



Water resilience and agriculture

How can agroforestry contribute?

Civil Dialogue Group 'Environment and Climate Change' - November 13th 2023



[Secretariat \(at\) euraf.net](mailto:Secretariat@euraf.net)



1. What is Agroforestry?

The CAP Strategic Plans give 28 definitions



EU Member States now have own definitions of Agroforestry



...

- **ICRAF (1):** *“The deliberate growing of **woody perennials** on the same unit of land as agricultural crops and/or animals, either in some form of spatial mixture or sequence” (Lundgren 1982)*
- **ICRAF (2):** *“A dynamic, ecologically based, natural resource management system that, through the integration of **trees** in farm- and rangeland, diversifies and sustains smallholder production for increased social, economic and environmental benefits” (Leahey 1996)*
- **USDA:** *“The intentional growing of **trees and shrubs** in combination with crops or forage ... agroforestry is distinguished from traditional forestry by having the additional aspect of a closely associated agricultural or forage crop.” (USDA 2011)*
- NOW every **EU Member State** now has its own AF definition ([EURAF Policy Briefing #22](#))

22. Agroforestry definitions in the new CAP

EURAF Policy Briefing 22 v1, Feb 2023. Gerry Lawson (policy@euraf.net). 10.5281/zenodo.7828435



The European Agroforestry Federation is an NGO (Transparency Register [913270437706-82](#)), which “promotes the adoption of agroforestry practices across Europe by supporting efforts to develop awareness, education, research, policy making and investments which foster the use of trees on farms”. It has a network of 31 affiliated entities in 23 countries.

EURAF has collated the definitions of agroforestry included by Member States in their CAP Strategic Plans. Some are detailed and include minimum and maximum numbers of trees per hectare, but usually without a definition of “tree”. Few of the definitions can lead to remotely-sensed identification of those parcels which are “agroforestry” and those which have too few trees to be considered as agroforestry. Nevertheless, Member States are progressively adding more detail to their identification of Landscape Features (including individual trees, hedges and trees in groups and lines) and Non Productive Areas (GAEC-8) in their CAP Land Parcel Identification Systems. This detail is also needed to measure compliance with the 10% target in the Biodiversity Strategy and Nature Restoration Law (see Briefings #18 and #21). It should be possible for Member States to propose a % threshold tree-crown cover (actual or potential) which would be used to distinguish agroforestry parcels in the CAP and also in LULUCF accounting of GHG emissions. Several Member States have taken advantage of the flexibility offered in the Strategic Plan Regulation to define “permanent grassland” to include areas which are predominantly covered by shrubs which can be grazed or cut for fodder. These include areas which could also be considered as agroforestry.



The difference between “Forest Land” and “Agricultural Land” ...

.... is in EURAF Typology of Agroforestry Systems ... but CADASTRES need linking

Tree Location	AF System	Land Use Classification (e.g. LPIS)	
		Forest Land	Agricultural Land
Trees within parcels	Silvopastoral	Forest Grazing	Wood pasture Orchard grazing
	Silvoarable	Forest Farming	Alley Cropping Alley Coppice Orchard Intercropping
	Agrosilvopastoral	Sequential mixtures of silvoarable and silvopastoral systems	
Trees between parcels	Linear Agroforestry	Forest Strips	Shelterbelt Networks Wooded Hedges Riparian Tree Strips

New Landscape Features - Biodiversity Strategy (>10%)



