Oaks from Europe between market demand, global changes and societal challenges. Case-study – Western Romania

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Oaks of Europe

- **The whole history and civilisation of Europe is closely connected with woods.**

- ***Pre-industrial era* = wood for fuel, construction and machinery material + important social role**

- **Different environmentalists (White, 1985, Brimblecombe et al, 1993; Mc Neil, 2003; Huges and Donald, 2005; Huges, 2006;...): the „wooden age *was a component of stability, of the ecology and the traditional economic and social order in pre-industrialised Europe*".**

The 650-year-old Oak Józef – the tree of the year 2017

- Oaks remain one of the most popular tree species in Europe
- The 650-year-old Oak Józef - a shelter for a Jewish family hiding from the Nazis during WWII become the tree of the year 2017.
- Its image - a pre-war PLN 100 banknote. At present, oak Józef is a nature monument.

Wood shortages →
sustainable forestry in the Middle Ages

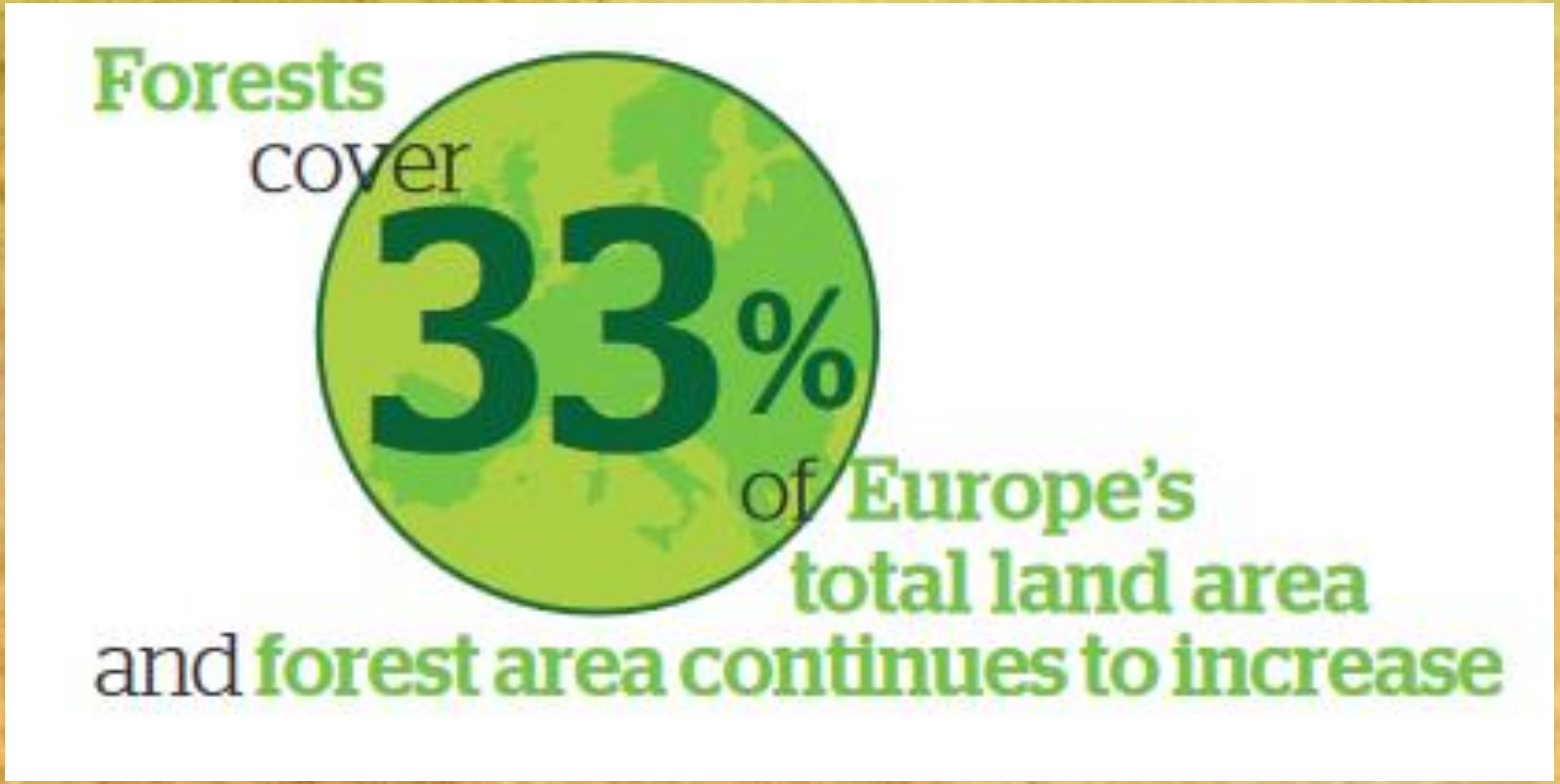
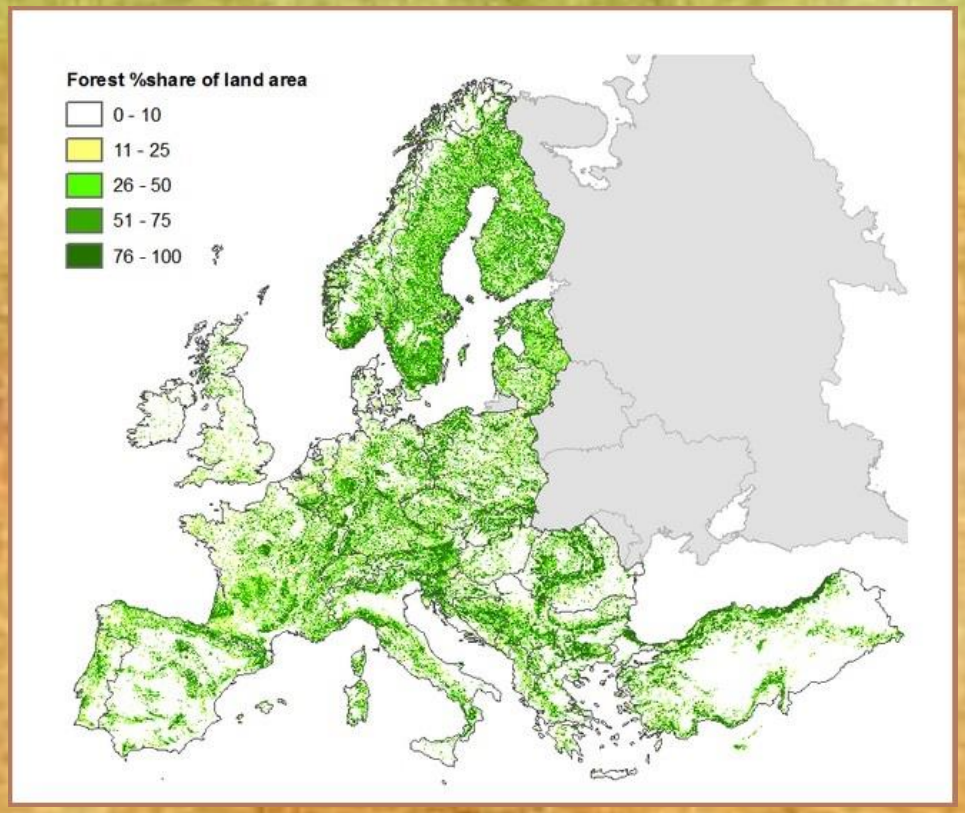
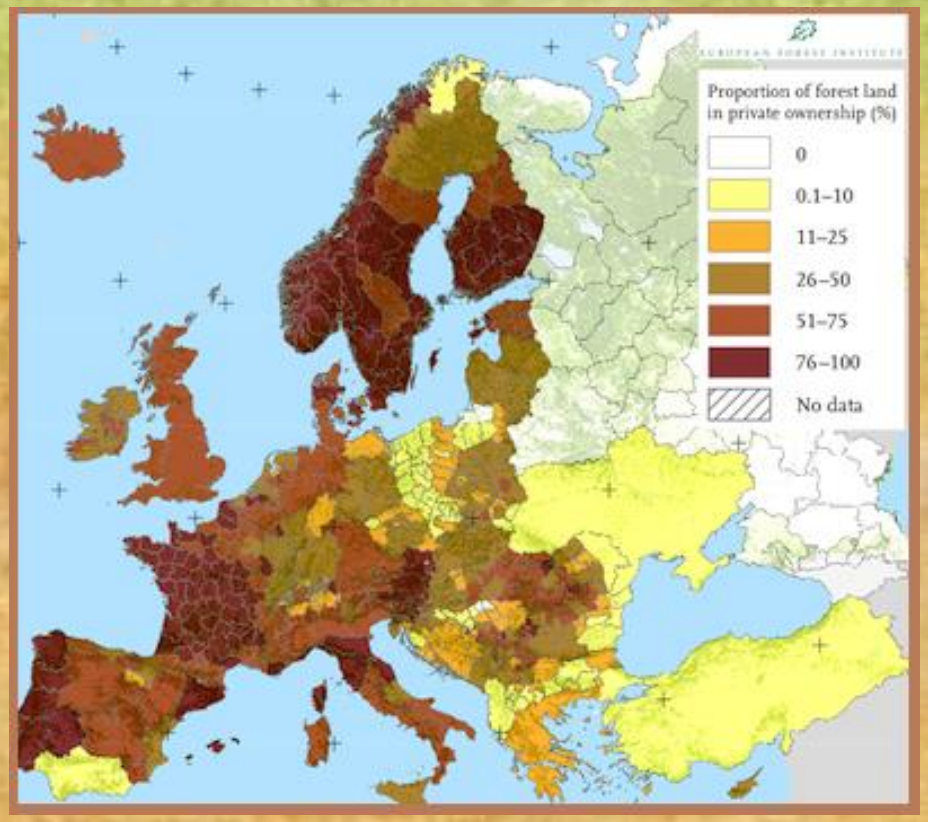


