

# What does biodiversity-friendly forestry look like?



CITAB



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Biodiversity and Climate Neutrality: the role of the EU law

Sept.29.2020



# CLOSE-TO-NATURE FORESTRY

## Benefits and functions

- I. Conservation of biodiversity
- II. Protection of soil and climate
- III. Production of timber and other goods
- IV. Amenity, recreation and cultural aspects



SUSTAINABILITY

Biodiversity



Soil / Climate



Wood



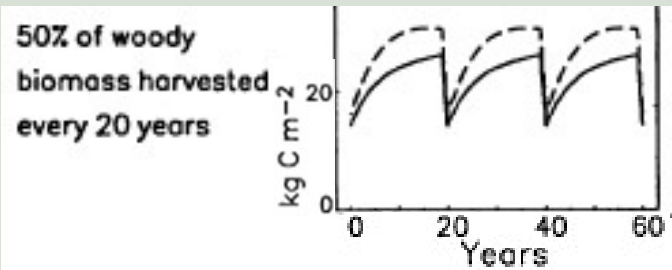
Landscape / Culture



## Benefits of close-to-nature forestry on Carbon storage

*Pinus* (Scotland)

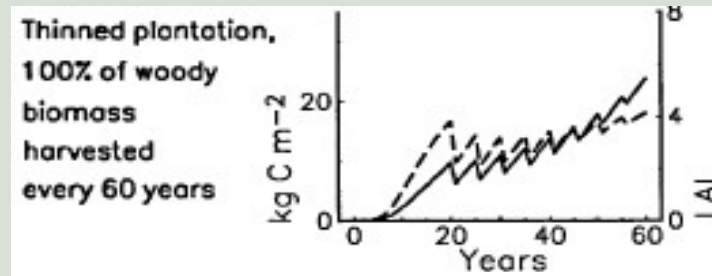
### Selective Cuttings



(biomass + soil + products)  $(8.9 + 17.3 + 1.4) = 27.6$



### Clear-cutting



(biomass + soil + products)  $(3.8 + 6.4 + 4.0) = 14.3$



### Managing forests for wood yield and carbon storage

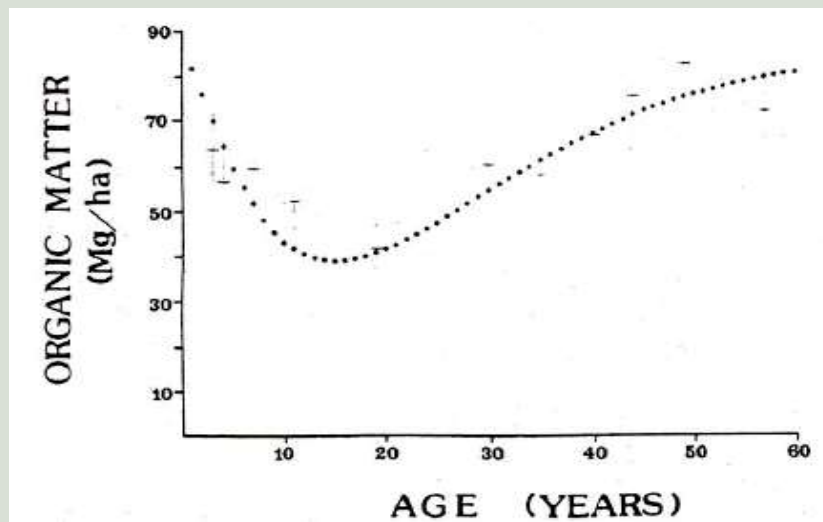
J. H. M. THORNLEY and M. G. R. CANNELL

## Benefits of close-to-nature forestry on Carbon storage

### CHANGES IN FOREST FLOOR ORGANIC MATTER AND NUTRIENT CONTENT FOLLOWING CLEAR CUTTING IN NORTHERN HARDWOODS<sup>1</sup>

W. WALLACE COVINGTON<sup>2</sup>

Clear-cutting



Clear-cutting *Pinus pinaster* Aiton , Alvao Natural Park (PT)

