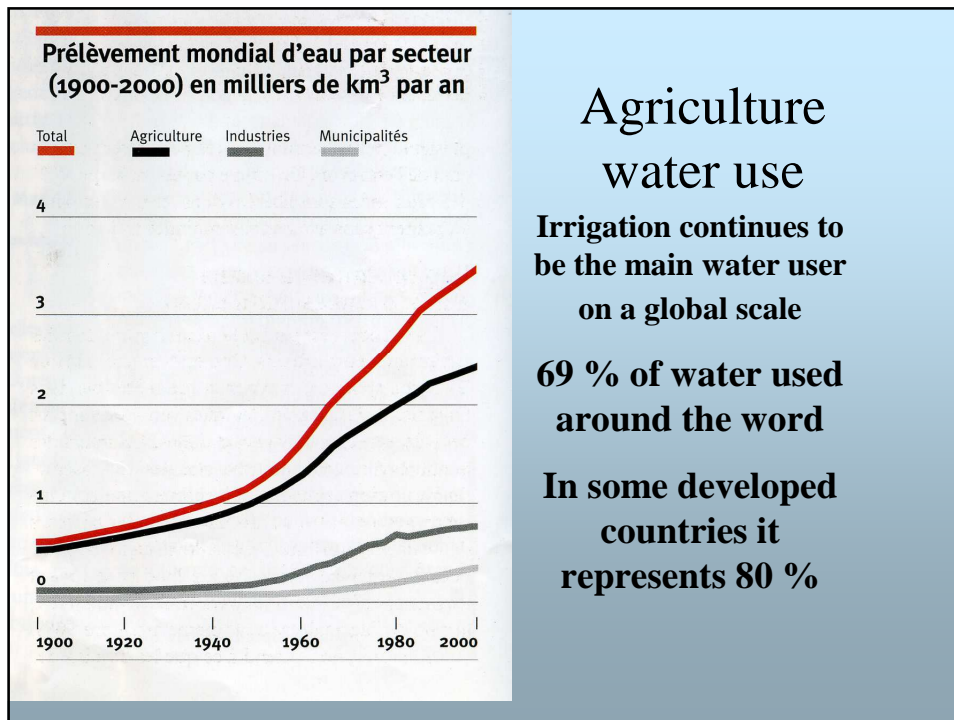
T° increase: +1.8°C to
+ 6°C from 2000 to 2100

Increasing needs

Constant hydrous deficit

**Increase the
resources**

**Water saving
and Irrigation
management**



Agriculture futur challenge

- **Irrigation is one of the main ways to increase food production and rural incomes.**
- **The great challenge for the coming decades will be the task of increasing food production with less water**
- **Crop Water Management is a key area to optimize crop production with limited and dwindling water supplies.**

water consumption evolution in my area vaucluse – south France

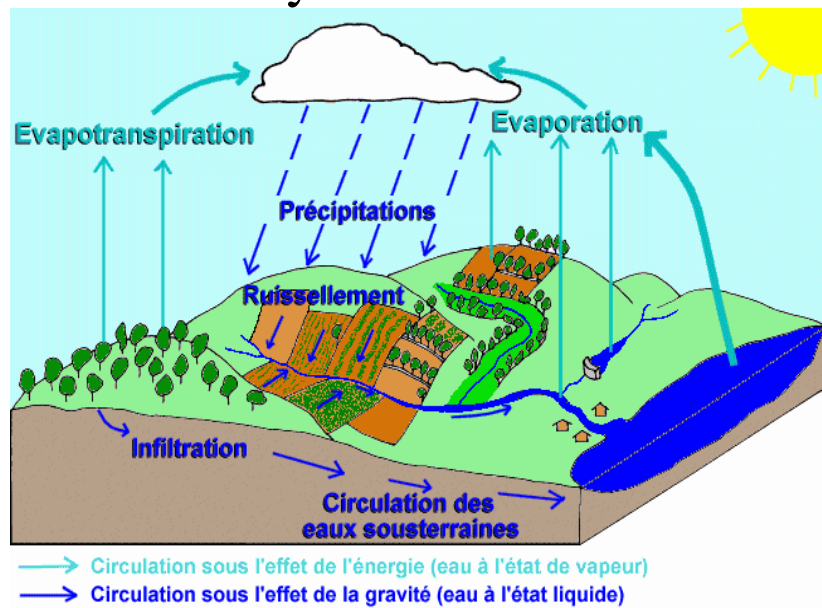
Années	IRRIGATION			Total volumes prélevés (m ³)
	Gravitaire (m ³)	Aspersion (m ³)	Micro-irrigation (m ³)	
1970	360 000 000	0	0	360 000 000
1988	224 000 000	25 800 000	10 800 000	260 600 000
2000	120 000 000	37 500 000	28 500 000	186 000 000

