

# SILVOARABLE AGROFORESTRY SYSTEMS

AUTHORS:

LÉA VEUILLEN

FABIEN BALAGUER

MODULE 8



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## AIM OF THE MODULE



- Definition and historical context of silvoarable agroforestry
- Different types of silvoarable agroforestry
- Tree – crop interaction
- Novel agroforestry systems – alley cropping, importance and function of alley cropping



## DEFINITION AND HISTORICAL CONTEXT OF SILVOARABLE AGROFORESTRY



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In silvoarable systems, agricultural or horticultural crops are grown in wide **alleys intercropped with tree rows**.

This systems provides annual income while the trees mature.

Silvoarable agroforestry is NOT new: as the other traditional agroforestry systems, it has been existing for a long time, just not under the term « agroforestry », which is quite recent.



## DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



Trees can be grown for timber, fuelwood, fruits, nuts, ... thus taking different shapes (pollard, cup tree, high-value timber tree, ...)

*Walnuts with  
wheat and lavender,  
provence, France*





# DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



*Wheat under walnut  
(INRA, France)*



# DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



*Olive trees with aloe vera, Spain*



# DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



*Large windbreaks in traditional crops, Czech Republic*



# DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



*Alley cropping with cereals, Czech Republic*



# DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



*Poplar with vegetable crops, France*



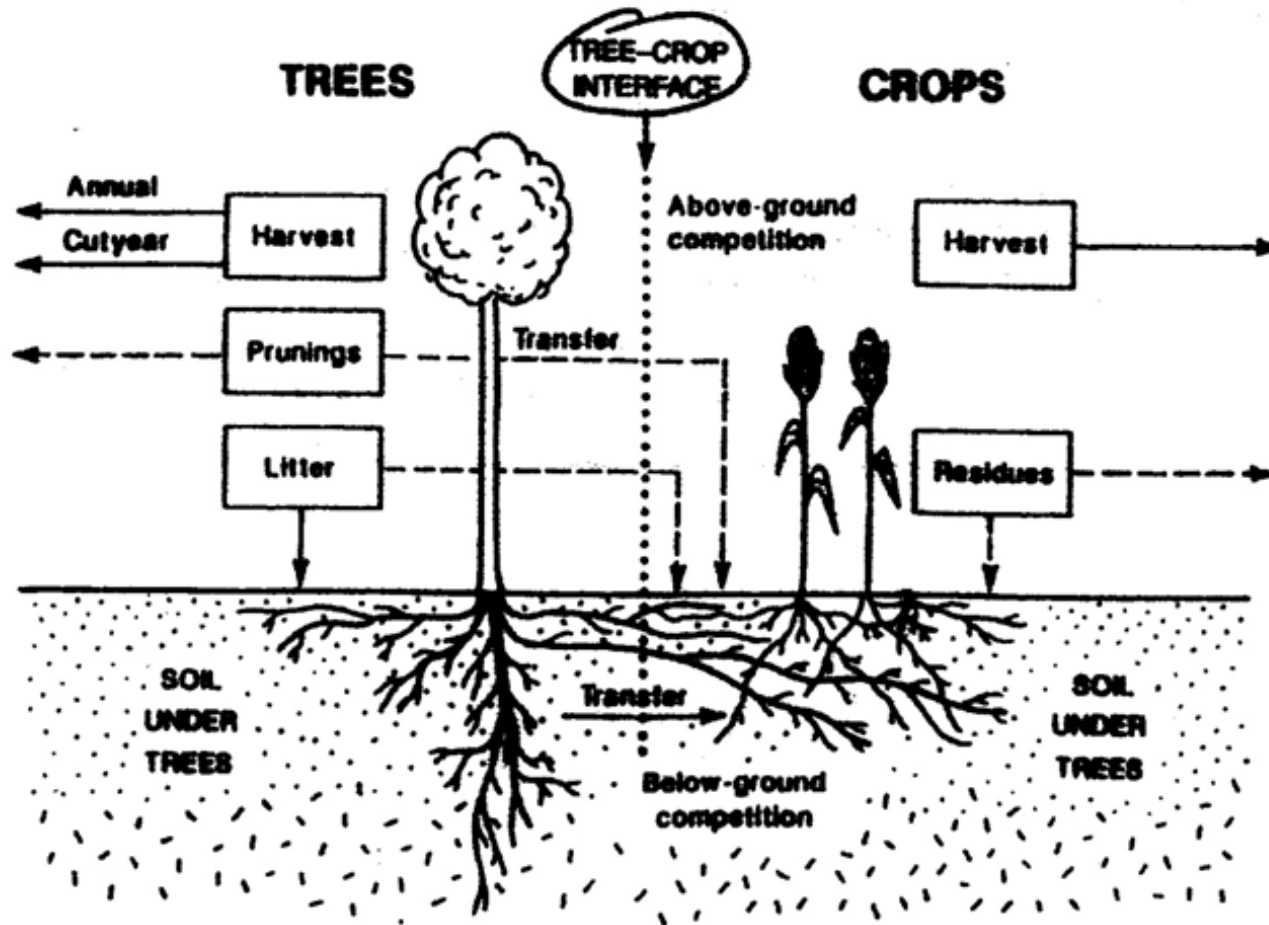
# DIFFERENT TYPES OF SILVOARABLE AGROFORESTRY



*Trees with vineyards, France*



# TREE-CROP INTERACTIONS



- Organic matter returns to the soil : improved soil fertility
- A tree seeks its nutrients deeper than a crop, and then
- Releases them on the top soil : efficient and balanced
- Nutrient cycling
- Improved soil conservation management
- Improved microclimate for the crops
- Increased productivity : 1,2 to 1,6 ha of separated crop + forest areas are needed to produce as much as 1 ha of agroforestry

If the system is not well managed...