## Benefits of close-to-nature forestry on Carbon storage



# Forest Adaptation to Climate Change

**Adaptation**

Compositional, Structural and Functional  
Characteristics of the Ecosystem



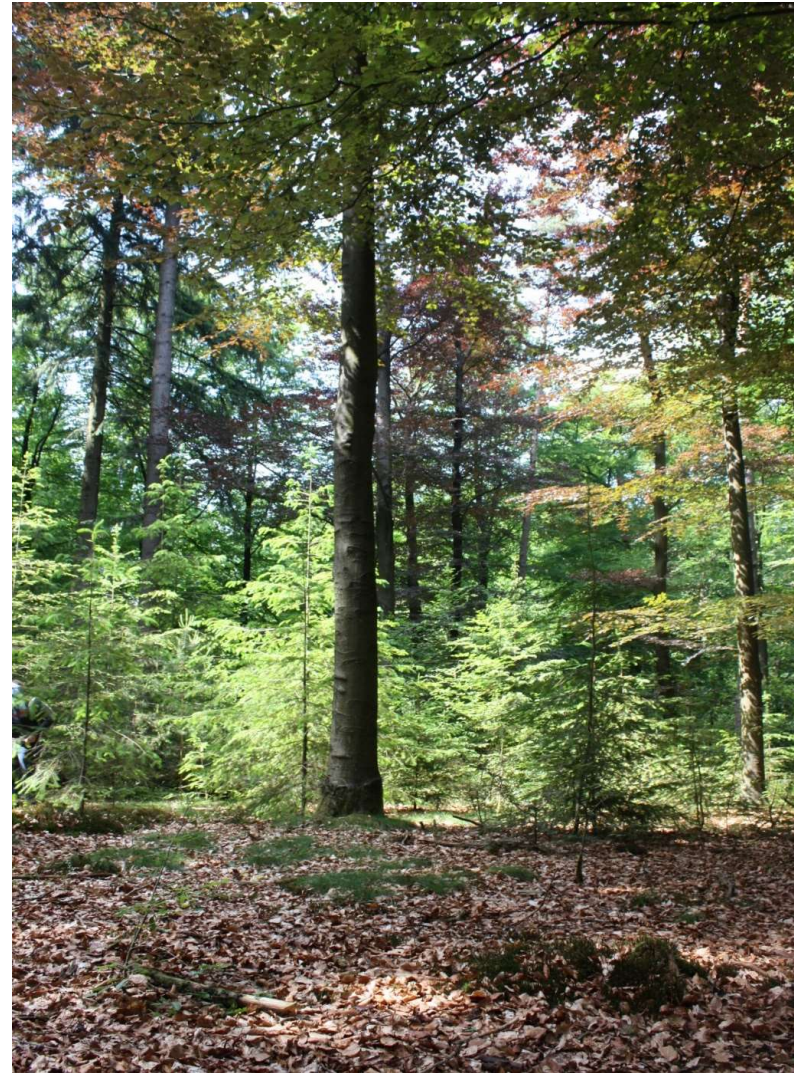
Improvement of Response Ability



## Forest Microclimate - Regeneration – Climate Change Adaptation



Regeneration *Fagus* and other Broadleaved, Belgium

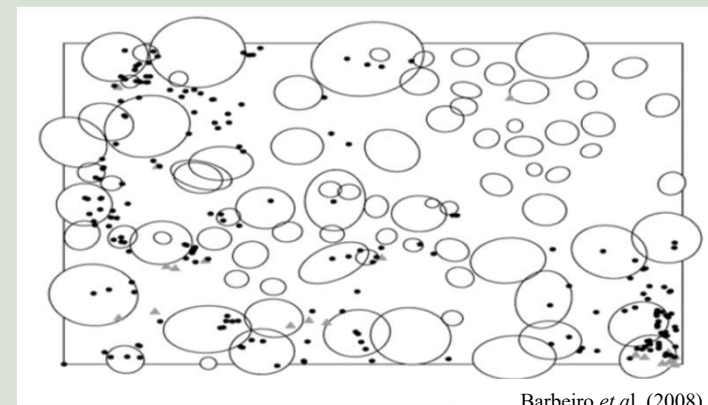
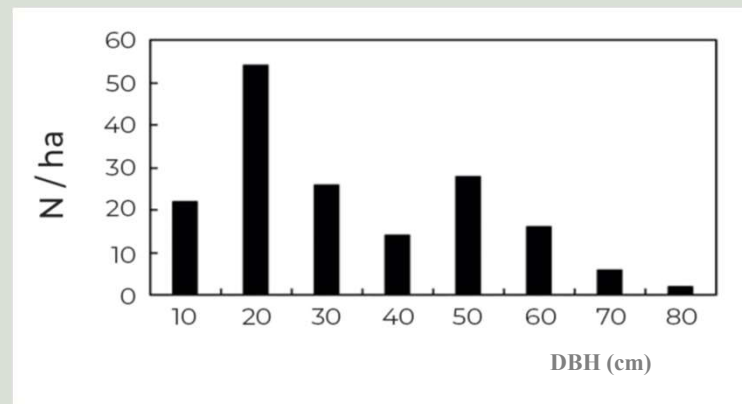


