Rainfed almonds in Spain
Case Study 1

Experimenting crop diversification and low input farming

Experimentation plot of 0.10 ha with 54 almond trees located in Region of Murcia (Spain) in a rainfed conventional monocropping system used for food production

The soil shows high erosion with rills and gullies, low quality, and low soil organic matter content because of this cropping system

2 DIVERSIFICATIONS CARRIED OUT IN THE CASE STUDY AS ALLEY CROPS

1. Almond trees intercropped with *Thymus hyemalis*
2. Almond trees intercropped with *Capparis spinosa*

AGRONOMIC BENEFITS

The **main crop yield** is not reduced with the diversification

Essential oil production in the thyme diversification provides **extra income in farm productivity**

Improvement in the availability of **nitrogen and water for plants**

ENVIRONMENTAL BENEFITS

Contribution to **climate change mitigation**
+ Reduction of soil CO_2 emission rates by 20%
+ Increase in soil organic carbon in the thyme diversification

Significant **reduction in interrill erosion**
+77% and 100% for thyme and caper diversification, respectively

Improvements in **soil structure and soil fertility**

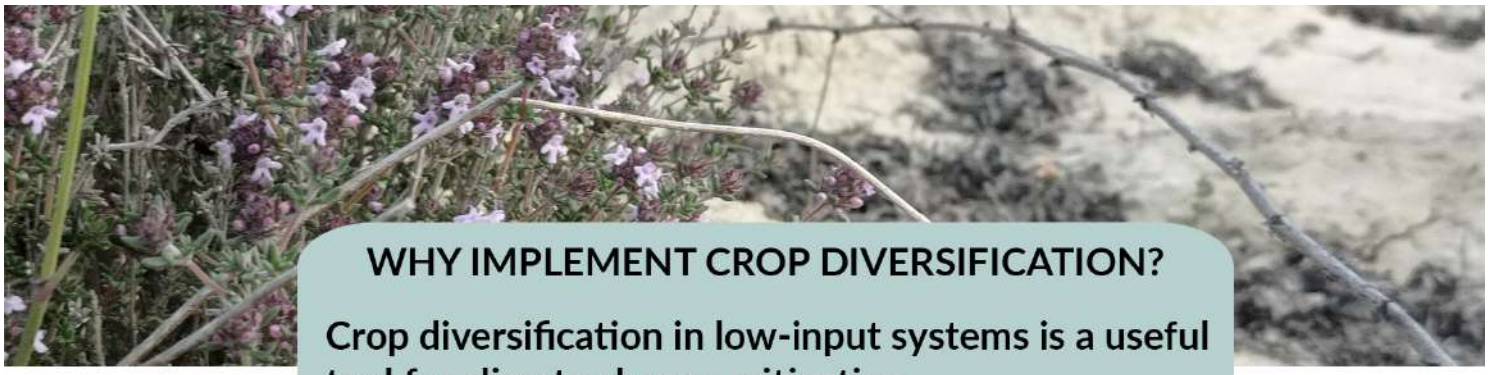
SOCIOECONOMIC BENEFITS

Slightly **higher farm revenues** with diversification

Improves local economy and retains local population

Enhances **alternative and non-intensive use of land**

DIVERFARMING



WHY IMPLEMENT CROP DIVERSIFICATION?

Crop diversification in low-input systems is a useful tool for climate change mitigation

AGRONOMIC DRAWBACKS

Improvements in the main crop yield are **not observed immediately**

Dependency on climate and microsite conditions for a successful crop diversification development and establishment

Potential problems of competition for water and nutrients between the main crop and the diversification crop, given the harsh environmental conditions

ENVIRONMENTAL DRAWBACKS

Environmental changes in the short-term are difficult to detect due to the harsh environmental conditions because the diversification is implemented in a low-input system

Susceptibility to soil compaction due to no-tillage in diversified systems

SOCIOECONOMIC DRAWBACKS

Higher variable and fixed costs at farm level due to the experimental plantation design that requires, for example, harvesting by hand

Higher gross/net margins at farm level

Economics benefits from the diversification are not immediate

FINAL CONCLUSION

Is it beneficial to adopt these sustainable practices?

The results indicate the potential viability of implementing crop diversification as alley cropping in rainfed woody crops, given that significant environmental and even agronomic benefits have been observed without compromising the production of the main crop in the shortterm.The increment in the farm cost for the implementation can be compensated by agronomic and environmental benefits. Those benefits will help the local economy in the longterm.

HORIZON 2020

DIVERFARMING