Image source: State of Europe's Forest 2015 Report

Forest in EU



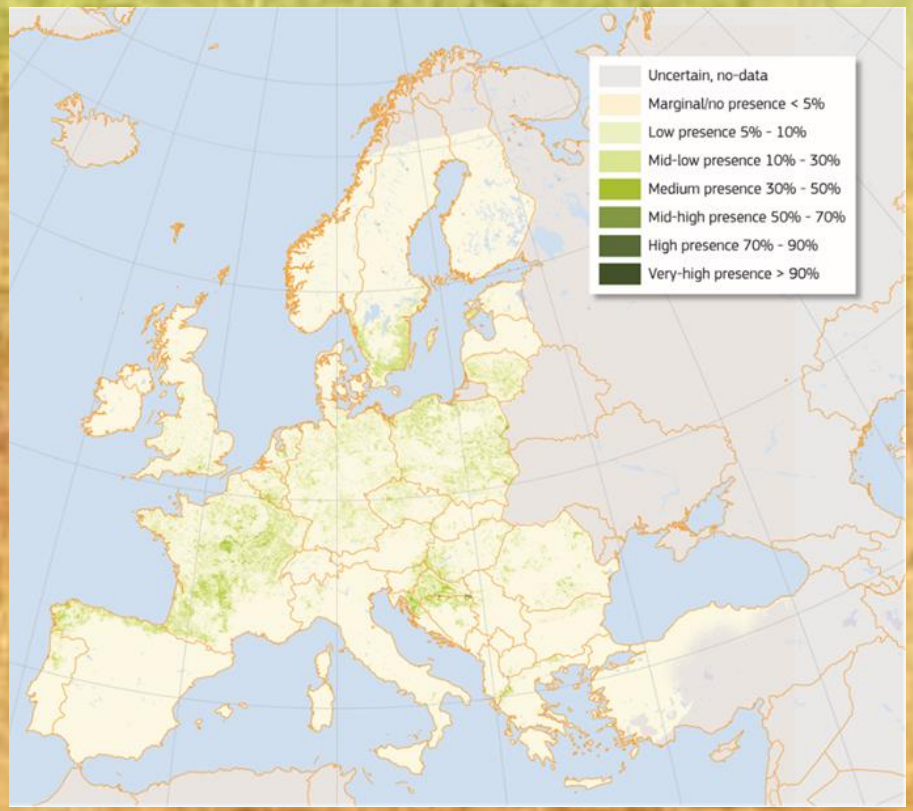
5 % of the world's forests.

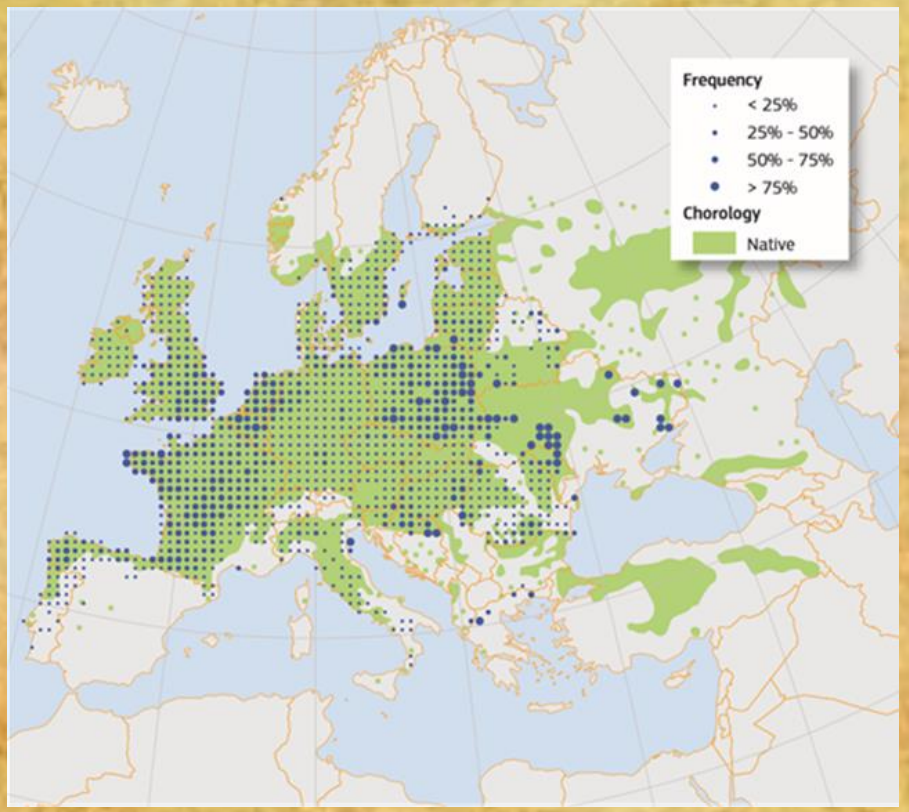


30% state owned.

