

MAJOR AGROFORESTRY SYSTEMS IN EUROPE

BEST PRACTICES, CASE STUDIES

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MODULE 2



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AIM OF THE MODULE



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- Classification of agroforestry systems
- The main types of agroforestry systems in Europe
- Available case studies and best practices



CLASSIFICATION OF AGROFORESTRY SYSTEMS

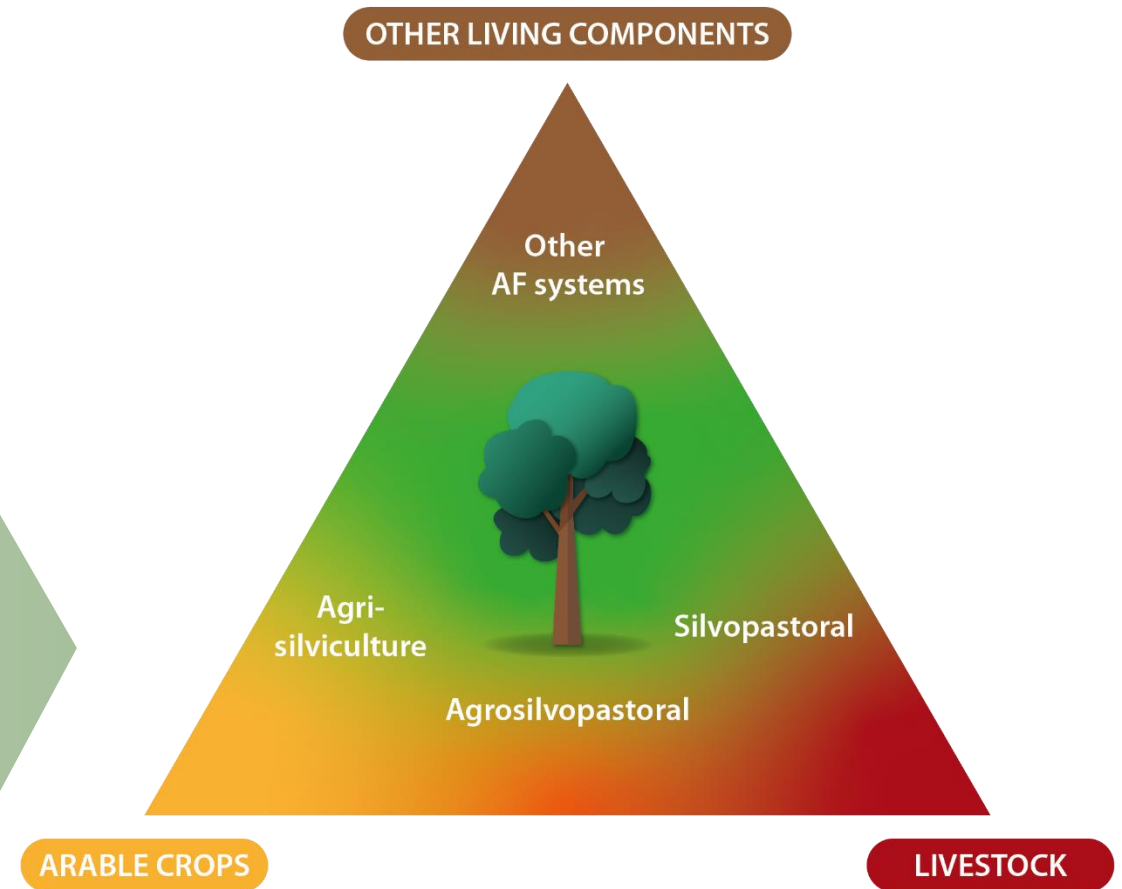


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The first global inventory of agroforestry systems was developed by ICRAF between 1982 and 1987, the information from which Nair (1985) organised the first comprehensive classification of agroforestry systems.

Since then, many classifications have been developed by Sinclair (1999), Dixon et al (2001), McAdam et al. 2009, Mosquera-Losada et al. (2009), and Minang et al. 2015, among others.

In this lecture, a classification based on the structural and functional aspects will be introduced where the type of components are taken as primary considerations in categorization of agroforestry systems.





