

Olive cultivation in the face of global change

Insights from Moroccan farmers in the Ouezzane province

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Session 2.5. The dynamics of agrobiodiversity and diversified agricultural systems for resilience and wellbeing



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Context

The importance of olive cultivation in Morocco



Landscape importance

65% of the national orchard area



Farmers & jobs

479 095 farms

50 millions of working days

Historical importance

Olive cultivation dates back from antique times

Oleasters used since Neolithic



National food security

16% of national edible oil needs

100% of national olive needs

Socio-cultural importance

Keystone of Moroccan diet

Medicinal uses

A rich body of place-based knowledge



Increase in olive oil production

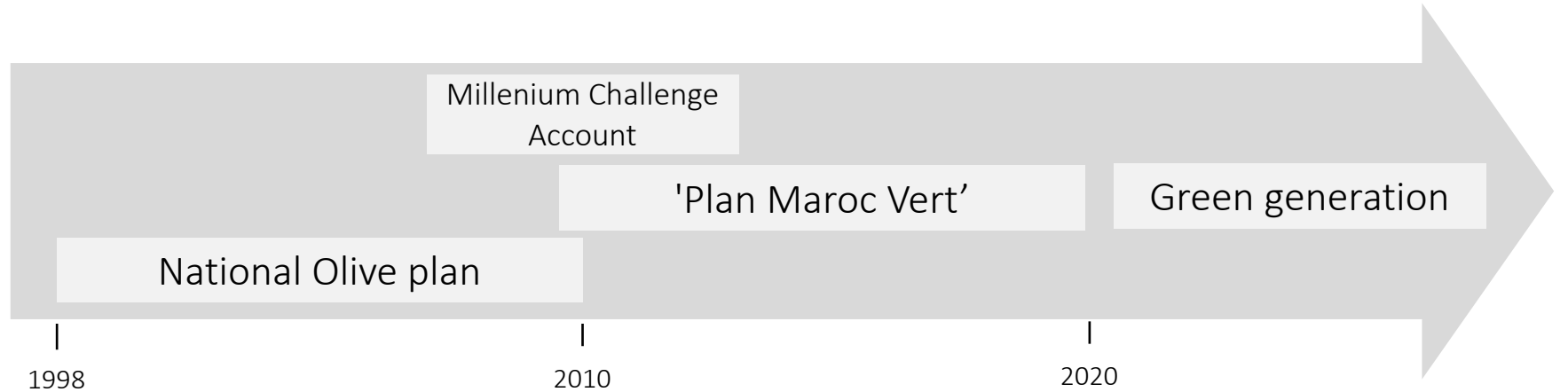
from 66 kT to 142 kT in approx. 15 years



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Context

Recent olive development efforts in Morocco



Main actions & objectives

- Increasing yields
- Extending olive cultivation areas
- Promoting modern oil mills
- Improving oil quality
- Structuring the value chain

A multifaceted olive production landscape



Rainfed orchards
60% of national olive
orchard areas



Irrigated orchards
40% of national olive
orchard areas

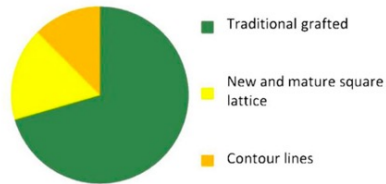
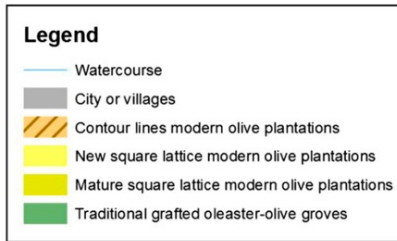
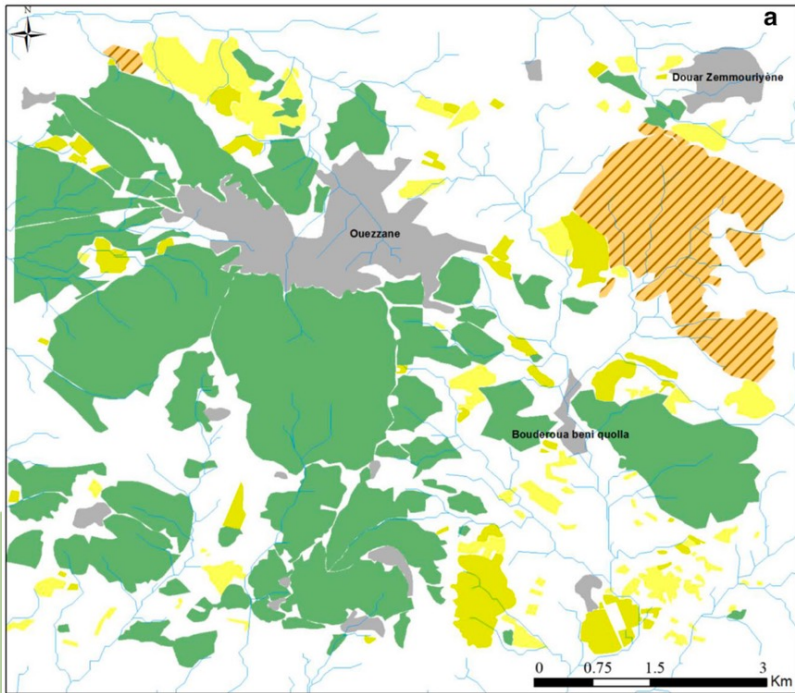




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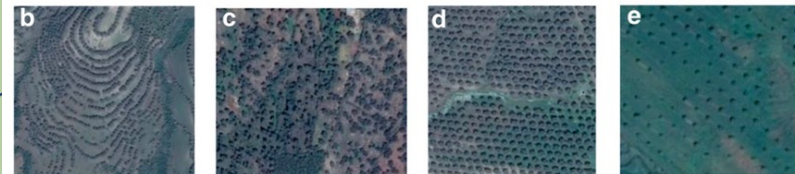
Context