Water agriculture saving since 1970 represent about 174 000 000 m³

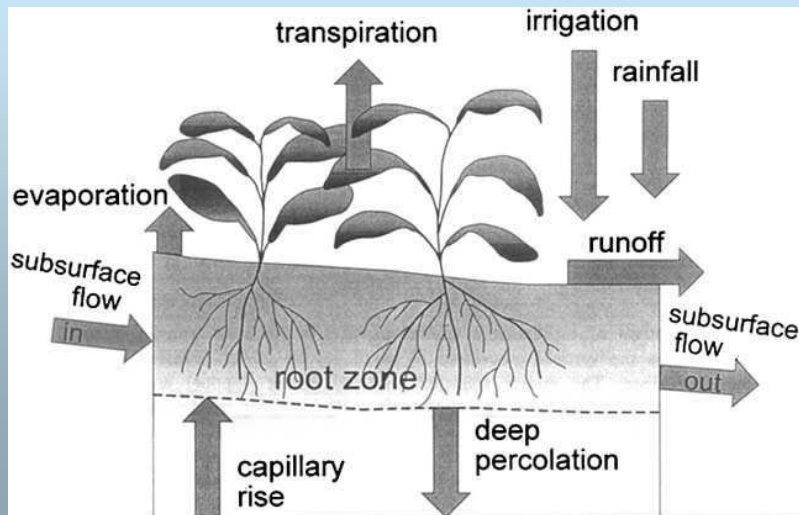
{so 48 % water used in agriculture has been saved}

Today, agriculture use twice less water than 30 years ago

Cycle of Water



Cycle of water



Different water forms in the soil

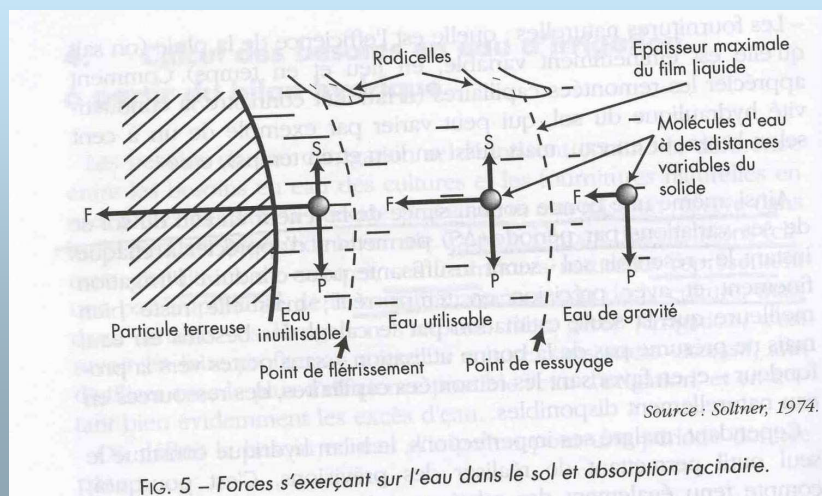
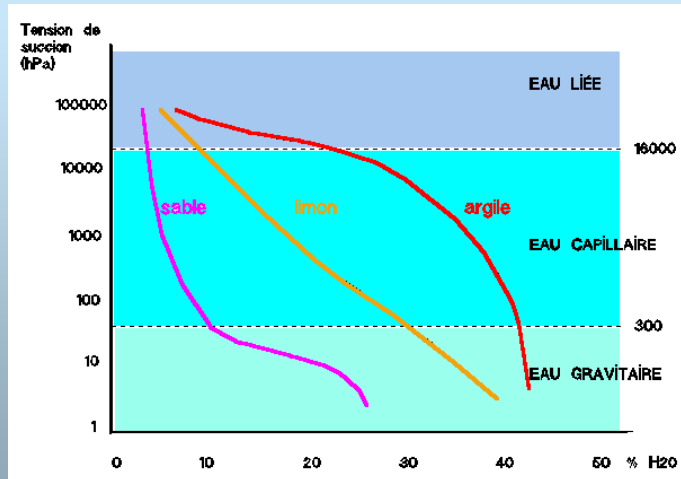
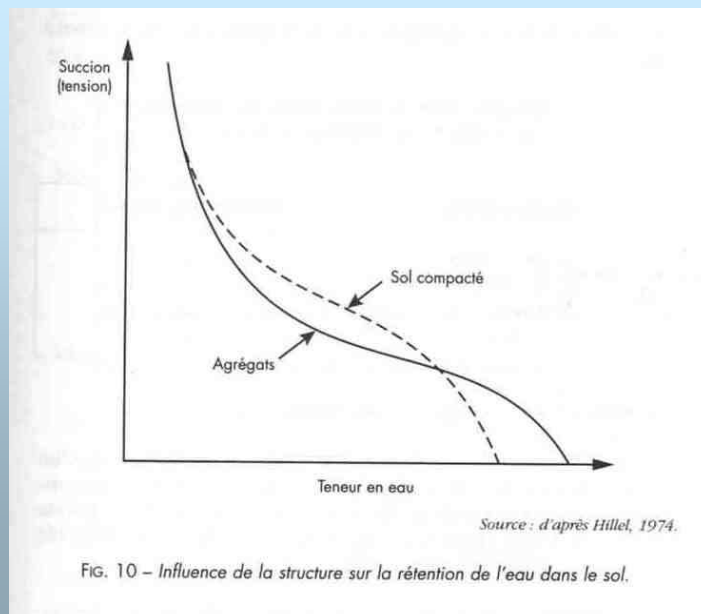


FIG. 5 - Forces s'exerçant sur l'eau dans le sol et absorption racinaire.