Image source:www.efi.int

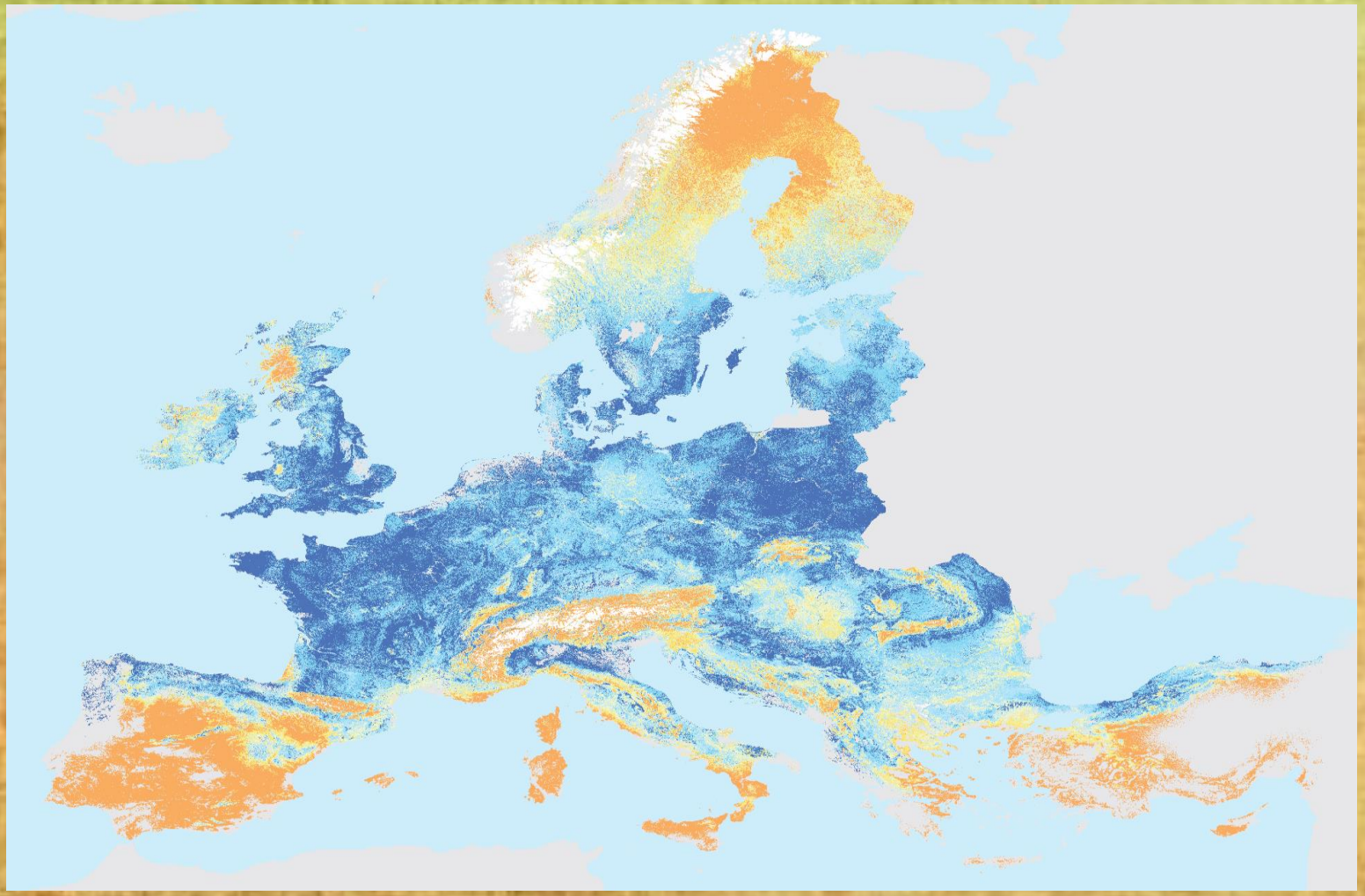
Q. petraea & Q.robur in Europe – present-day occurence





Source: European Atlas of Forest Tree Species -Eaton, Caudullo, Oliveira, de Rigo 2017

Q. petraea & *Q.robur* in Europe – potential (high survivability in blue)



Source: European Atlas of Forest Tree Species -Eaton, Caudullo, Oliveira, de Rigo 2017

The oak forest has diminished due to high demand for raw material + different anthropic activities

Decline of oaks in Central Europe

- oak decline → the past three centuries → recent decades.
- historical records + recent dendrochronological measurements:
  - oak decline in Central Europe → single or combined effects of climatic extremes + defoliating insects + pathogenic fungi.
- potential related factors (scientific literature):
  - various abiotic (air pollution, nitrogen eutrophication, soil chemical stress, climatic extremes, site conditions)
  - biotic factors (insect defoliation, borer attack, infection by pathogenic fungi, microorganisms) .

- **Recent studies (Thomas et al, 2002):**
  - **consecutive insect defoliation + climatic extremes = the most significant complex of factors for oak decline.**
  - **Additional stress factors making the trees more susceptible to insect defoliation:**
    - **(1) hydromorphic site conditions**
    - **(2)excess nitrogen**
- **Air pollution, soil chemical stress (including excess manganese), and nitrogen-induced nutritional imbalance = not important causal factors.**

