



Interreg
North Sea Region
Carbon Farming
European Regional Development Fund



EUROPEAN UNION



Agroforestry as Carbon Farming Measure

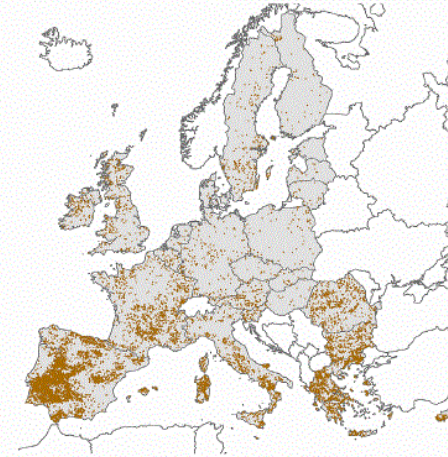
Dr. Ernst Kürsten, 24.03.2022

In total (EU 27):
 15.4 mio. ha =
 8.8% of all
 agricultural land
 15.1 mio. ha of
 ot it = livestock
 agroforestry

A) arable agroforestry



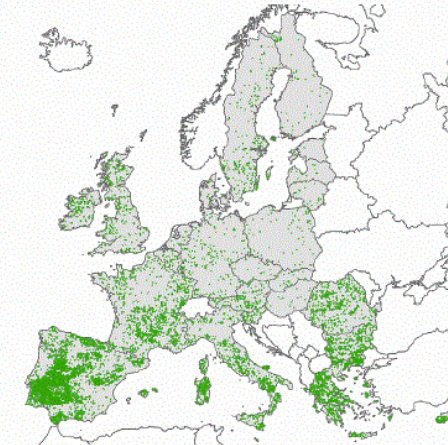
B) livestock agroforestry



C) high value tree agroforestry



D) all agroforestry



Distribution of Agroforestry in Europe

(Source: Den Herder et al. 2017)

Agroforestry =
 the practice of
 deliberately integrating
 woody vegetation
 (trees or shrubs) with
 crop and/or livestock
 production systems to
 benefit from the
 resulting ecological and
 economic interaction



FIG. 47. Top: South Central France. Nearly all trees in landscape, grafted chestnuts. A part of farm system—corn substitute—FIG. 48. Center: The Apennines near Florence, Italy. Terraced wheat fields, foreground. Grafted chestnuts, background. Value of terrace and orchard same as Illinois cornland—FIG. 49. Bottom: Corsican chestnut monarch. The man stands by its understudy and successor. (Photos J. Russell Smith.)

Arable Agroforestry



Traditional wall hedges (coppice with standards)



Modern alley cropping systems

Livestock Agroforestry

Traditional shelterbelts
and modern fodder hedges
+ fruit + chestnut trees for shade



Modern systems: laying
hens between short
rotation coppice (or
fruit trees)

High Value Tree Agroforestry



Nut trees in France

Photo: Cristian Duprez, INRAE (National Research Institute for Agriculture, Food and Environment)



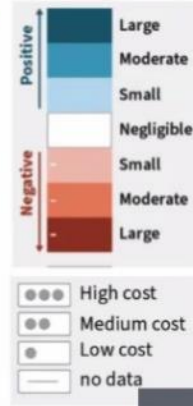
Traditional fruit (apple) orchard in Germany

Effects of Agroforestry



IPCC recognises that potential

Response options based on land management		Mitigation	Adaptation	Desertification	Land Degradation	Food Security	Cost
Agriculture	Increased food productivity	L	M	L	M	H	---
	Agro-forestry	M	M	M	M	L	●●
	Improved cropland management	M	L	L	L	L	●●●
	Improved livestock management	M	L	L	L	L	●●●●
	Agricultural diversification	L	L	L	M	L	●
	Improved grazing land management	M	L	L	L	L	---
Forests	Integrated water management	L	L	L	L	L	●●
	Reduced grassland conversion to cropland	L	---	L	L	L	●
	Forest management	M	L	L	L	L	●●●
Soils	Reduced deforestation and forest degradation	H	L	L	L	L	●●●
	Increased soil organic carbon content	H	L	M	M	M	●●●
	Reduced soil erosion	↔	L	M	M	L	●●●
	Reduced soil salinization	---	L	L	L	L	●●●
Other ecosystems	Reduced soil compaction	---	L	---	L	L	●
	Fire management	M	M	M	M	L	●
	Reduced landslides and natural hazards	L	L	L	L	L	---
	Reduced pollution including acidification	↔	M	M	L	L	---
	Restoration & reduced conversion of coastal wetlands	M	L	M	M	↔	L
Restoration & reduced conversion of peatlands	M	---	na	M	---	●	



Potential for CO₂ mitigation



- Potential varies widely with type of system, soil/climate, tree species and density, and other local factors. EU level estimates range from 8 to 234.85 million t CO_{2eq}/yr.
- 0,5 – 1 t C /ha,yr for many systems
- 7.29 t C /ha,yr for relatively intensive stem wood production with 200 poplar/ha
- Source: Kay et al. 2019

Problems to be solved

- Obstructive nature conservation regulations (a group of five trees and more is protected; bird protection)
- Obstructive agroforestry regulations (20 m distance to borders, exclusion of important species etc.)
- Uninsufficient financial support for longterm investment
- High percentages of rented land
- Drainage pipes
- Lack of knowledge