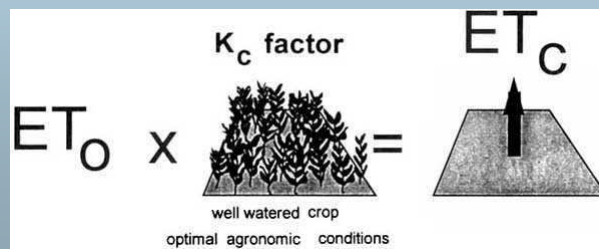
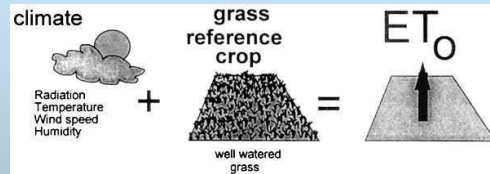
Different water forms in the soil



Relation between water and soil structure



Evapotranspiration

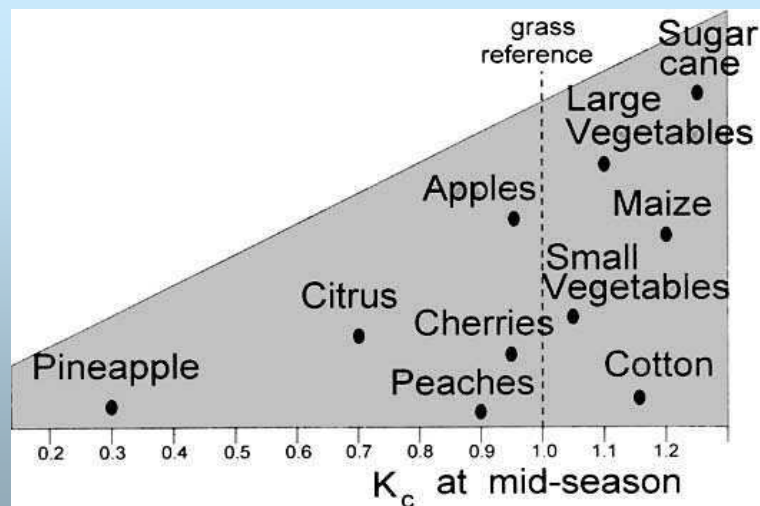


Average ET_0 for different agroclimatic regions in mm/day

Regions Mean daily temperature (°C)	Cool ~10°C	Moderate 20°C	Warm > 30°C
Tropics and subtropics			
- humid and sub-humid	2-3	3-5	5-7
-arid and semi-arid	2-4	4-6	6-8
Temperate region			
- humid and sub-humid	1-2	2-4	4-7
-arid and semi-arid	1-3	4-7	6-9

Previous remarks before talking about irrigation in organic farming

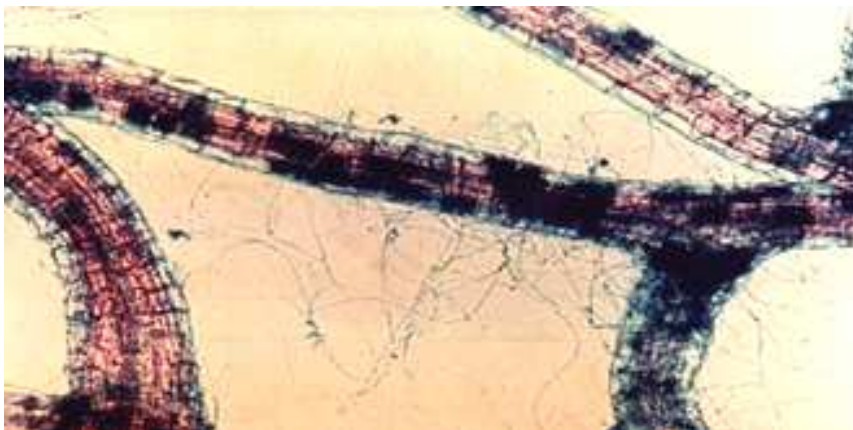
Crop choice : Theoretical trees needs for water



Soil organo-biological fertility

- Manage organic matter
- Maintain and develop biological activities

Rhizosphere and roots mycorrhization increase roots prospecting



Macro-biomass

- Structure – soil porosity - drainage



Promote deep roots

- prepare properly the soil before planting
- when planting : leave at least 2-3 cm roots length; “ pralinage », organic matter, endomycorrhization, biodynamic preparations
- during orchard and vineyards life, reduce the weight of engines and limit the number of intervention

limit water losses per erosion



sow grass or green manure