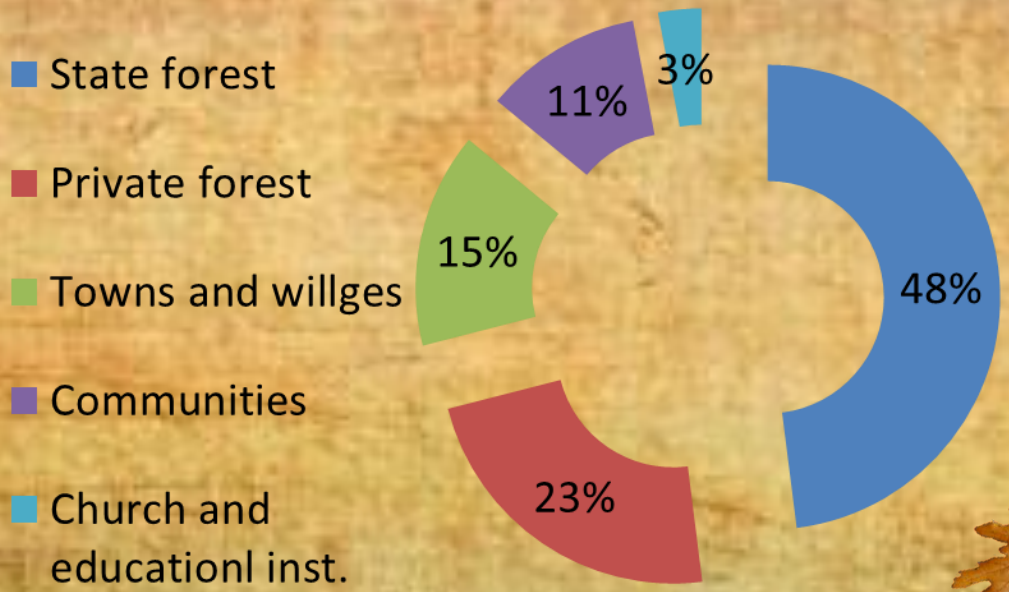
The game species bring extremely high damage to the natural regeneration, as well as to plantations and various crops.

In some regions of Europe, oaks remained only in new forest plantations and urban areas

Jacob van Ruisdael – (1646) Road in an Oak Forest

Jacob van Ruisdael- (1648) Chene pres d'un etang

Romania forest structure

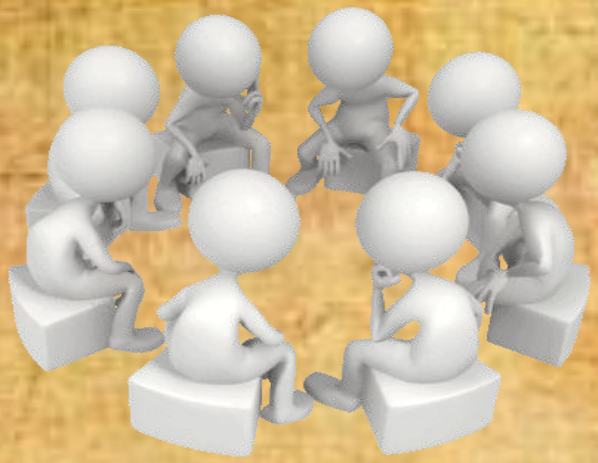


Oak forest management and natural regeneration – a sensitive issue

- The „traditional" forestry pressure , market demand and economic reasons
- General social pressure from the green field investments and real estate bussines development in lowland areas in Western Romania
- Hunting and grazing community lobby
- Environmental/environmentalists pressure
- Climate change challenges

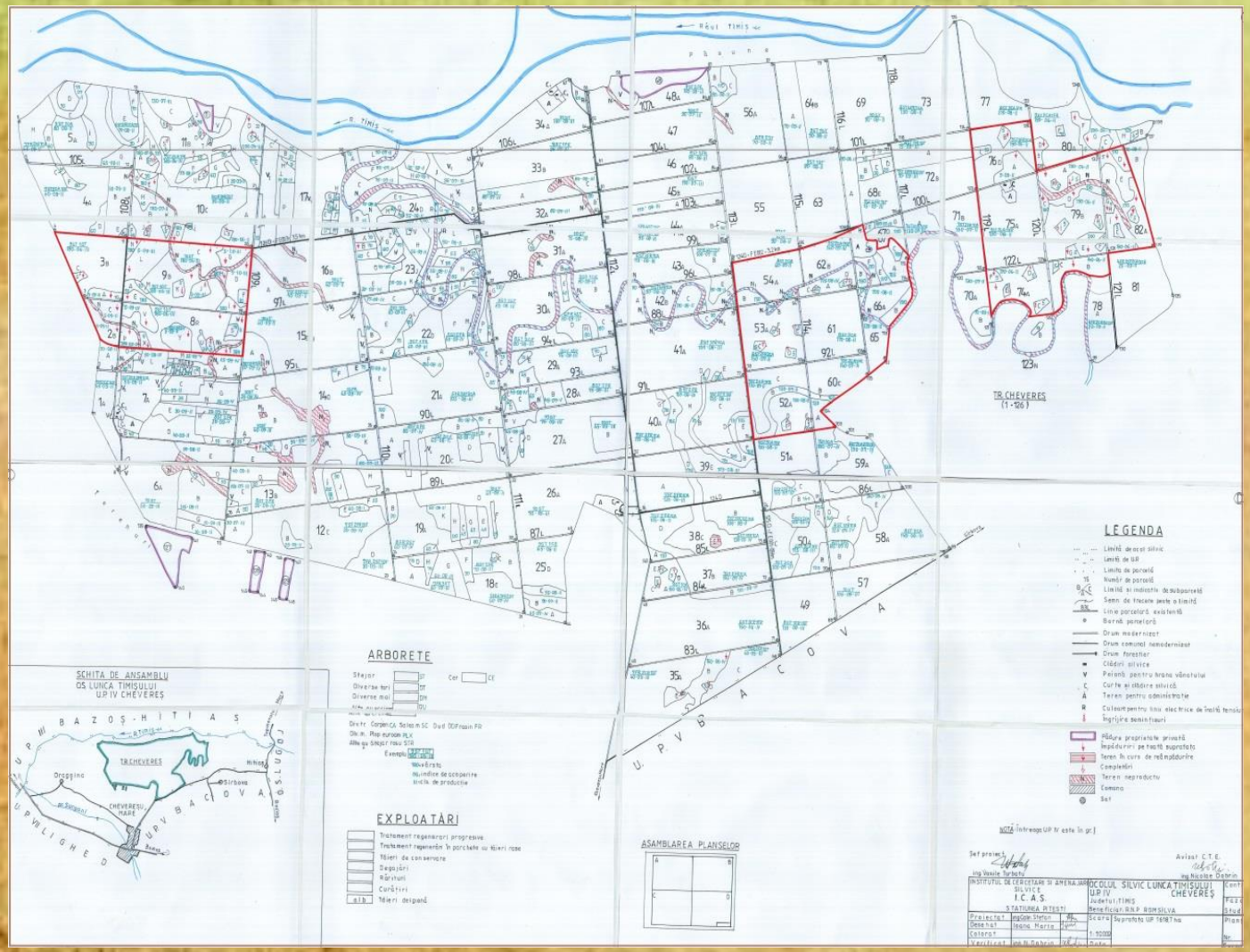
Conflict management: hunting *versus* natural regeneration