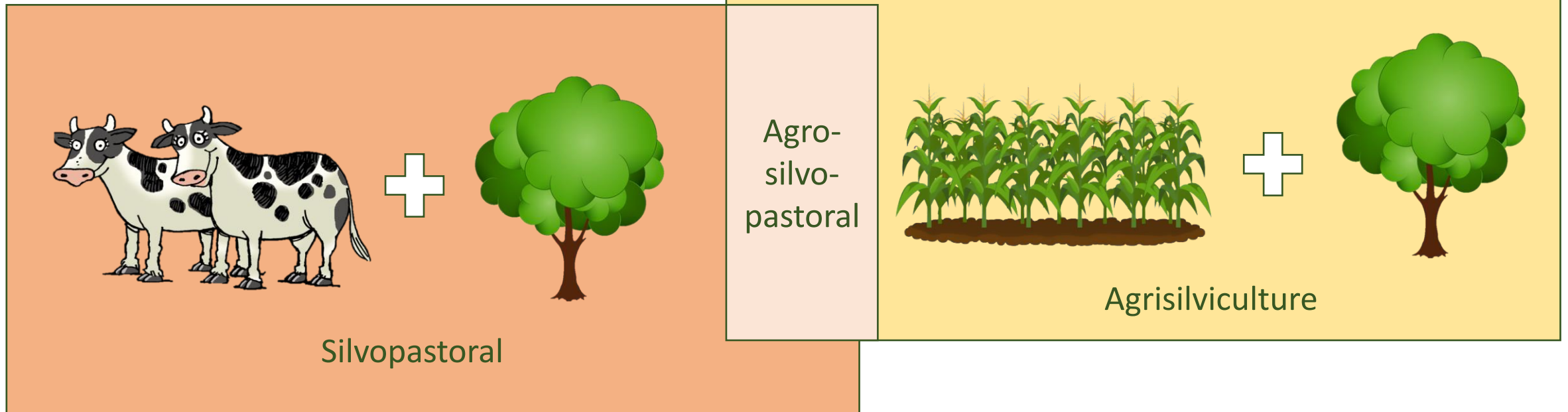
CLASSIFICATION OF AGROFORESTRY SYSTEMS



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According to the three basic components (tree, agricultural crop and animal) that are managed by the land user in an AF system three main types of systems can be distinguished.

Each of these main categories incorporate a variety of different systems introduced on the next slides.





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SILVOPASTORAL SYSTEMS

Combining trees with forage production and animal husbandry. These include grazing in forests or woodlots, wood pastures, open forest trees and grazed orchards



Intensive grazing in a forest in USA to reduce the height and density of the understory
(Source: Cornell University, Small Farm Program)



Montado with pigs and cattle grazing in Portugal
(Source: <http://www.agforward.eu>)



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SILVOPASTORAL SYSTEMS

Grazed orchards: this practice includes fruit orchards, olive groves and vineyards which are grazed



Grazed orchard in the Czech Republic
(Source: eurafagroforestry.eu)



Sheep grazing in a vineyard in early spring, California
(Source: Houston and Kent, 2017)