A multifaceted olive production landscape



Grafted and planted orchards coexist

A large diversity of oleasters that contrast with the homogeneity of domesticated varieties





Research objectives

**Environmental constraints
experienced by farmers**

Farmers' adaptation practices

Role of varietal diversity in
adaptation strategies



1. Which environmental factors affect olive production?
How do these factors changed?

As farmers experience climatic and biological factors as a whole (e.g. interlinkage between diseases and climatic events), an holistic approach of the environmental constraints was required



Research objectives

Environmental constraints
experienced by farmers

Farmers' adaptation practices

Role of varietal diversity in
adaptation strategies



2. How do farmers cope with environmental constraints in their orchard management strategies?

Taking into account 3 levels of management: the tree, the orchard and the farm



Research objectives

Environmental constraints
experienced by farmers

Farmers' adaptation practices

**Role of varietal diversity in
adaptation strategies**



3. What is the specific role of olive tree varietal diversity and/or selection in farmers' adaptation strategy?

Assessing farmers' knowledge about olive varieties and the importance of varietal diversity and selection in farmers' adaptation strategy to environmental constraints



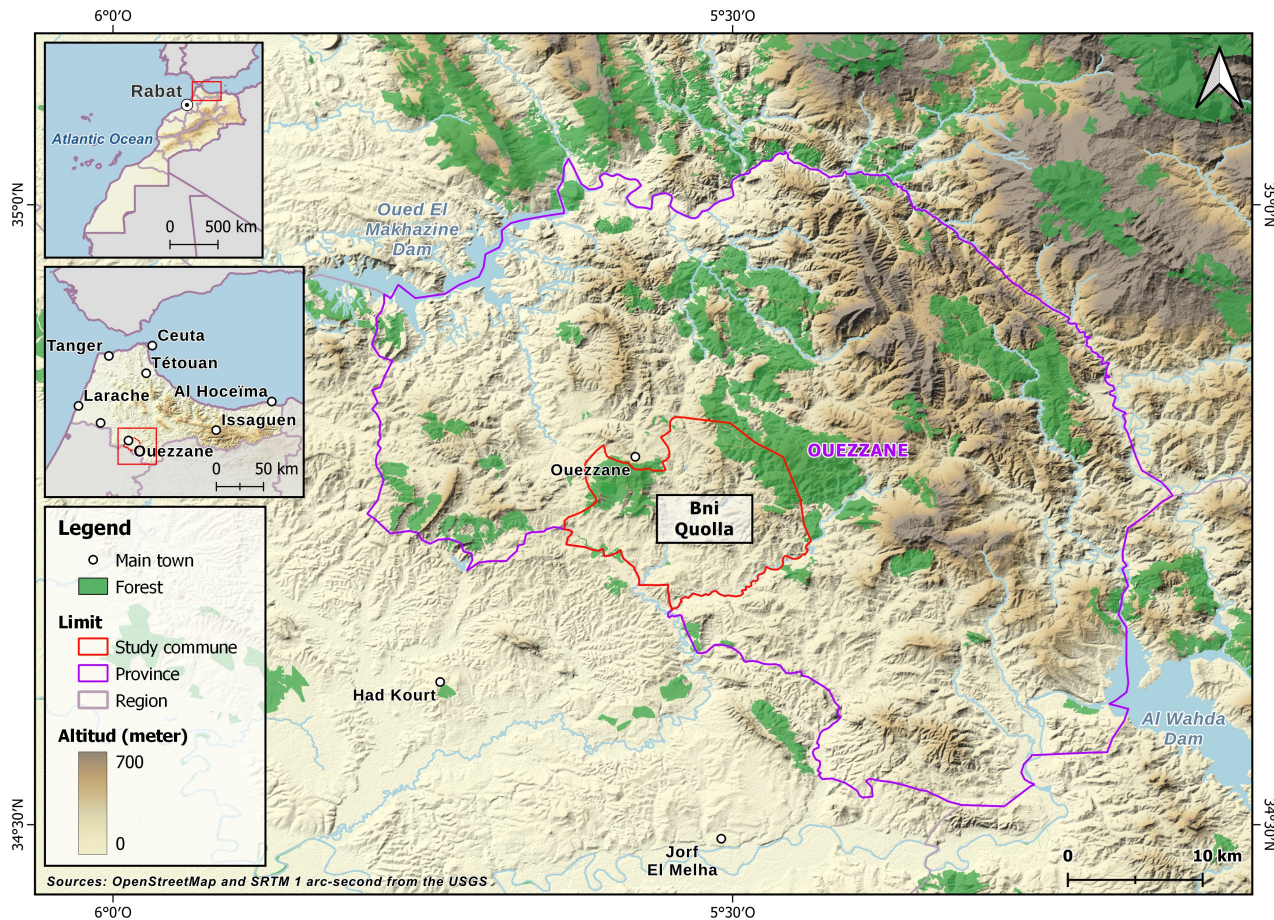
Materials & Methods

Focus on the Ouezzane province

47 farmers interviewed in two villages in the Bni Qolla commune

Scoping phase: 15 farmers

Main phase: 32 farmers





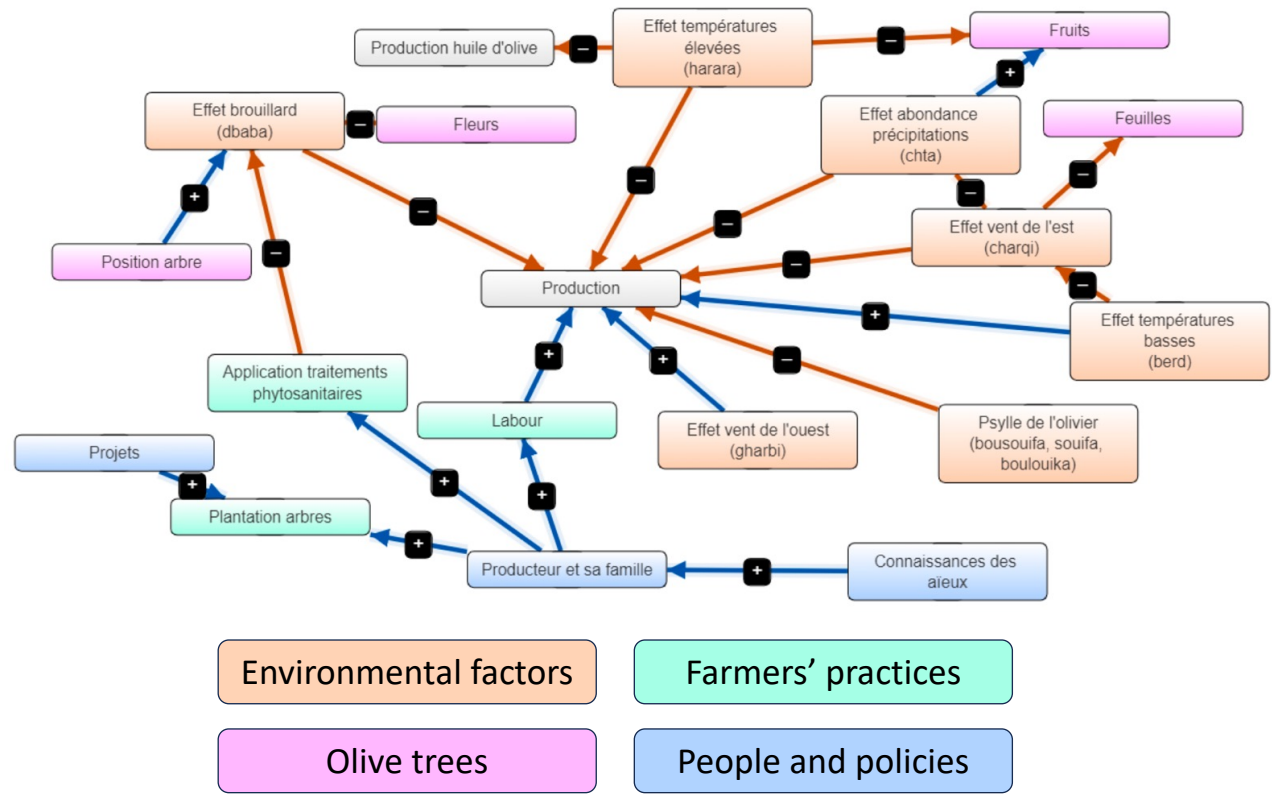
Materials & Methods

Thematic analysis of semi-structured interviews

Descriptive statistics

Cognitive mapping of farmers' systems of practices

Example of an individual cognitive map built from one of farmer's interview



The background image shows a rural landscape. In the foreground, a flock of sheep, including several black ones, is grazing in a field of tall, dry grass. A person, likely a farmer, is visible in the middle ground, tending to the sheep. The background features a hillside covered in olive trees under a clear blue sky.

Results 1

Environmental constraints
experienced by farmers

Droughts, pests and diseases are the most salient constraints and are reinforcing