Regeneration *Abies* and *Fagus*, Slovenia

## Forest Microclimate - Regeneration – Climate Change Adaptation



Regeneration *Pinus pinea* L., Valladolid (SP)



Barbeiro *et al.* (2008)

- . Tree regeneration under a certain crown cover degree (CCF)
- . Protection against solar radiation, high air and soil temperatures, air and soil dryness

## Forest Microclimate - Regeneration – Climate Change Adaptation

Study on natural regeneration and adaptation to climate change

**Plant Mortality**



Artificial Regeneration *Quercus suber* L., Romeu (PT)

**Soil Degradation**

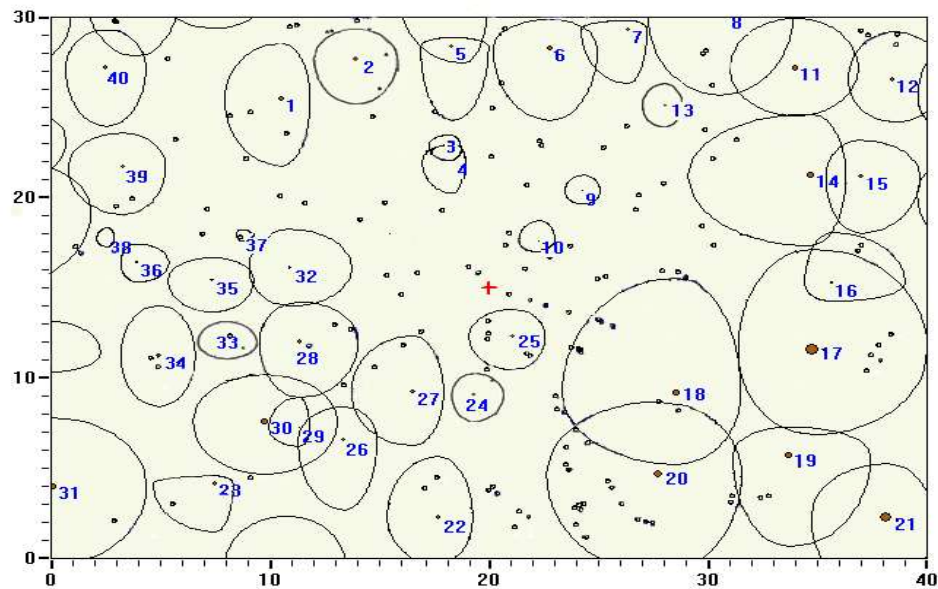


### Study Comparison

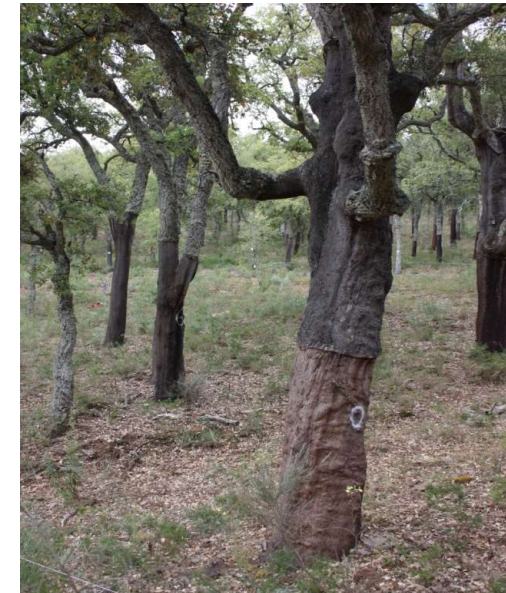
- . Restoration / Regeneration costs
- . Restoration / Regeneration success
- . Ecological factors