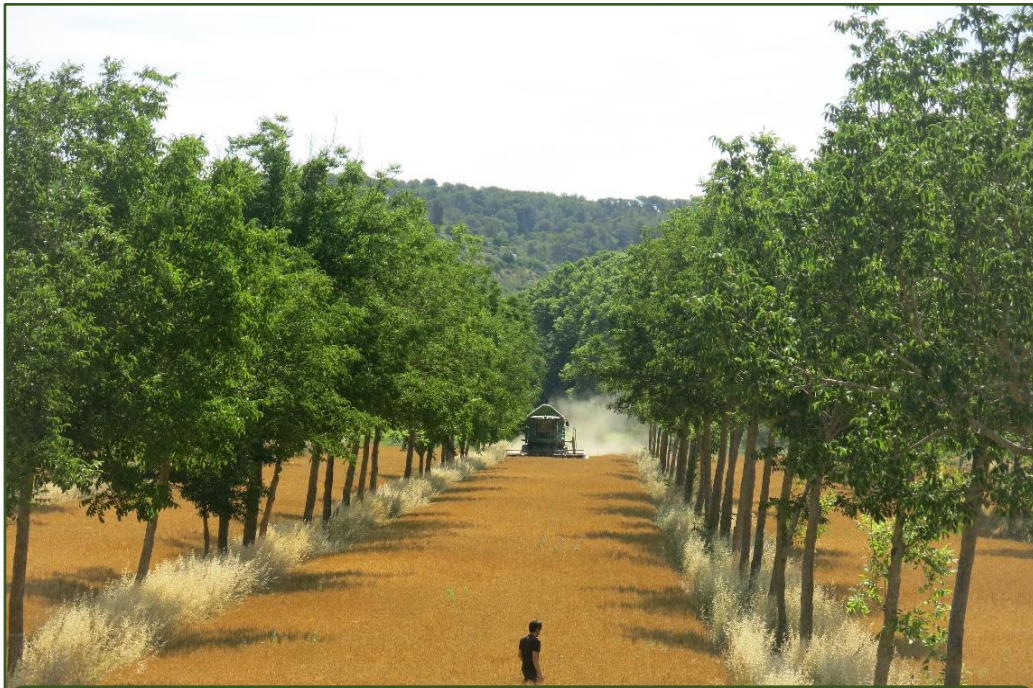
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AGRISILVICULTURAL (SILVOARABLE) SYSTEMS

This group of AF systems includes hedgerows, shelterbelt and windbreak systems as well as alley cropping systems



Wheat and walnut alley cropping system in Restinclières, France
(Source: Inra, C. Dupraz)



Pine windbreaks sited 450 m apart reduce windspeed at Esperance
(Source: Sudmeyer et al., 2007)



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AGRISILVICULTURAL (SILVOARABLE) SYSTEMS

Hedgerows, shelterbelts and windbreaks are line belts providing shelter, shade, and natural boundaries to a crop and/or livestock production system as well as additional source of income (fuel, fruits, honey etc.)



Managing hedges to benefit pollinators

(Source: <https://www.agricology.co.uk/resources/managing-hedges-benefit-pollinators>)



System of the water regulation shelterbelts in Ukraine

(Source: <https://euraf.isa.utl.pt/countries/ukraine>)



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AGRISILVICULTURAL (SILVOARABLE) SYSTEMS

Alley cropping systems are widely spaced trees planted in lines intercropped with annual or perennial crops



Alley cropping with fast growing trees and alfalfa in Hungary
(Source: Vityi et al. 2017, photo by A. Vityi)



Alley cropping system in Wakelyn with a wide range of tree and crop varieties
(Source: <http://wakelyns.co.uk>)



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AGROSILVOPASTORAL SYSTEMS

A production system composed of trees, crops, agriculture and livestock



Agrosilvopastoral strips on the farm (Buenavista farm, Albania)

(Source: <https://blog.ciat.cgiar.org>, photo by Neil Palmer)



Growing cash crops and forage crops for grazing, small grains and hay crops for livestock feed in rotation

(Source: <http://waltergra.com/crop-livestock-integration/>)



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OTHER SYSTEMS: MULTIPURPOSE TREES

In these systems trees are especially valued for their many uses and products as well as several ecological functions



Traditional farming systems on the foothills of the Himalayas with multipurpose trees

(Source: AME Foundation/Leisa India)



Indigenous AF system with fruit, cocnut, banana, *Cananga odorata*, *Inocarpus fagifer*, *Hibiscus tiliaceus* and taro, sweet potatoes, yams and kava *(Source: Thaman et al., 2000)*



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OTHER SYSTEMS: FOREST FARMING

Forested areas used to grow plants for medicinal, ornamental or culinary purposes under trees



Medical plants grown in a forest farm

(Source: Pennsylvania Department of Conservation and Natural Resources)



Mushroom cultivation in forest farm

(Source: den Herder et al. 2019)