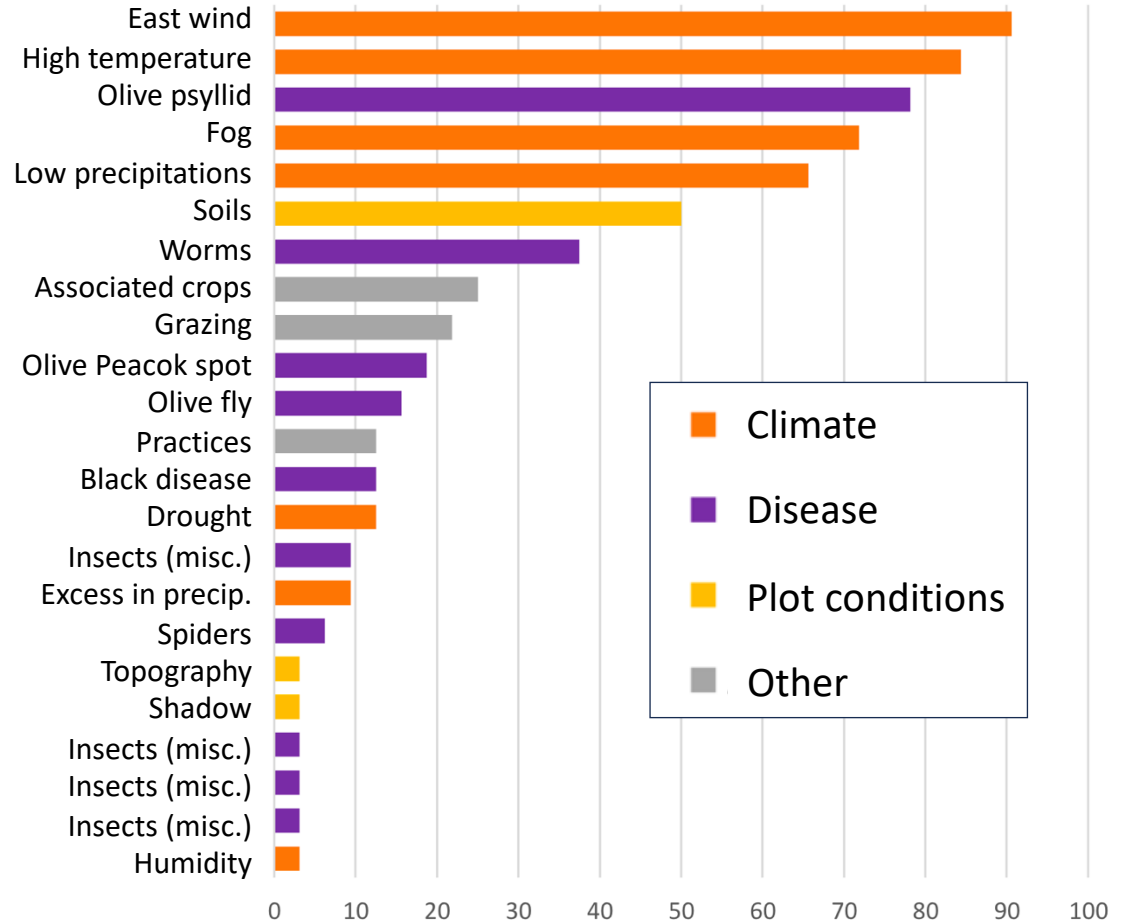


Results 1

Frequently-cited environmental constraints

East wind (*charqi*) => drying wind, yellowing of leaves, flower drop, smaller fruits

West wind (*gharbi*) => refreshing wind, beneficial to olive production



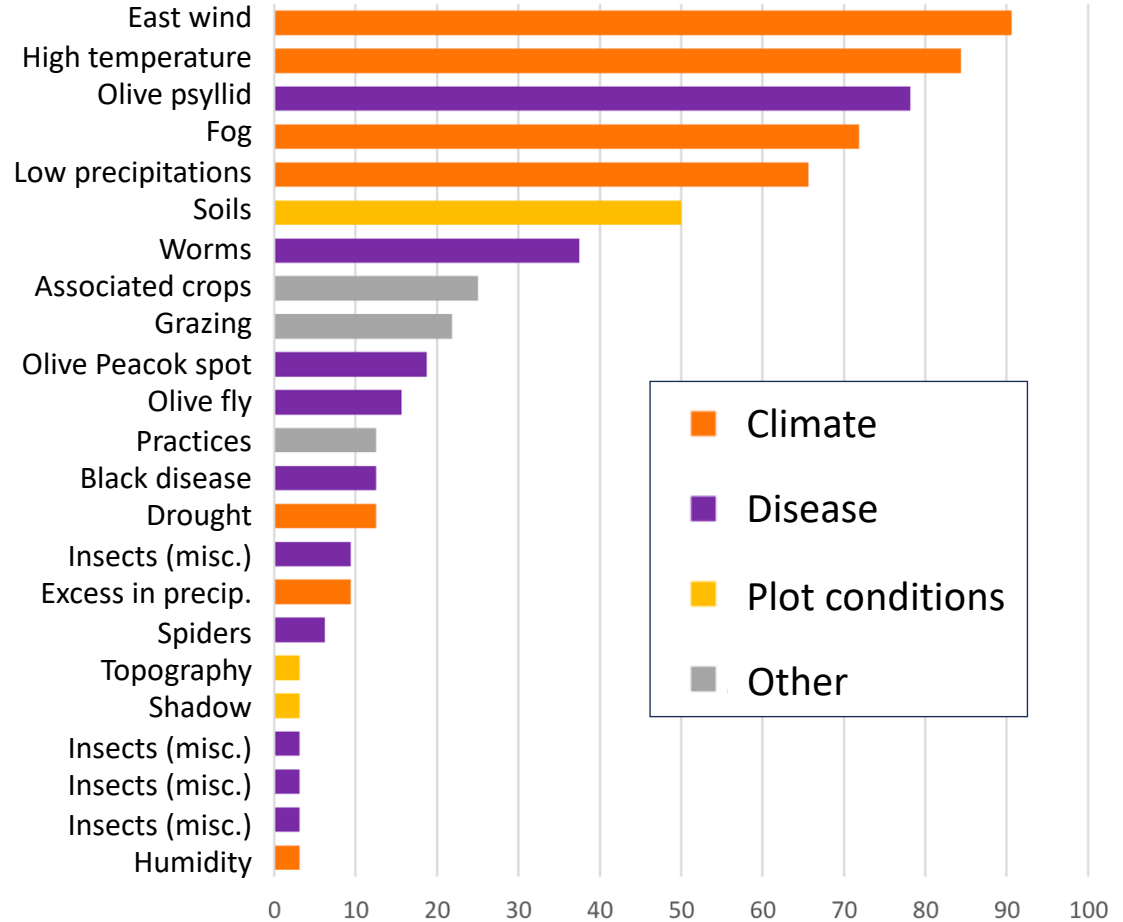


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Results 1

Frequently-cited environmental constraints

Fog (humidity) favors the development of *Euphyllura olivine*: it impacts buds and leads to leaf fall