Country	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	HR	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SK	SI	Sum
01 Buffer Strips	1	1	1	1				1								1	1			1	1	1			1		1	1	13
02 Cairns	1						1			1	1							1	1	1					1				8
03 Cultural Features	1		5					1	1	1	1			1		1							1						13
04 Ditches			1			1			1	1			1	1	1	1	1	1		1		3	1	1	1				16
05 Field Margins (# types)		1	3	1	2	7	1	1	1		1		1	2		7	1	1	4	1		4		1	1	2	1	44	
06.1 Hedges or woody strips	1	1	1	1			1		1	1	1		1	1	1	1	1	1	1			1		1	1		1	20	
06.2 Trees in Line		1	1	1		1	1		1	1	1		1		1	1	1		1	1		1	2	1	1		1	21	
06.3 Trees in Groups/ Copses	1	1	1	1		1	1	1	1	1	1		1	1	1		1	1	1	1		1	2	1	1		1	24	
06.4 Isolated Trees			1	1	1	1	1			1	1		1	1	1		1	1	1	1		1		1	1		1	19	
06.5 Forest Edge Strips - non prod		1	1	1					1		1				1	1												7	
07 Fallow Land	1	1	2	1	1	1	1	1	2	1	1	1	1	2	1	1	1			2		2	1	2		3		30	
07.1 Cover or catch crops (7% option)		-	-			1		-	-	-	-		1	1				-				-		-			-	3	
07.2 N-Fixing Crops (7% option)		-	-			1			1	-	-		1	1				-				-		-			-	4	
08 Others			1			2	1	1			2						1	1				4	1	1			-	15	
09 Small Ponds	1	1	1							1	1		1	1		1	1	1	1		1	1	1	1			1	15	
10 Small Wetlands						1	1			1									1	1	1	1	1					8	
11 Traditional Stone Walls	1						1		1	1	1		1		1	1	1			1	1		1				1	13	
12 Streams										1											1	1						3	
13 Terraces						1	1			1	1			1							1						y	7	
Total elements / sub-elements active	8	8	19	8	4	18	11	6	11	13	14	1	11	12	8	16	12	8	11	11	6	21	10	10	8	5	6	7	283
4% Option	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	28
3% Option	y	y	y	y				y	y	y	y		y	y	y			y	y			y	y	y				13	
7% Option		y	y	y		y			y	y	y		y	y				y				y	y	y	y		y	15	
LULUCF Regulation - threshold of "forest land" (ha)	0.05	0.5	0.5	0.1	0.3	0.05	0.1	0.5	0.5	0.3	1	0.5	0.5	0.5	0.1	0.1	0.5	0.1	0.5	0.1	1	0.5	0.1	1	0.25	0.5	0.3	0.25	
Strategic Plan - max LF copse/grove size (ha)	0.1	0.3	0.3	0.3	-	?	0.2	?	?	?	0.3	-	0.5	0.5	?	-	0.3		0.3	0.5	-	1.5	0.5	0.5	0.9	-	?	0.5	
<i>Details of hedge width and permitted gaps?</i>	y	y	y	y			y		y		y		y	y	y			y	y	y		y			y			15	
<i>Details of permitted crown size of trees in line?</i>		y	y	y			y		y				y		y				y			y	y	y	y			14	
<i>Details of crown size of isolated trees?</i>			y	y									y	y					y			y	y					8	

RED shows where the definition of "copse/grove" on agricultural land differs from the national definition the minimum size threshold for a forest block. In many countries the size threshold is not given or copses/groves are not recognised as Landscape Features

In many countries no information is given on the types of n-fixing crop or catch/cover crop, even when the 7% option is selected (shown with a dash)



2. Case studies from across Europe

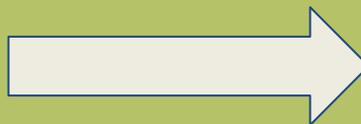
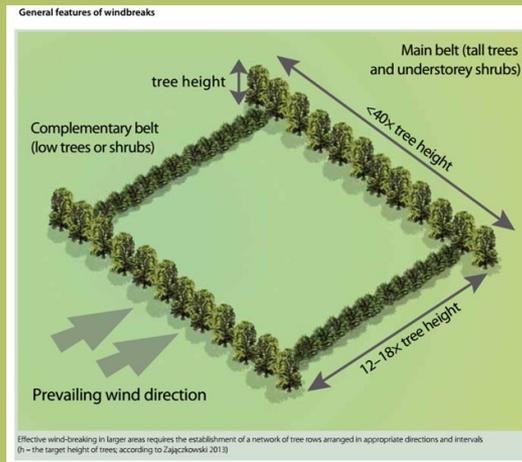
water resilience in agroforestry systems



Poland



Good practices from Poland: water balance and microclimate



Results from EU-funded projects (case studies CH)



1.