- **Hunting community lobby → important in the area of Western Romania (high demand for hunting areas)**



- **High demand for natural regeneration of oaks after progressive cuttings**

Conflict Solution:
“Fenced Forest Regeneration Areas” =
„Perimetre de Regenerare”



A. „Fenced Forest Regeneration Area *Sârbova 1* (84,2 ha),

Tabel nr. 2

Nr.	u.a.	Surface (ha)	Consistecy	Compozition	Interventions	Estimate volume in the parcel (mc)	Type of int.	Extrascted vol. (mc)	Oak	Other species	Veneer logs obtained.		Obtained Compozition
											Nr.	Vol.	
1	74	7,0	0.7	3St4St1St1Fr1Ca	10	3491	Progr.	2989	1676	1106	17	37.91	7St2Fr1DT
2	75A	15.7	0.8	2St4St1Fr1St2Ca	20	8416	Progr.	8612	5049	3562	92	125.21	6St3Fr1DT
3	75a	0.7	Administrative land										
4	75C	0.3	Construction										
5	76	12.6	0.7	2St1Fr4St3Ca	16	5492	Progr.	5512	3295	2217	128	261.70	7St2Fr1DT
6	79A	4.9	0.8	2St5St3Ca	6	2540	Progr.	2589	1668	921	54	101.91	6St3Fr1DT
7	79B	9.3	0.8	2St2St2Fr2Fr3DT	12	4223	Progr.	4328	1689	2639	15	19.77	7St2Fr1DT
8	79C	0.8	0.8	3St2St1Fr1Fr3Ca	2	432	Progr.	441	205	236	18	29.30	6St3Fr1DT
9	79D	1.9	0.8	4St3St1Fr2Ca	3	869	Progr.	884	598	286	5	5.61	7St2Fr1DT
10	79E	2.6	0.7	3St3St2Ca2Fr	4	1041	Progr.	1098	622	476	18	24.48	7St2Fr1DT
11	79T	1.2	Abandoned channel bad										
12	80A	12.5	0.7	4St3St1Fr2Ca	14	5565	Progr.	5457	3311	2146	20	37.59	7St2Fr1DT
13	80C	1.2	0.7	7St2Fr1DT	2	599	Progr.	587	389	198			6St3Fr1DT
14	82A	5.6	0.7	4St2St3Ca1Fr	6	2468	Progr.	2398	1623	775			7St2Fr1DT
15	82C	3.1	0.7	1St4St2St3Ca		1452	Progr.						6St3Fr1DT
16	82T	1.0	Abandoned channel bad										
17	78B	3.8	0.7	1St6St13Ca		1798	Progr.	1812	1045	767			7St2Fr1DT
TOTAL		**84.2**	-	-	-	**38386**		**36797**	**21170**	**15627**	**367**	**643.48**	-

Light is very important to oak species, because they are sensitive to shading from the top of the crown, which can lead to its overwhelming by the nearby trees.

But at the same time the shading from the side stimulates its growth, so that the mixing species are welcomed, while covering the soil.