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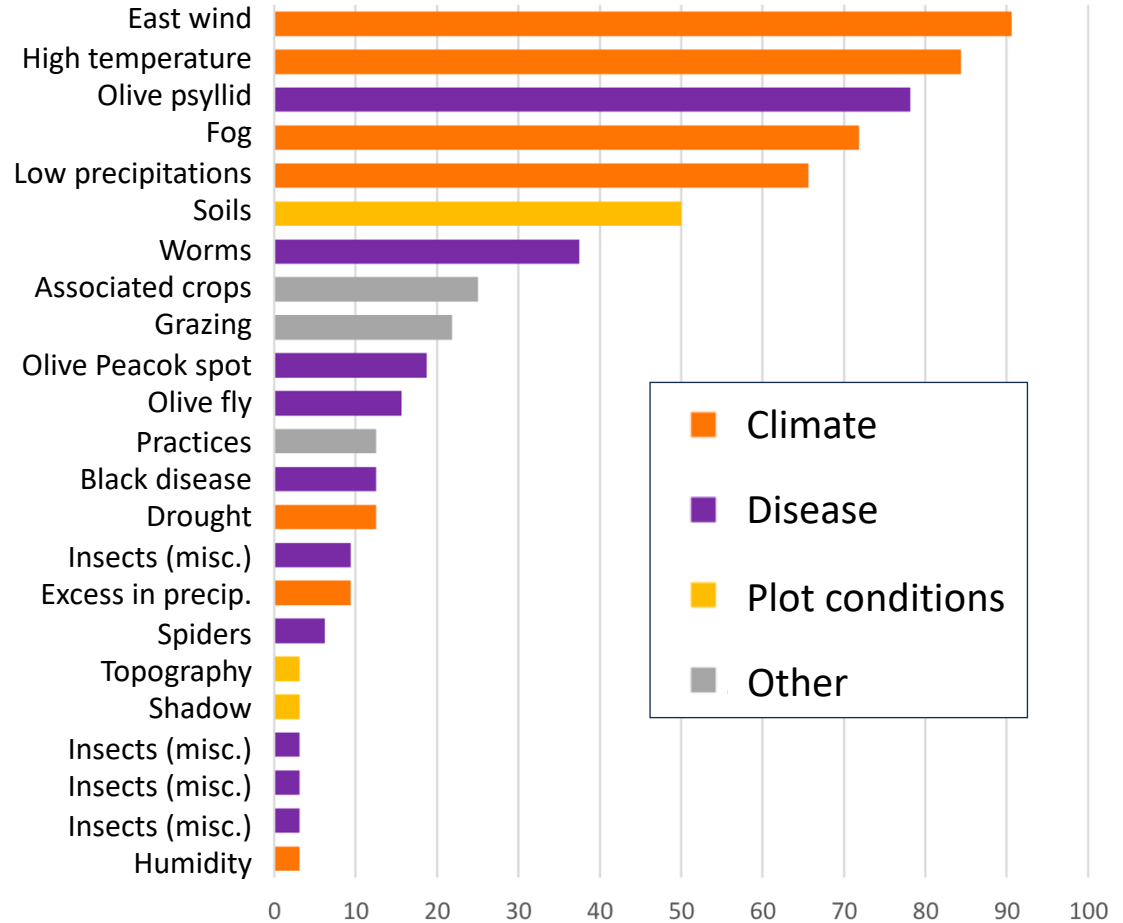
Results 1

Frequently-cited environmental constraints

Rainfall quantity and temporality matter

“Liali is a rainy period from the end of December to early January, lasting 40 days. During this period, it rains a lot. If it rains a lot as before, then rivers, wells and fountains fill up and then, we can say the year will be good in terms of production”

Interview with a farmer (08/05/2023)



Evolution of environmental constraints


Increase in the frequency, intensity and unpredictability of **heat waves**

Decrease in rainfall : watercourses remain dry longer than before, soils are fissured all year long



Pests and diseases increase because of...

- ... increasing temperatures
- ... the expansion of olive plantations under the Plan Maroc Vert (PMV)
- ... an improved knowledge of farmers who received training under the PMV



Soil and tree management techniques are central to face droughts, but farmers hardly fight pests and diseases