## Forest Microclimate - Regeneration – Climate Change Adaptation

### Study on natural regeneration and adaptation to climate change



Carvalho (2018)



Natural Regeneration *Quercus suber* L., Romeu (PT)

N : 333 árv/ha

dg : 27,0 cm

G : 19,0 m<sup>2</sup>/ha

ddom : 53,3 cm

FCC : 62 %

hg : 9,3 m

Peso fresco cortiça: fuste e pernadas (para 9 anos de criação): 5280 kg/ha

Regeneração: 11 plantas / 100 m<sup>2</sup> (*Q. suber*: 68 %. Outras esp.: 32 %)

## Forest Microclimate - Regeneration – Climate Change Adaptation

### Mediterranean and Degraded Ecosystems - Desertification

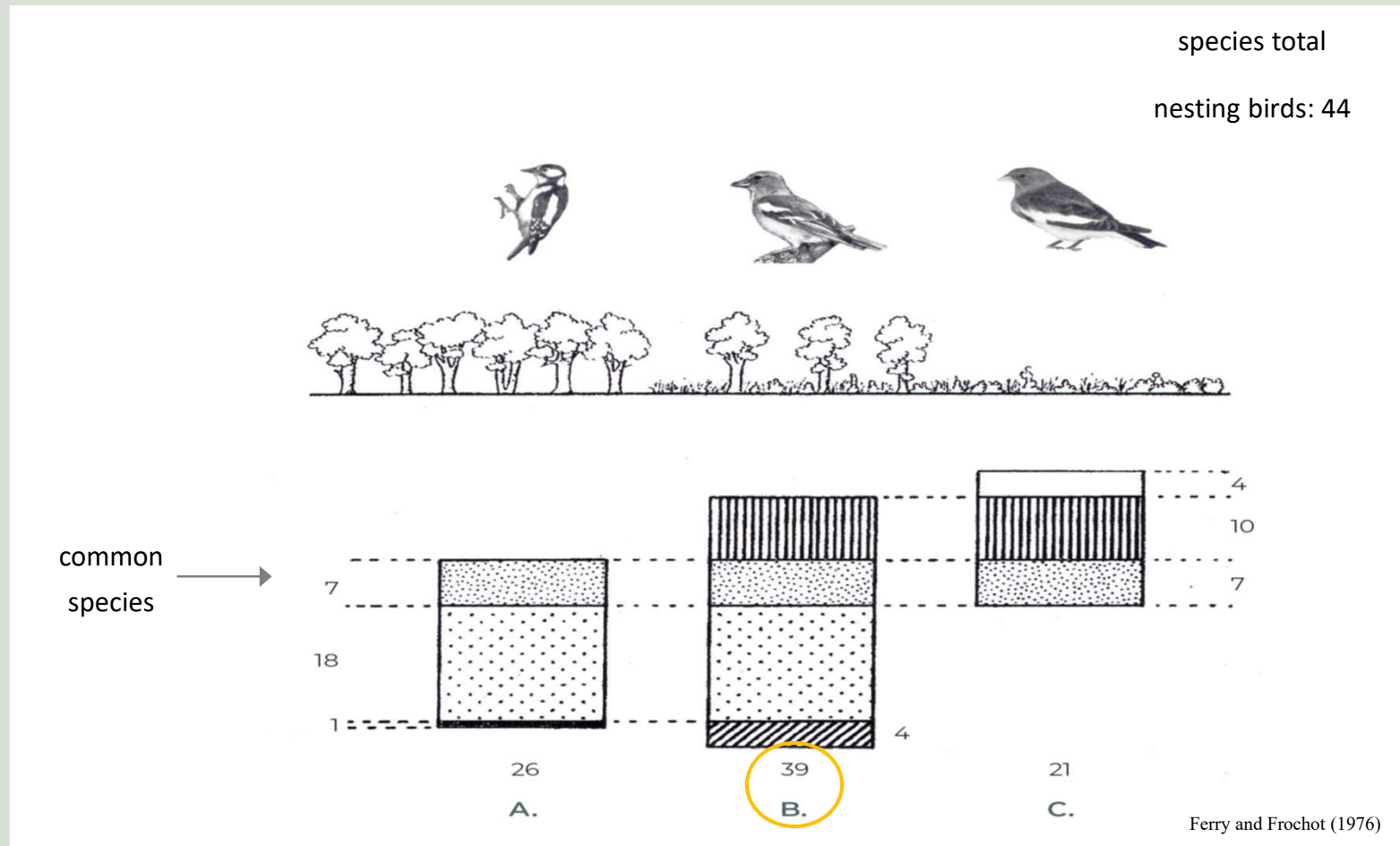


Areas threatened by desertification



## Biodiversity

### Birds

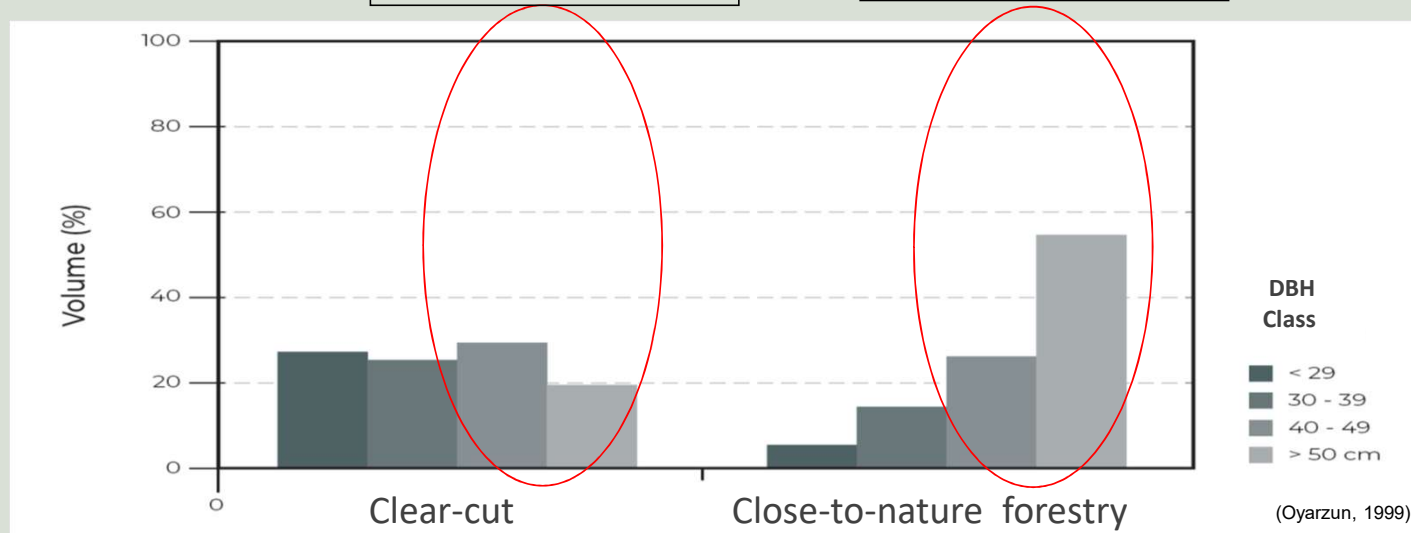


## Economics

### Wood Production

48% Volume

80% Volume  
+ 28% value



■ Higher wood production

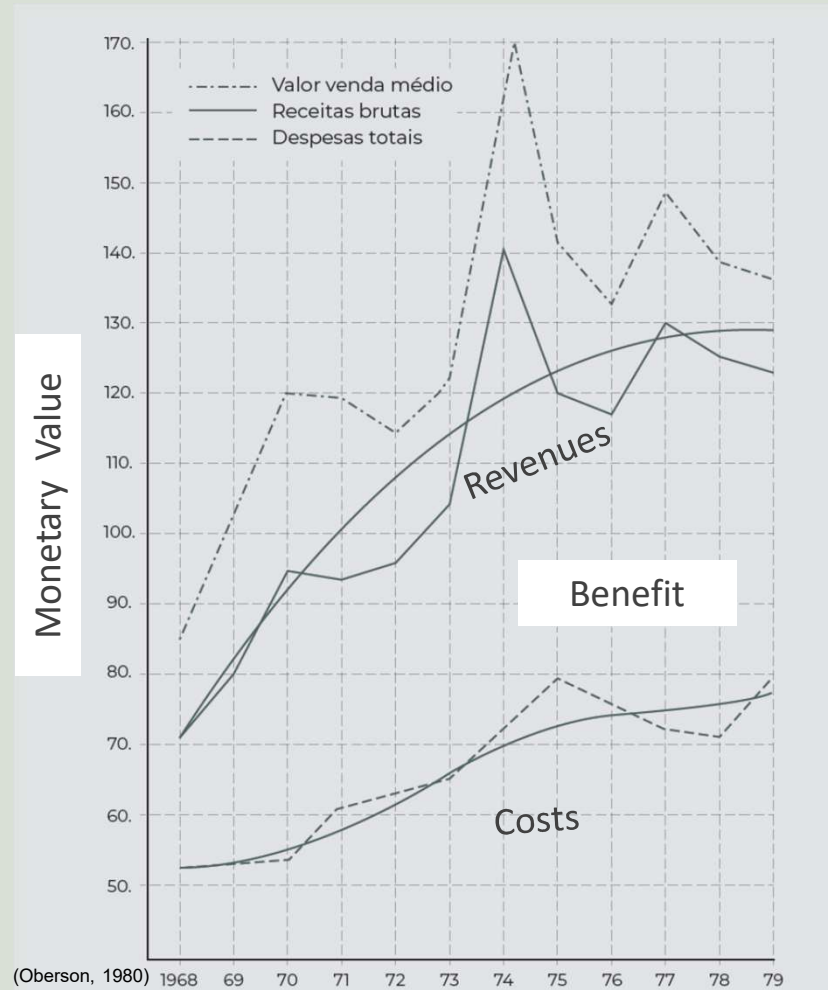