- Competition for light, water, and nutrients
- Allelopathy



# NOVEL AGROFORESTRY SYSTEMS – IMPORTANCE AND FUNCTION OF ALLEY CROPPING



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3 main types of agroforestry in EU :

- ✓ **livestock** (98 %)
- ✓ **silvoarable** (2 %)



Including **high value tree agroforestry** (7 %)

Agroforestry = 15.4 million ha in EU (8.8 % of the Utilised Agricultural Area)

*Source : den Herder, M., Moreno, G., Mosquera-Losada, R.M., Palma, J.H.N., Sidiropoulou, A., Santiago Freijanes, J.J., Crous-Duran, J., Paulo, J.A., Tomé, M., Pantera, A., Papanastasis, V.P., Mantzanas, K., Pachana, P., Papadopoulos, A., Plieninger, T., Burgess, P.J. (2017) . Current extent and stratification of agroforestry in the European Union. *Agriculture, Ecosystems and Environment* 241: 121–132*

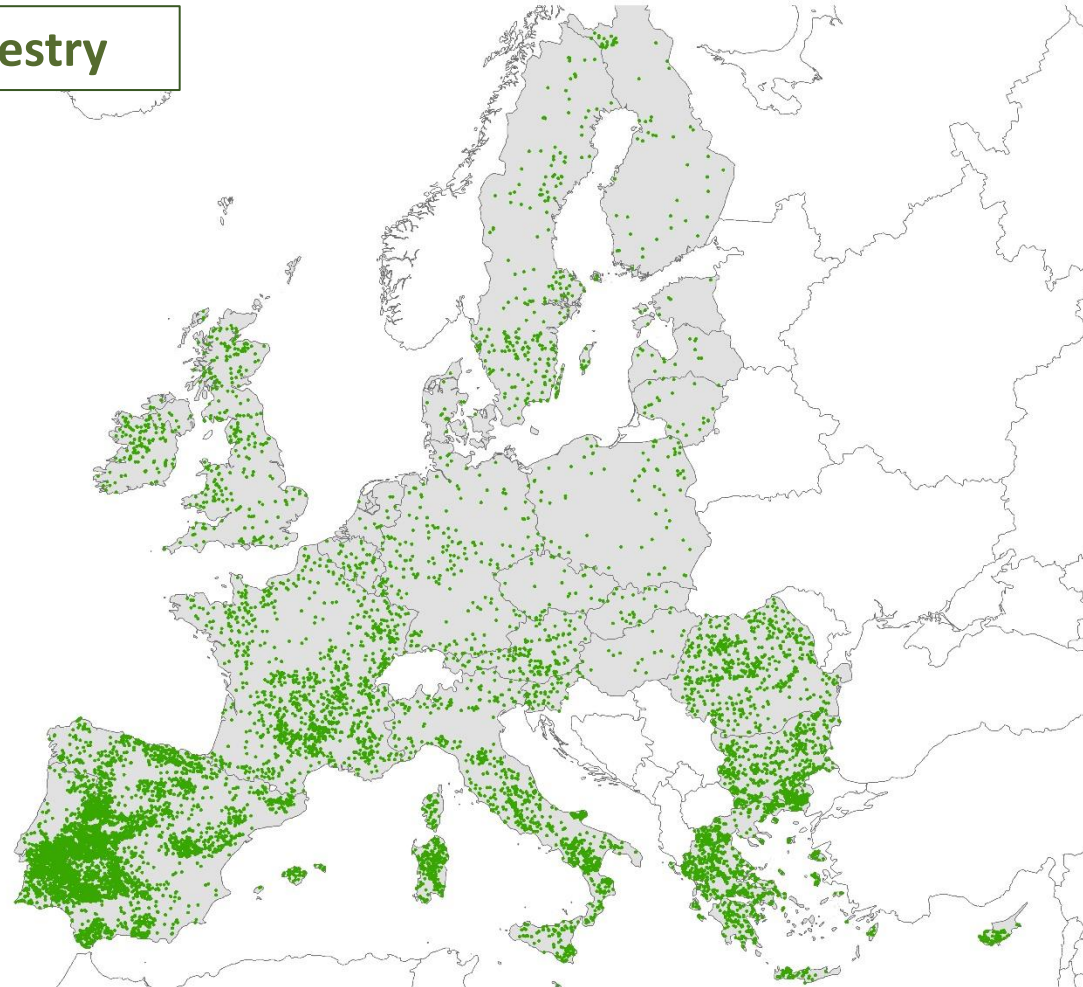


# NOVEL AGROFORESTRY SYSTEMS – IMPORTANCE AND FUNCTION OF ALLEY CROPPING



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All agroforestry