B. „Fenced Forest Regeneration Area *Dragşina*" (62,2 ha)

Tabel nr. 1

Nr	u.a.	Surface (ha)	Consistecy	Compozition	Interventions	Estimate volume in the parcel (mc)	Type of int.	Extrasted vol. (mc)	Oak	Other species	Veneer logs obtained.		Obtained Compozition
											Nr.	Vol.	
1	2B	2.1	0.6	5St2St2Ca1DT	10	582	Progr.	755	332	248			7St2Fr1DT
2	2T	0.3	Water chennel										
3	2C	1.7	0.8	5St2St3Ca	7	605	Progr.	598	329	269			6St3Fr1DT
4	3	12.3	0.8	5St2St2Ca1DT	13	4136	Progr.	4016	2797	1219	23	27.39	7St2Fr1DT
5	8P	1.1	0.6	5St2St3Ca	2	299	Progr.	288	196	92			7St2Fr1DT
6	8R	14.8	0.8	5St3St1Ca1DT	20	6484	Progr.	6950	4578	2372	49	67.95	6St3Fr1DT
7	8U	0.5	Non - productiv										
8	8T	0.9	0.6	3St4St1Fr1Ca	2	309	Progr.	270	184	86			7St2Fr1DT
9	8S	0.4	Plantation										
10	8T2	0.2	Water chennel										
11	8T3	0.6	Water chennel										
12	9A	0.9	50 years old Ash Arboretum										
13	9B	14.2	0.7	4St2St1DT3Ca	20	6491	Progr.	7128	4884	2244	13	25.24	7St2Fr1DT
14	9C	5.6	0.8	7St1Ca2DT	12	2424	Progr.	2283	2283	720			6St3Fr1DT
15	9D	3.7	0.7	4St3St2Fr1Ca	6	1295	Progr.	1113	806	307	8	9.40	6St3Fr1DT
16	9E	0.9	0.8	4St3St2Ju1Ca	2	363	Progr.	377	312	65	9	15.14	7St2Fr1DT
17	9F	0.5	Plantation										
18	9N	0.1	Non - productiv										
19	9T	1.4	Water chennel										
TOTAL		**62.2**	-	-	-	**22988**		**23778**	**16701**	**7622**	**102**	**145.12**	-

In plots where natural regeneration has been found to have a rapid evolution, interventions have been made in several stages.

In these cases, the treatments were applied to a certain percentage of the plot, gradually returning in the same plot with the same type of intervention.

C. „Fenced Forest Regeneration Areas”Sarbova 2” (71,3 ha)

Tabel nr. 3

Nr	u.a.	Surface (ha)	Consistacy	Composition	Interventions	Estimate volume in the parcel (mc)	Type of int.	Extracted vol. (mc)	Oak	Other species	Veneer logs obtained.		Composition to be obtained
											Nr.	Vol.	
1	52A	5,0	0,8	4St3St1Fr2Ca	1	1755	Progr.	391	277	103	29	42.19	7St2Fr1Dt
2	52B	2,3	0,7	3Fr4Fr2St1St		916	Progr.						7St2Fr1Dt
3	52C	6,5	0,7	5St1St1St1Fr2Ca	3	1724	Progr.	905	598	307	35	43.92	7St2Fr1Dt
4	52D	0,3	0,9	Plantation									
5	52E	0,3	0,9	Plantation									
6	53A	12,4	0,7	4St3St2Fr1Dt	8	3720	Progr.	2295	1589	706	60	86.33	7St2Fr1Dt
7	53B	0,3	0,6	3St2St2Fr2Dt	1	93	Progr.	93	86	8			7St2Fr1Dt
8	53C	0,3	0,9	Plantation									
9	53D	0,3	0,9	Plantation									
10	53E	0,2	0,9	Plantation									
11	53F	0,2	0,9	Plantation									
12	53N	0,2	Teren neproductiv										
13	54A	8,6	0,7	3St1St4St1Ca1Ca	9	2708	Progr.	2050	1224	826	84	137.68	7St2Fr1Dt
14	54B	1,2	0,7	4St1St1St2Ca1Fr	4	496	Progr.	370	153	217	7	7.58	7St2Fr1Dt
15	54C	0,4	0,7	6St2Ca2Dt		124	Progr.						7St2Fr1Dt
16	54N1	0,3	Non - productiv										
17	54N2	0,2	Non - productiv										
18	60A	1,5	0,7	50 year old mix arboretum									
19	60B	0,5	0,7	5St4Fr1Dt		215	Progr.						7St2Fr1Dt
20	60C	6,8	0,7	5St1St1St1Fr2Ca	3	2680	Progr.	700	129	571			7St2Fr1Dt
21	61	13,8	0,8	4St3St2Te1Dt	6	5175	Progr.	2471	1185	1286	42	50.13	7St2Fr1Dt
22	62A	3,0	0,8	3St4St2Fr1Dt		864	Progr.						7St2Fr1Dt
23	62B	5,8	0,7	4St3St2Fr1Dt		1642	Progr.	840	458	382	16	26.26	7St2Fr1Dt
24	62C	0,2	0,9	Plantation									
25	62D	0,3	0,8	Plantation									
26	62N	0,4	Non - productiv										
TOTAL		**71,3**	-	-		**22.112**	-	**11.938**	**5699**	**6239**	**273**	**394.09**	-