Results 2

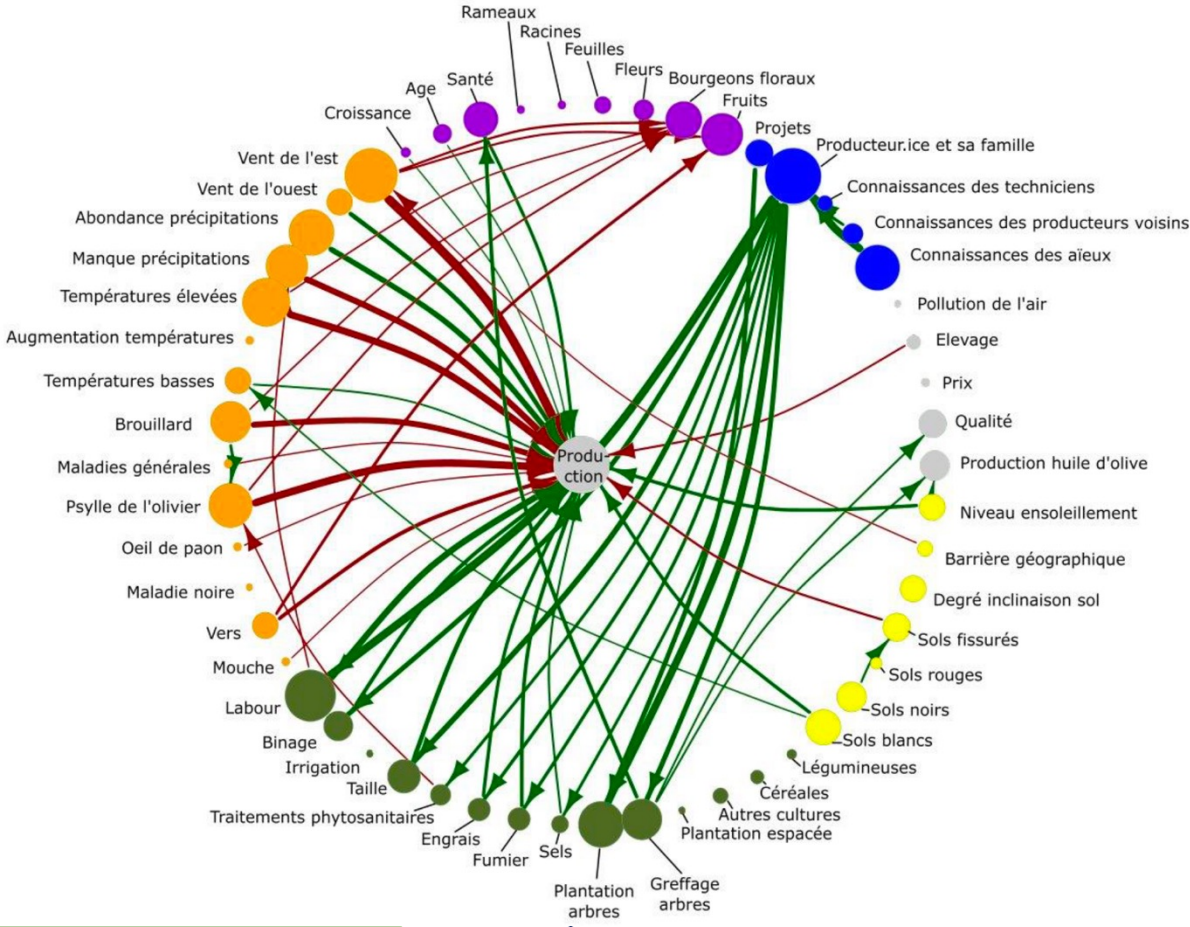
Farmers' adaptation practices



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Results 2

Overview of farmers' systems of practices

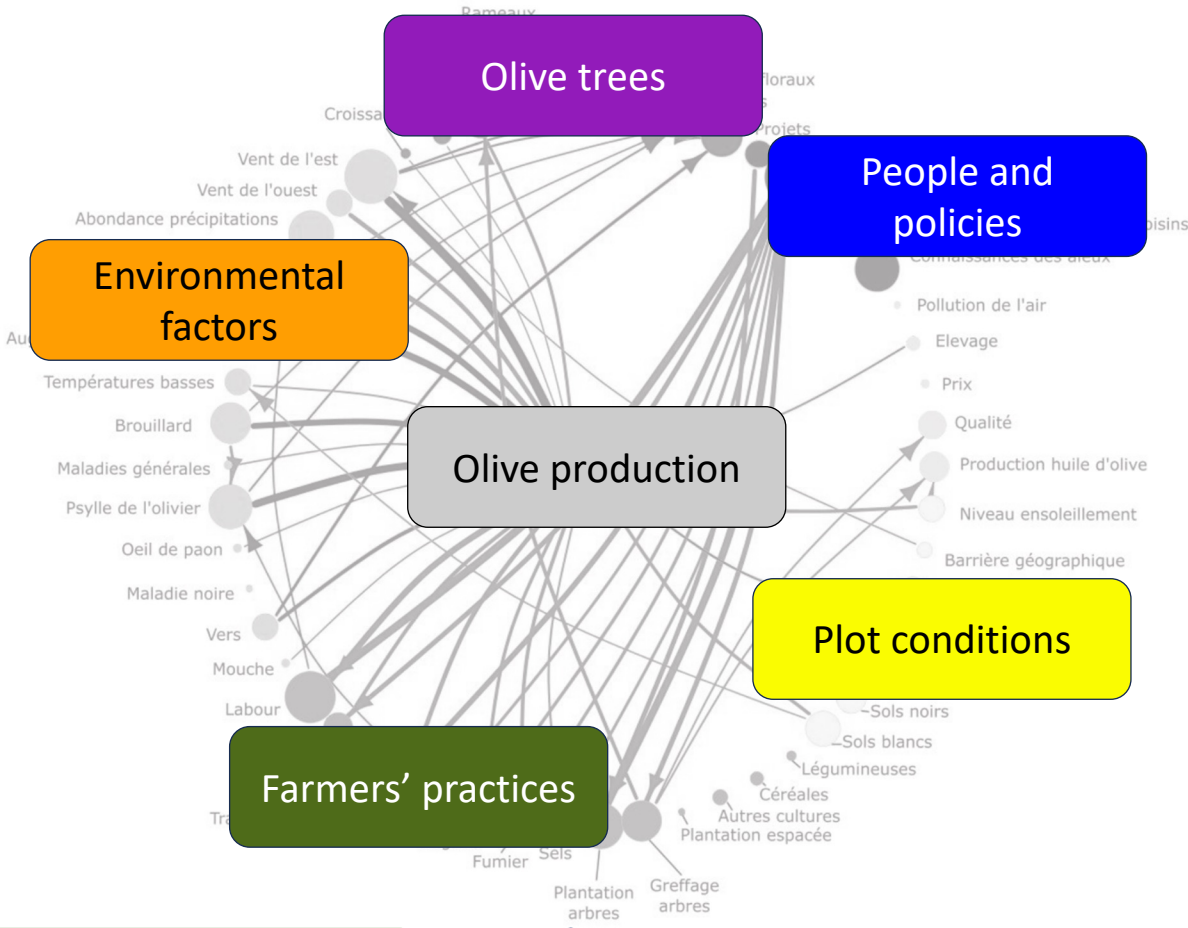




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Results 2

Overview of farmers' systems of practices



=> Soil & water management
tillage, hoeing, irrigation

=> Tree management
pruning, phytosanitary treatments, harvest

=> Inputs
fertilizers, salts, manure

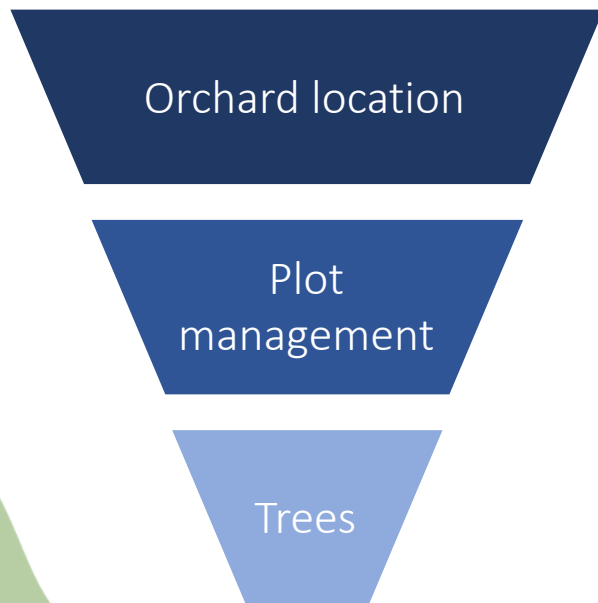
=> Associated crops