Source : Agforward Project

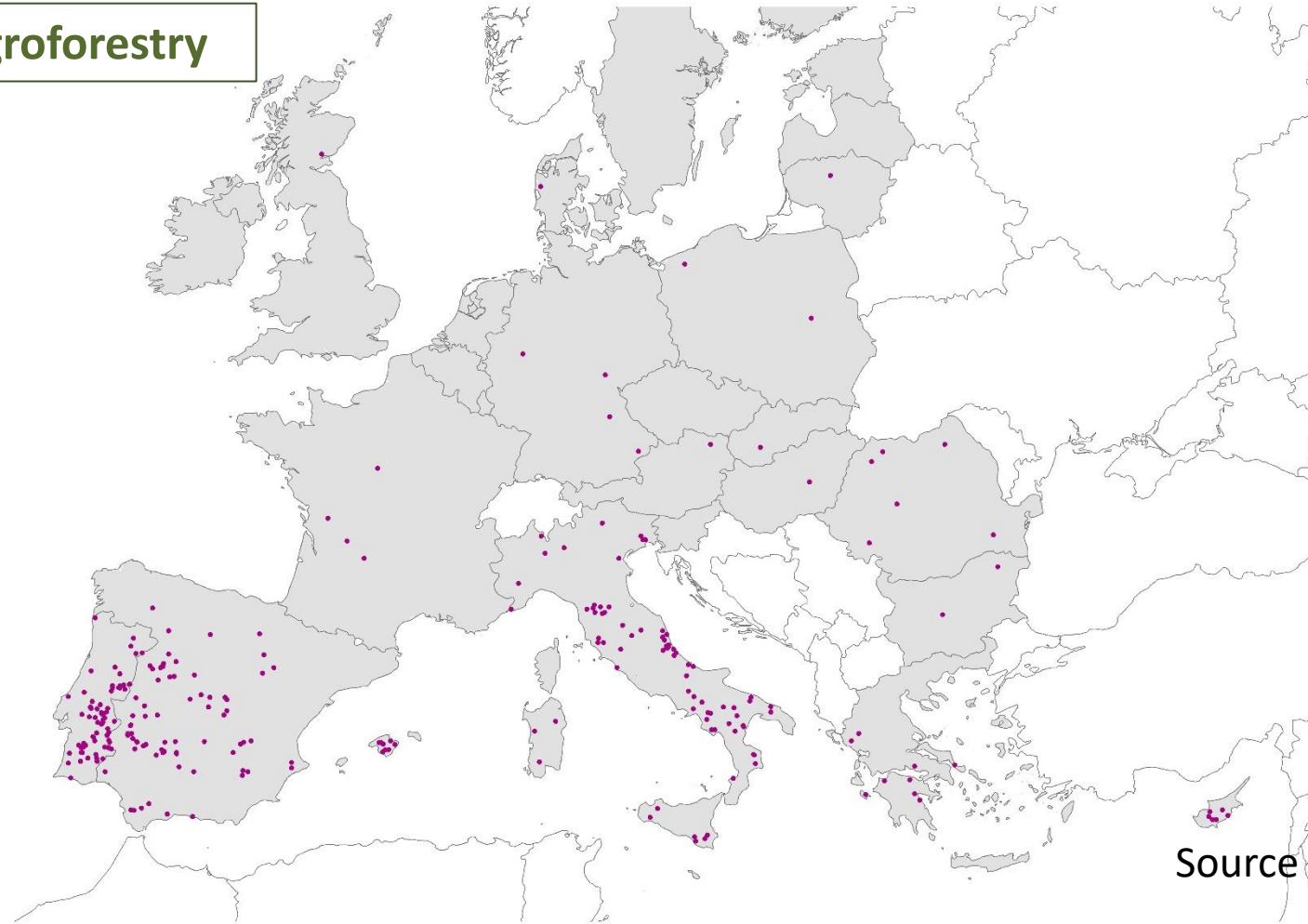


# NOVEL AGROFORESTRY SYSTEMS – IMPORTANCE AND FUNCTION OF ALLEY CROPPING



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Arable agroforestry



Source : Agforward Project



# NOVEL AGROFORESTRY SYSTEMS – IMPORTANCE AND FUNCTION OF ALLEY CROPPING



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High value tree  
agroforestry



Source : Agforward Project



# SUMMARY OF THE MODULE



## LESSON LEARNED

- **Silvoarable agroforestry = tree rows intercropped with arable crops**
  - Traditional land management
  - Different types of systems
  
- **Tree-crop interactions improve soil, water, microclimate, system productivity**
  
- Agroforestry = 15.4 million ha in EU (8.8 % of the Utilised Agricultural Area)
  - Most of it = livestock agroforestry
  - Arable agroforestry = only 2 %