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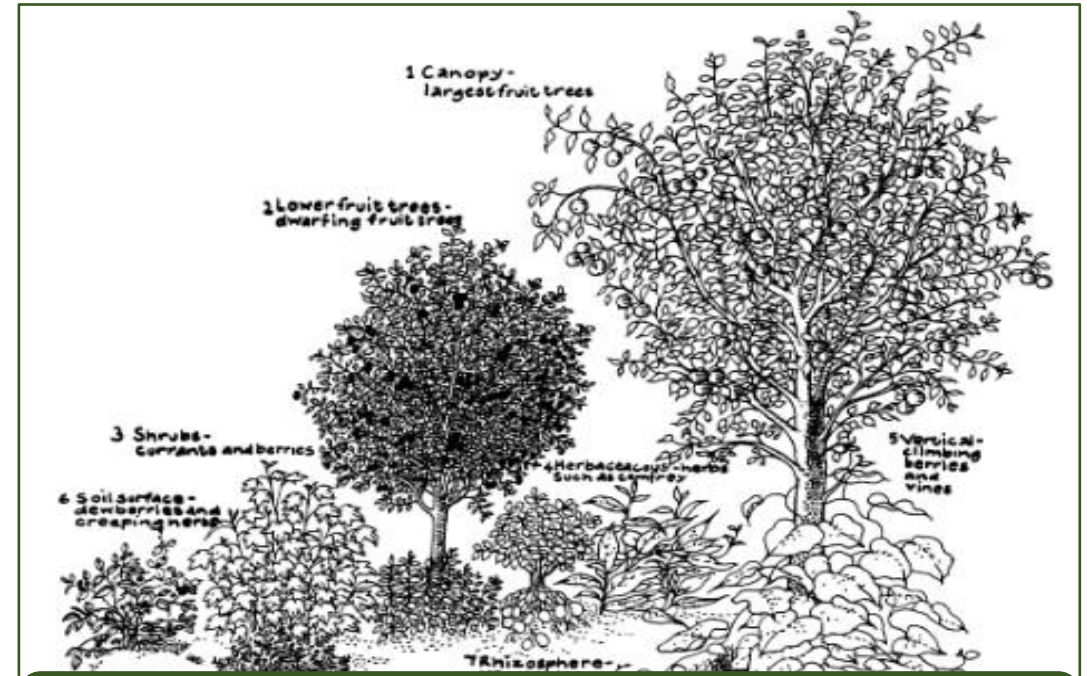
OTHER SYSTEMS: FOREST GARDENS

Low-maintenance and sustainable agroforestry system based on woodland ecosystems, incorporating fruit and nut trees, shrubs, herbs, vines, vegetables and other perennials



Forest garden

(Source: <https://www.motherearthnews.com>)



The seven levels (functional components) of a forest garden

(Source: Hart R, 1996)



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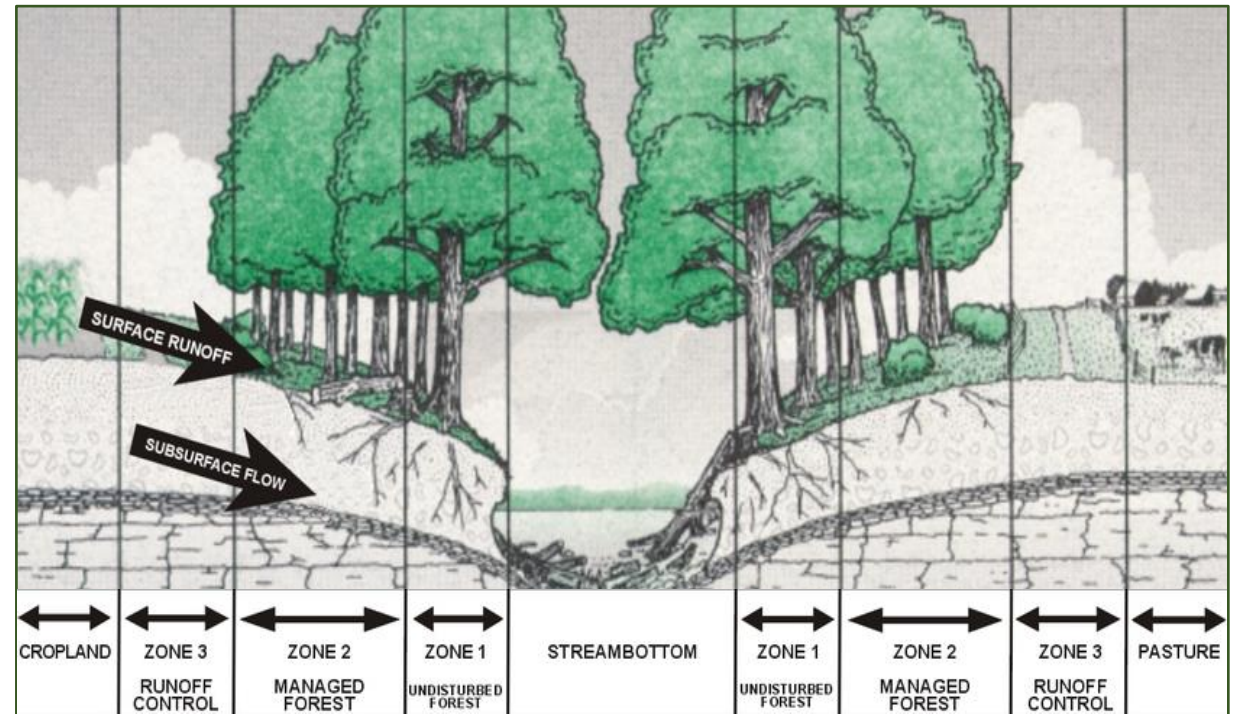
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OTHER SYSTEMS: RIPARIAN BUFFER STRIPS