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Results 2

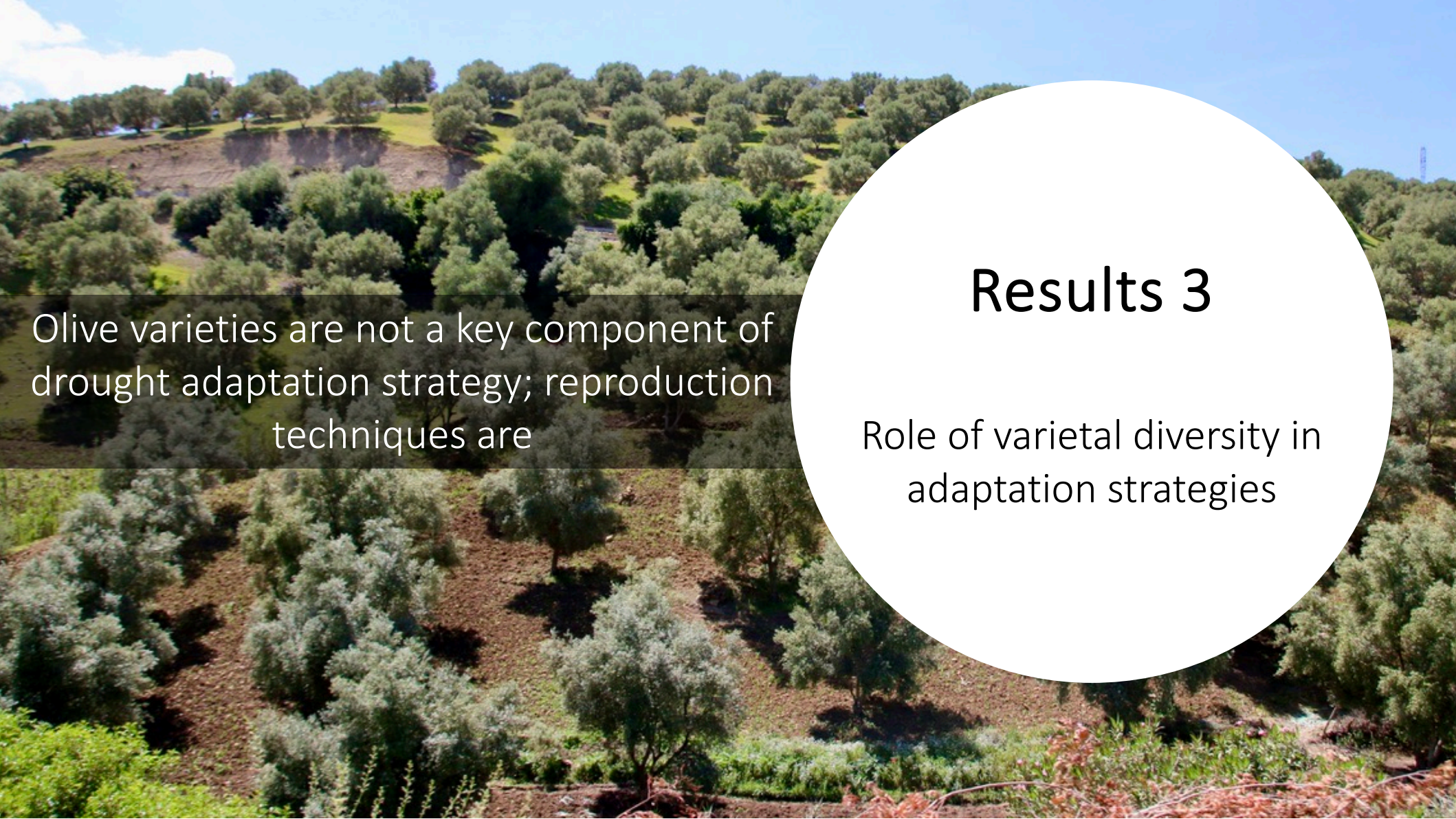
Factors of vulnerability of olive groves



Soils: white, black, red
Topography: plains, hills
Sun exposure

Grazing under olive trees
Orchard reproduction : grafting vs. plantation

Tree age
Landraces vs selected varieties

An aerial photograph of an olive grove on a hillside. The trees are densely packed and appear to be a mix of green and silvery-green varieties. In the background, a prominent cliff face is visible, suggesting a semi-arid or Mediterranean climate. The sky is clear and blue.