- 1 NUTRIENTS**
Wash-off and leaching of nitrate and phosphate from fertiliser and manure applications.
- 2 SEDIMENT**
Soil disturbance and sediment runoff due to land management practices and stock grazing.
- 3 PESTICIDES**
Aerial drift, wash-off or leaching of pesticides following applications.
- 4 FAECAL INDICATOR ORGANISMS**
Runoff of faecal bacteria from animal manure and slurry applications.

3.

	Permanent Grassland	Rough Pasture	Wheat	Barley	Maize	Oil Seed Rape	Woodland
Nitrogen Input (kg/ha/yr)	94-135	10	131-167	120-132	46-62	155-189	20
Nitrate-N Export (kg/ha/yr)	0.86-10.58	0.02-0.05	1.54-19.72	1.54-19.72	1.52-19.72	3.29-17.4	0.02-0.1
Phosphate Input (kg/ha/yr)	6-16	0	13-35	18-41	27-43	15-37	0
Phosphate Export (kg/ha/yr)	0.012-0.169	0.008	0.038-0.458	0.038-0.458	0.038-0.458	0.15-1.834	0.008

Table 1
Nutrient loads and modelled export coefficients to water for different crops vs woodland in Great Britain. Nutrient loads taken from the British Survey of Fertiliser Practice for 2000-2011 (BSFP, 2013) and export coefficients based on the same data modelled for the UK National Ecosystem Assessment Follow-on Report (Bateman et al., 2014).

2.

1 ALONG WATERCOURSES

Tree planting provides a protective buffer from management activities on the adjacent land, reducing nutrient, sediment, pesticide and FIO inputs to water. A tree cover also provides much needed shade and cooling of watercourses, while tree roots strengthen banksides and reduce channel erosion and siltation.

2 AROUND BOREHOLES

Tree planting protects local groundwater sources from contamination by nutrients and pesticides.

3 ON FLOODPLAINS

Restoring floodplain woodland slows flood flows and retains diffuse pollutants

4 AROUND ANIMAL HOUSING

Tree planting around animal housing captures ammonia and improves air quality.

5 ALONG WATER PATHWAYS

Tree planting along and across water pathways increases infiltration of runoff and pollutant retention.

@PESFORWARD COST-Action, 2019

(Soil) Good practices from Greece: soil stabilisation & multiple production



- Intercropping in an oak agroforestry system in Kea island (Aegean sea)
- Valonia oak + Barley (*Hordeum vulgare*) as animal feed

A traditional practice where acorn cups are used for tannery, the acorns and the annual crop production as animal feed and the trees conserve the soil from erosion (stabilise the terraces)



3. Conclusions - what is to be done?

“Plant more ToFs” (Trees Outside Forests)



1. New Targets for Afforestation & Agroforestation - 1 million trees/ha/yr



Office of the Prime Minister - Ethiopia @PMEthiopia

PM Abiy Ahmed officially closed the tree planting season by planting seedlings with members of the #4billionTrees steering & technical committees. He called upon all Ethiopians to now embark on the caretaking process of planted seedlings to see our efforts bloom.

#PMOEthiopia



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2 Billion Trees Commitment

2BILLION TREES

Planting today for a better tomorrow

Follow us #2BillionTrees

COMMISSION STAFF WORKING DOCUMENT

GUIDELINES

ON BIODIVERSITY-FRIENDLY AFFORESTATION, REFORESTATION AND TREE PLANTING

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1. Recommended actions before afforestation and reforestation

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1.3. Choose the right species