Strips of trees and shrubs that separate arable land / pastures from water sources (eg streams, lakes and wetlands) to protect water quality



Riparian Buffer on Bear Creek (Iowa, USA)
(Source: USDA)



Riparian buffer system
(Source: Graff et al. 2005)



CASE STUDIES OR BEST PRACTICES OF SELECTED AGROFORESTRY SYSTEMS IN PRACTICE IN EUROPE



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Case studies

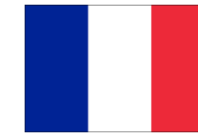
These case studies show real examples of agroforestry practices from the countries of AGFOSY project. The possibilities of application vary from country to country, so within project consortium we managed to collect interesting and different studies that should serve as a source of inspiration for farmers when implementing agroforestry practices.



Belgium



Czech Republic



France



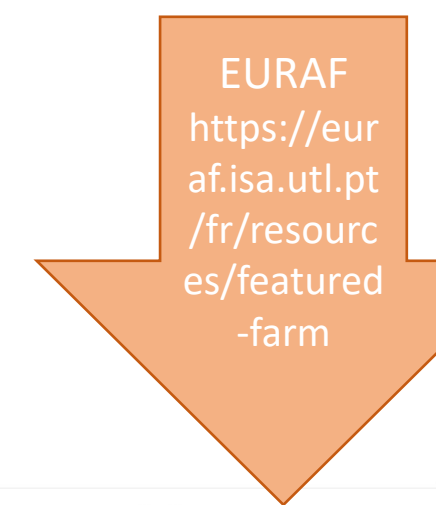
Hungary



Slovakia



Spain



Featured Farm



The orchards are grazed by geese and dairy sheep, while Jersey cows are present to prevent damage to the forest, grazing on trees, forest trees and



The Freitag's have traditionally been dealing with agroforestry systems for a long time, even though they were not previously referred to as such. The company can look back on three generations of experience in willow cultivation.



The Biolandhof Braun is a much-diversified organic farm with 58 ha of arable land, 17 ha of permanent grassland and some forest. In 1988, the conversion to organic farming took place with the aim of respecting





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LESSON LEARNED

- The elements of agroforestry systems can be combined in many ways according to **local conditions** and the **needs of the farmer**. This led to a great variety of systems
- Taking different aspects into consideration **agroforestry systems** can be classified in **different ways**
- According to the three basic components (tree, agricultural crop and livestock) that are managed by the land user in an AF system three main types of systems can be distinguished: **agrisilvicultural, silvopastoral** and **agrosilvopastoral systems**
- Each of these main categories incorporate a variety of different systems based on their **structural** and **functional features**
- In special cases, in addition to trees, there are other main components in the system such as in agroforestry combined with **aquaculture** or **apicultures**



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