+ 20 – 40%

■ Higher revenues and profitability

+ 20 – 30%

## Economics

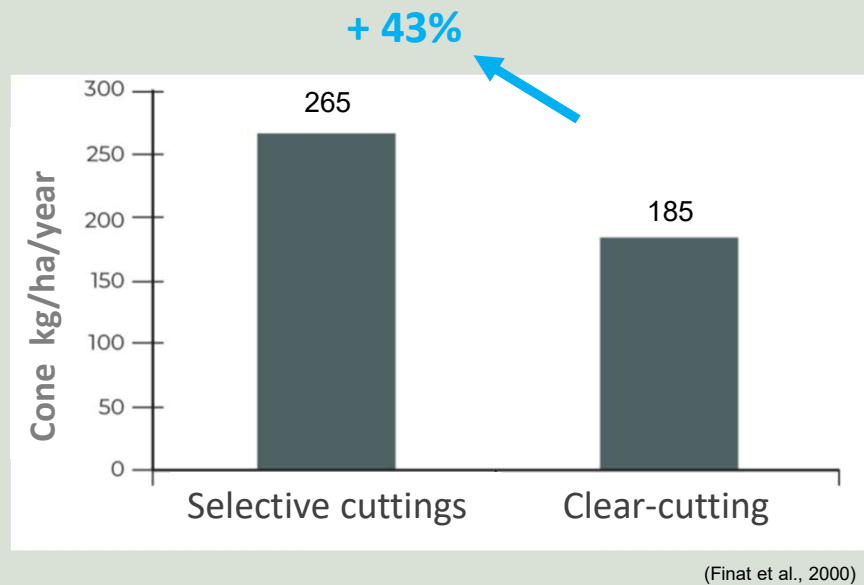
### Wood Production



#### Forest Development Policy & Transformation Programme

- Val-de-Travers, Switzerland > 1950

### Non-Wood Products

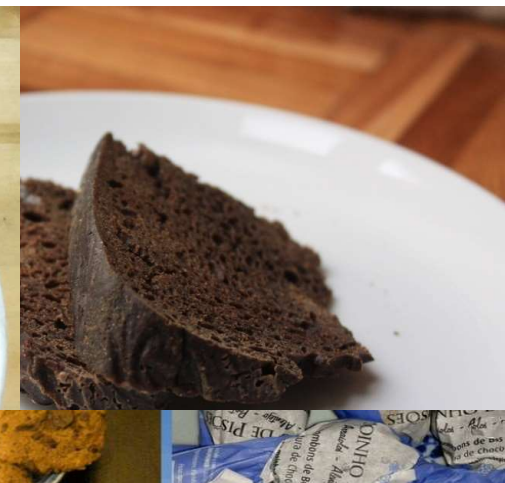


- . Progressive transformation to close-to-nature > 1970: 20 → 60% forest area
- . Cone and wood production (45 m<sup>3</sup>/ha/year , rotation 25 years)