1.3.1. Choose species adapted to the local ecological and climatic habitats 11

1.3.2. Focus on native species

Which species

1.3.3. Avoid introducing invasive alien species

1.3.4. Take climate change into account

1.3.5. Promote the mixing of species

1.4. Adapt nurseries

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LIVE STATUS COUNTER

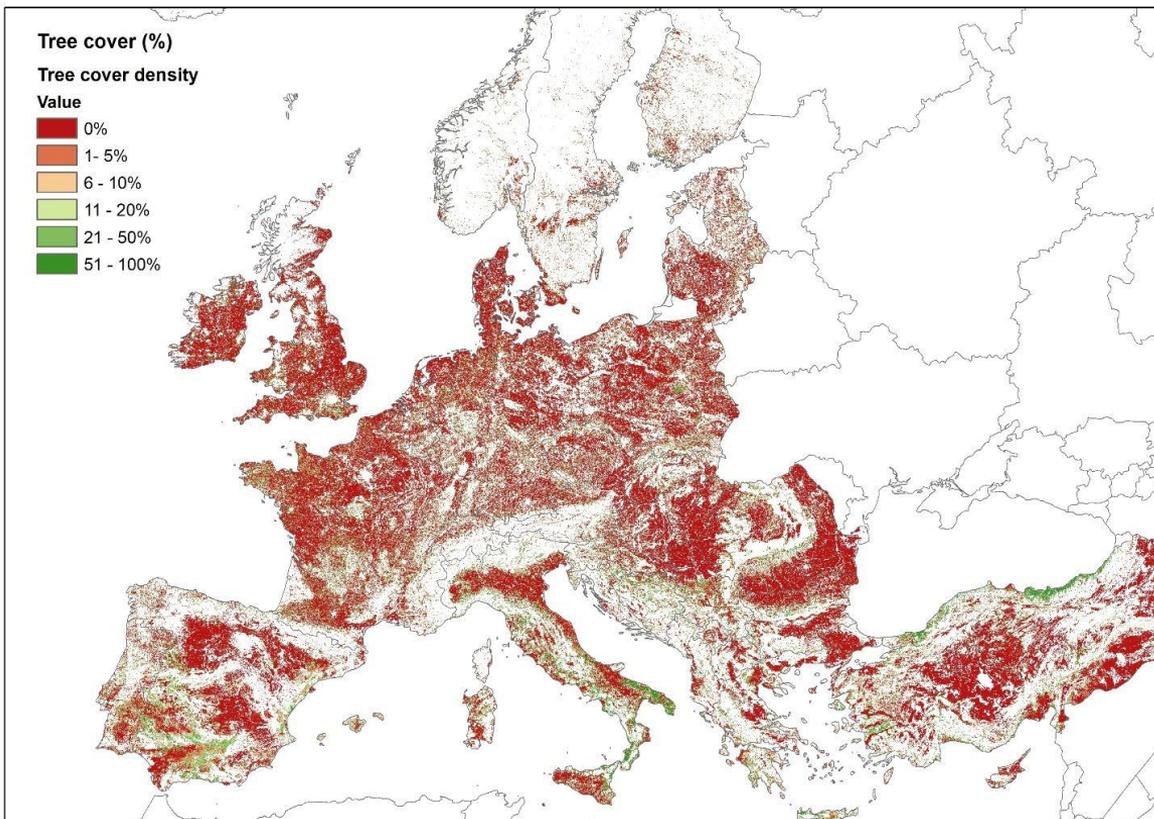
12,517,249 additional trees planted and reported in EU27

37 Active Organisations

27 EU27 Countries

Source: MapMyTree dataflow available on November 2 platform for transmitting environmental and climate data to the European Environment Agency (EEA)

2. Focus new planting on “tree deserts”



Priority planting areas, where tree cover density (% tree cover) on agricultural land is particularly low. Source: Copernicus tree cover density 2015 overlaid on LUCAS agricultural land use.

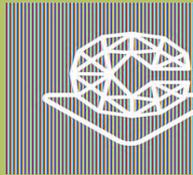
[EURAF Policy Briefing #2](#)

[Den Herder et al. \(2017\)](#) estimate that the total area under agroforestry in the EU 27 is about 15.4 million ha which is equivalent to about 3.6% of the territorial area and 8.8% of the utilised agricultural area.

[Den Herder et al. \(2020\)](#) show that 1.69 million km² of European agricultural land has 0% tree cover. An area of 1.71 million km² of agricultural land has less than 1% tree cover. These could be priority areas for agroforestry tree planting.



Thank you for your attention



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