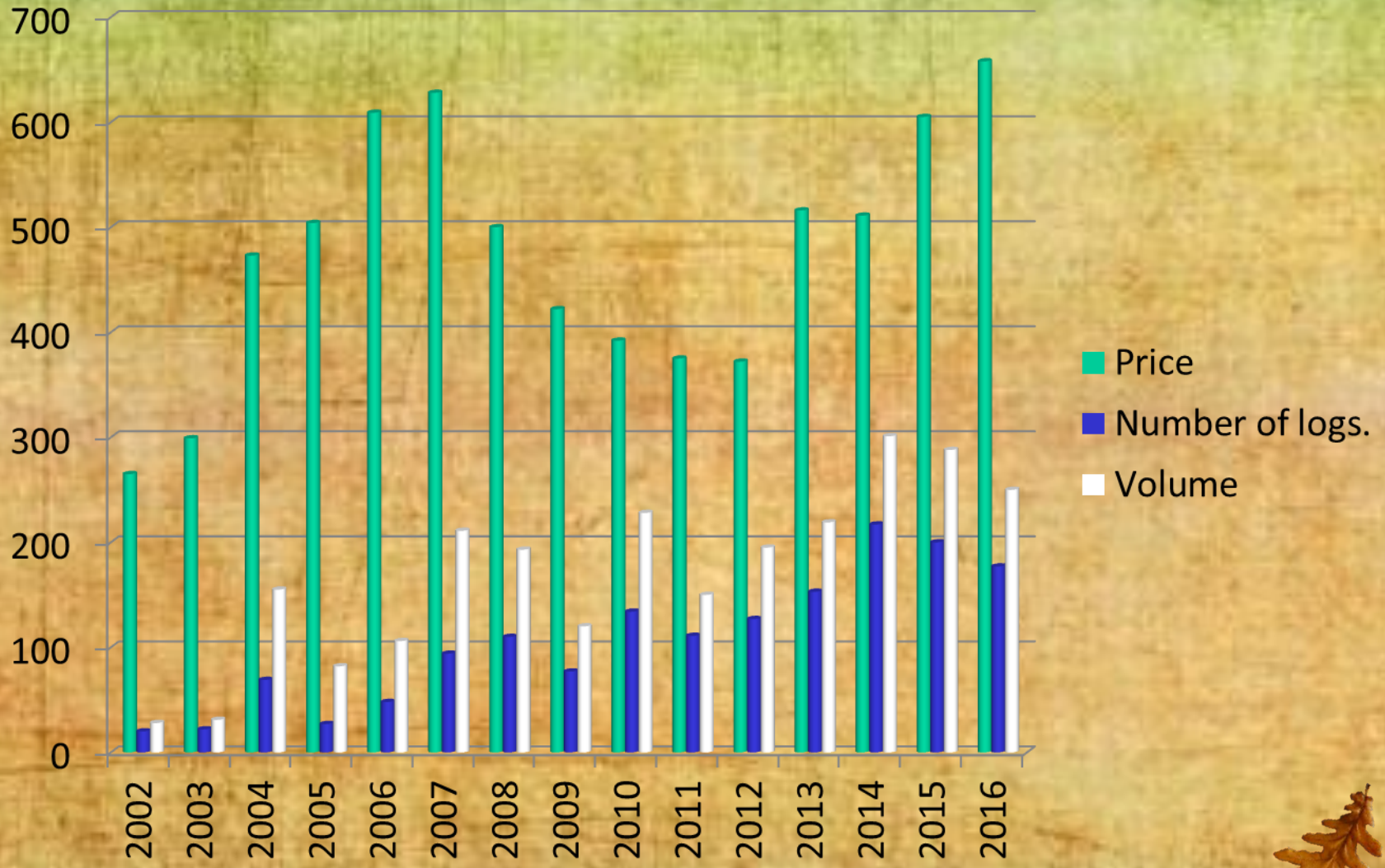
The fructification of the oak was stimulated by specific works, for ensuring the necessary light.

Natural regeneration was supported by removing herbaceous and woody vegetation, as well as partial soil mobilization, especially in the areas adjacent to seed trees.

Oak wood highly praised

- oak wood highly praised → the Middle Ages (**strength + durable**).
- **one of the densest** naturally occurring materials (0.75 g/cm3),
- **good folding qualities**
- **high tannin content** which makes it resistant to fungal diseases and insects.
- **impregnates easily, stained and polished well, resists to moisture absorption**
- high aesthetic qualities and resistant → **excellent feedstock** for the furniture industry and beyond (floors, stairs, interior architectural elements, natural or stained plywood, boards) + barrels etc.

Oak wood highly praised in Western Romania



Result: 742 veneer logs (182 m3) with very high value + a natural oak regeneration + available area for hunting.

Conclusions

The optimal solution to promote the natural regeneration of oak in outstanding conditions (short time, high density of game, social pressure, overgrazing) = the creation of regeneration areas/perimeters, by fencing using finnacial support from hunting/grazing activities.

The alternance of such areas in time will have important benefits for biodiversity conservation (*silence area* for reproduction).

Harvesting and thinning operations that open up the forest canopy, allowing more light to reach down through the lower levels of the forest, encouraging dormant seeds to germinate, providing light for plants to grow should be encouraged.

We have to promote a sustainable management plan with SPECIFIC proactive measures to promote oak forest in nowadays conditions.

Image source : State of Europe's Forest 2015 Report

It is very important to identify, to study, and to monitor the areas favorable in obtaining valuable arboreta of Quercus Robur, Quercus petraea or Quercus frainetto.

It would be desirable to promote only those oak raw materials which are the result of a certified sustainable forest management areas where the forest ecosystem services are promoted as well as of certified wood chains of custody.

In fact: the well managed forest is the best example of sustainability.

Image source: www.eustofor.eu

Thank you

for your attention