- . Selective harvesting , Periodic and sustainable harvests

## Economics

### Added values to Oak forests

► Acorn Association



## Why are native oak forests important ?



Climate . Soil . Carbon . Landscape



Biodiversity . Water



Wood Products



Fire Resistant



Non-Wood Products

## Nature and Economy



Plantation *Eucalyptus globulus* (PT)



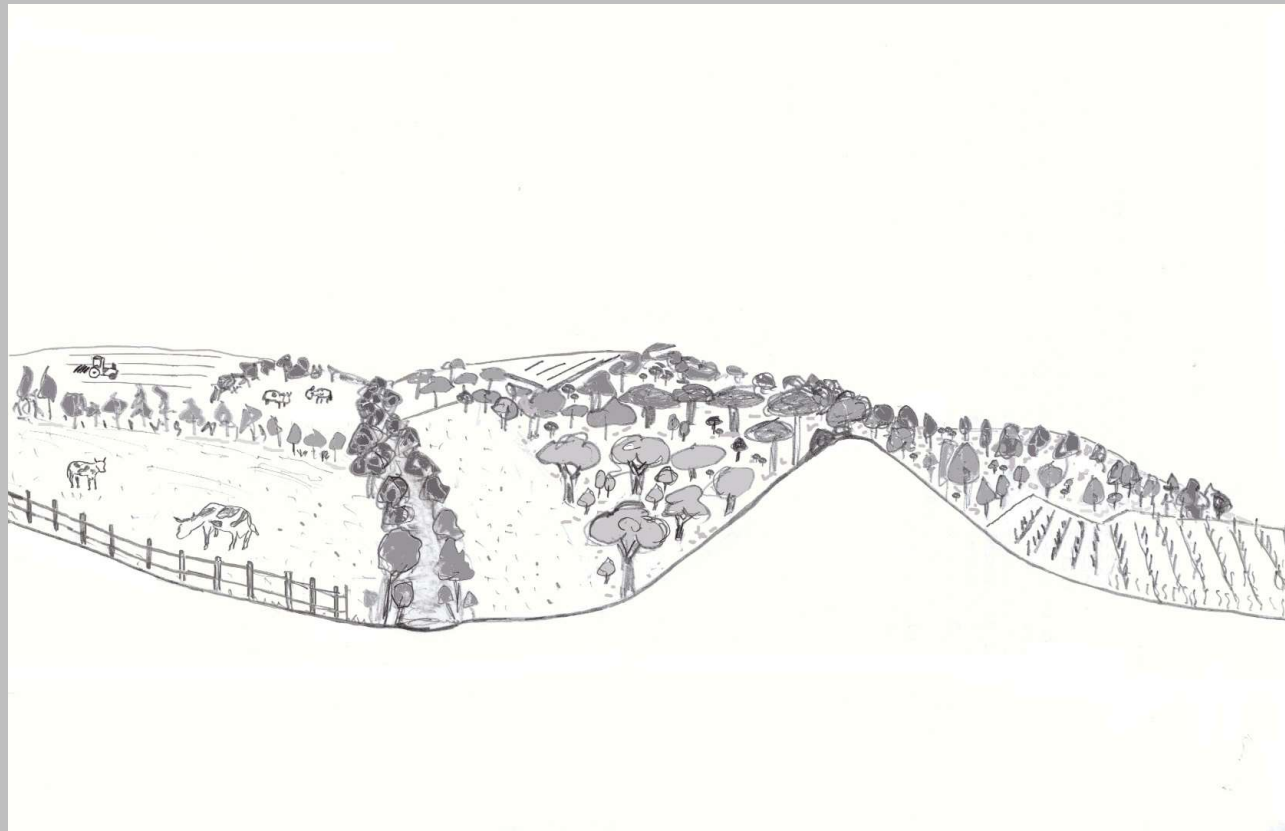
Plantations *Eucalyptus globulus* (PT)