Olive varieties are not a key component of drought adaptation strategy; reproduction techniques are

Results 3

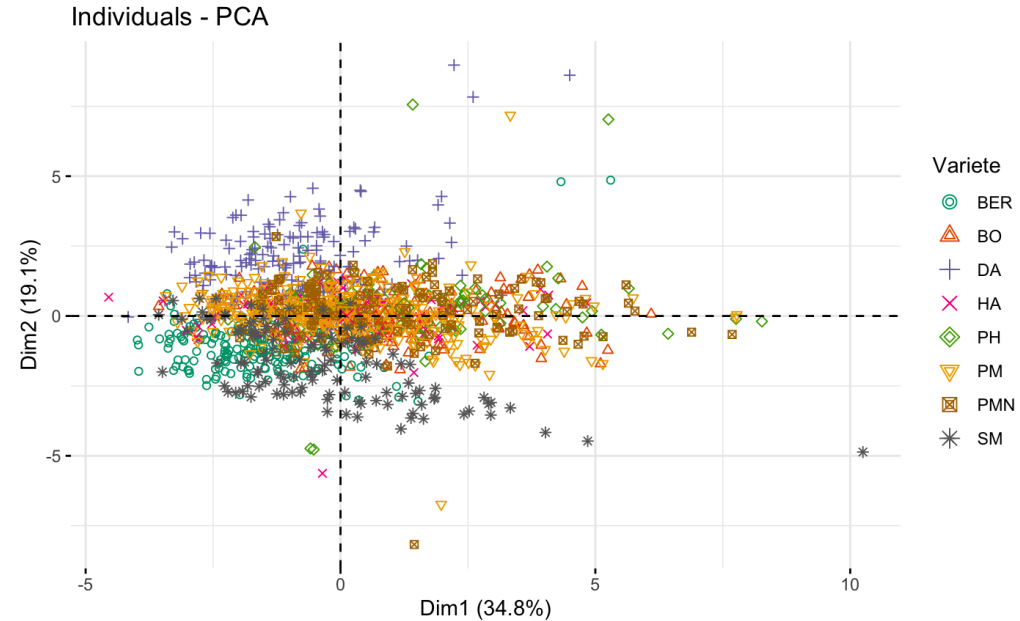
Role of varietal diversity in adaptation strategies

How farmers discriminate olive varieties

Main criteria used by farmers are linked to olive fruits: shape, color, fruit and stone size
Most farmers cannot distinguish varieties without fruits



Discrimination of olive varieties on the basis of measured foliar traits

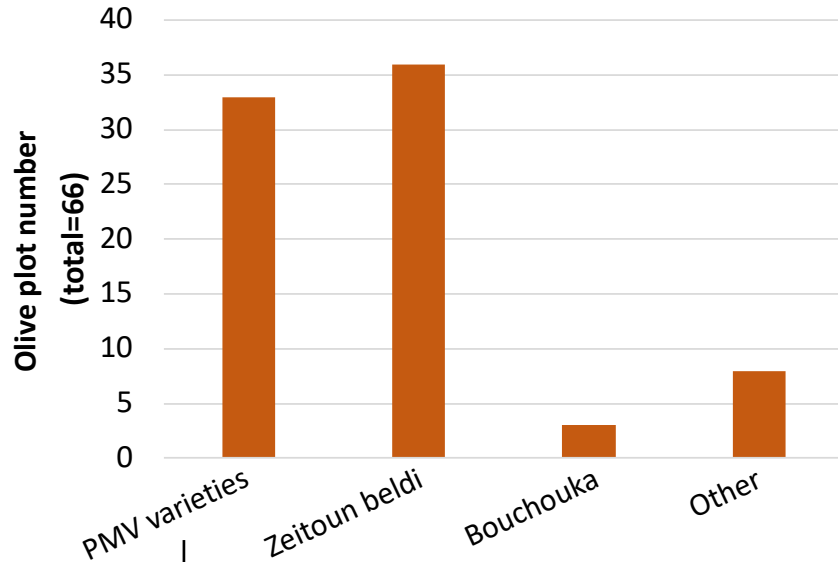




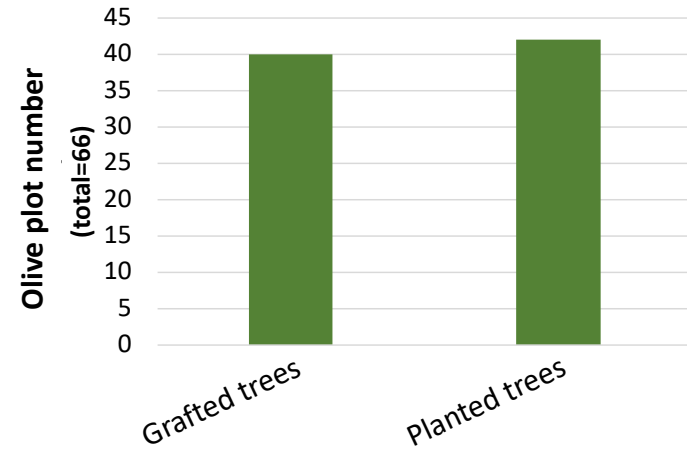
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Results 3

Olive varieties and reproduction techniques



60% picholine
20% Haouzia
20% Menara



Grafted landraces (Bouchouka et Zeitoun beldi) are considered more resistant to east wind and drought than planted varieties

**Discussion
and
perspectives**



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Discussion

Contrasts with public policies and perspectives

Existing **grafted orchards** are the **blind spot of the successive support programs** of the olive sector while farmers tended to highlight their relevance

Similarly, **sound management practices could help farmers cope with increasing droughts** in rainfed systems but are poorly supported by current programs

There is a large lack of research on the relative (economic and environmental) **performances of grafted vs. planted systems** that should be urgently addressed

Farmers are not the only stakeholders in the olive sector => what are the **perspectives from the other stakeholders?**

Thank you for your attention!