# Why Are Native Oak Forests Important?



## Forest Ecosystem Services

### Land use and Landscape mosaic



# Forest Ecosystem Services

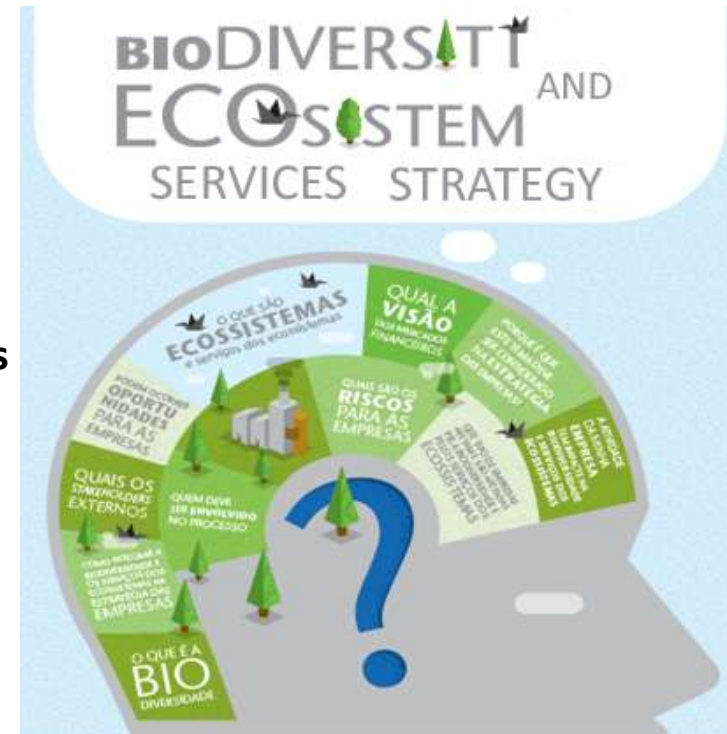
## The Forest Ecosystem Services

Unperceived and uninterrupted,  
the ecosystems provide essential services  
with much higher economical value

FIGURA 1:  
SERVIÇOS  
Ciclagem c  
Valor cultu  
Tratament  
Controle d  
Armazena  
Produção  
Regulação  
Regulação  
Recreação

Fonte de flutuantes e madeira para construção civil e energia elétrica	10,2
Regulação de gases que afetam o clima, especialmente CO <sub>2</sub> , NO <sub>2</sub> , CH <sub>4</sub> e CFC	0,68
Controle de erosão e sedimentação através da retenção do solo	0,57
Controle biológico de pragas e doenças	0,42
Proteção de habitats utilizados na reprodução e migração de espécies	0,22
Preservação de polinizadores vitais para a reprodução de plantas	0,11
Fonte de material genético para melhoramento e controle de pragas	0,08
Intemperismo da rocha-mãe e formação do solo	0,05

FORTE: ADAPTADO DE COSTANZA E OUTROS (1997)



BCSD PORTUGAL  
CONSEJO EMPRESARIAL PARA O  
DESENVOLVIMENTO SUSTENTÁVEL



CLOSE-TO-NATURE  
SILVICULTURE

- Better carbon storage
- Better climate change adaptation
- Higher profitability (wood and non-wood products)
- Periodic revenues
- Ecosystem maintenance and functioning
- Biodiversity conservation
- Ecosystem services



# EU law needs and challenges

## Some Final Notes

- Close-to-nature forestry in **EU & National** forest development **plans** (DFP) and **law**
- Close-to-nature forestry in **National Guidelines**
- **Payment** for Forest Ecosystem Services
- Financial instruments to support **transformation** to close-to-nature forestry

***Thank you***

