C.R.E.A.R. CENTRO RICERCA ENERGIE ALTERNATIVE E RINNOVABILI

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Managerial Economics and Accounting

International Symposium on

How to both harvest and preserve forests more or better?

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Medium term strategies to improve the quality of Mediterranean forests: Valtiberina case in Tuscany

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The Tuscany Forest problem

- In several countries of the **Mediterranean Europe**, **forest productions are scarcely competitive** on the markets. The survival of the enterprises of the sector depends, mainly, from a **public aid** that in the future will decrease progressively. Thus, it becomes necessary to **revitalize the sector** which, otherwise, will run into a quick decline. **The problem** is mostly linked to **the typologies of forest resources**, that, for the case of Central Italy, are mainly represented by **aged coppices**, and **sporadic tree species (mesophile species like: mountain maple**, **linden tree**, **ash tree** and **yew tree, etc.)** .

The forestry problem:

- Low value Forest (aged coppices)
- Small forest enterprises (no much equipment)

Aim of the study

- Define the strategy useful to gain three mutually objectives:
  - **Maintain forest activities** in defense of the Tuscan wood
  - **Increase the profitability** of forest activities
  - **Improve the quality of forests** in order to promote the production of valuable species

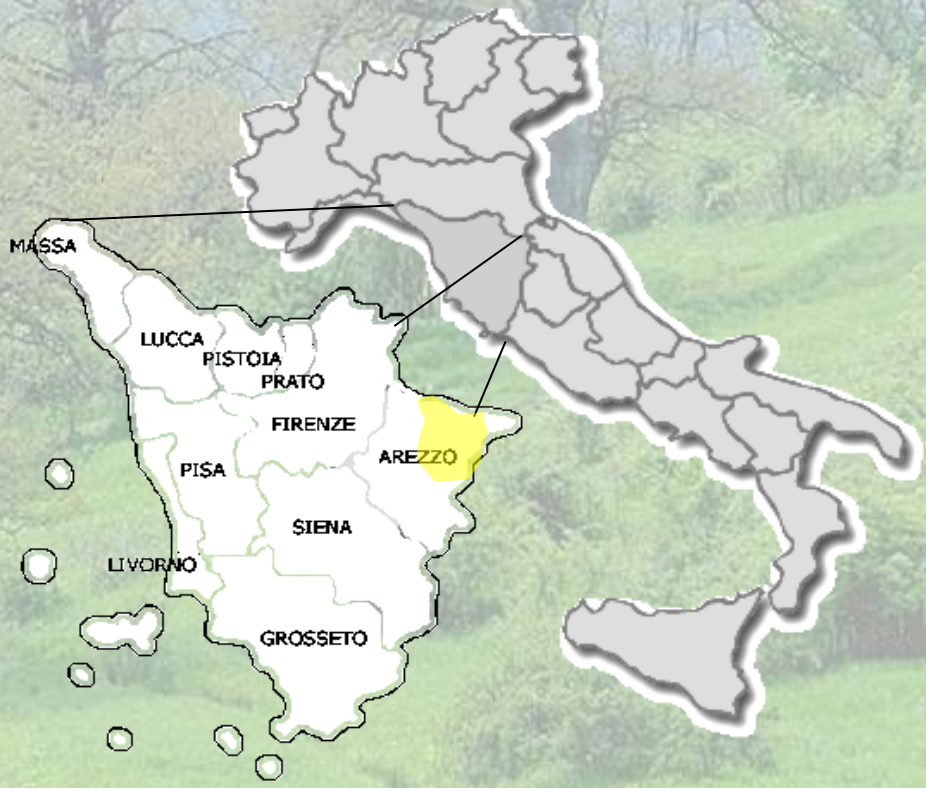
How is it possible?

- Through analysis of local resources
- Through the study of forestry enterprises operating within territory
- Through the study of local and external markets of timber industry and relationships they have with the territory

What is the territorial situation?

Site study: Valtiberina

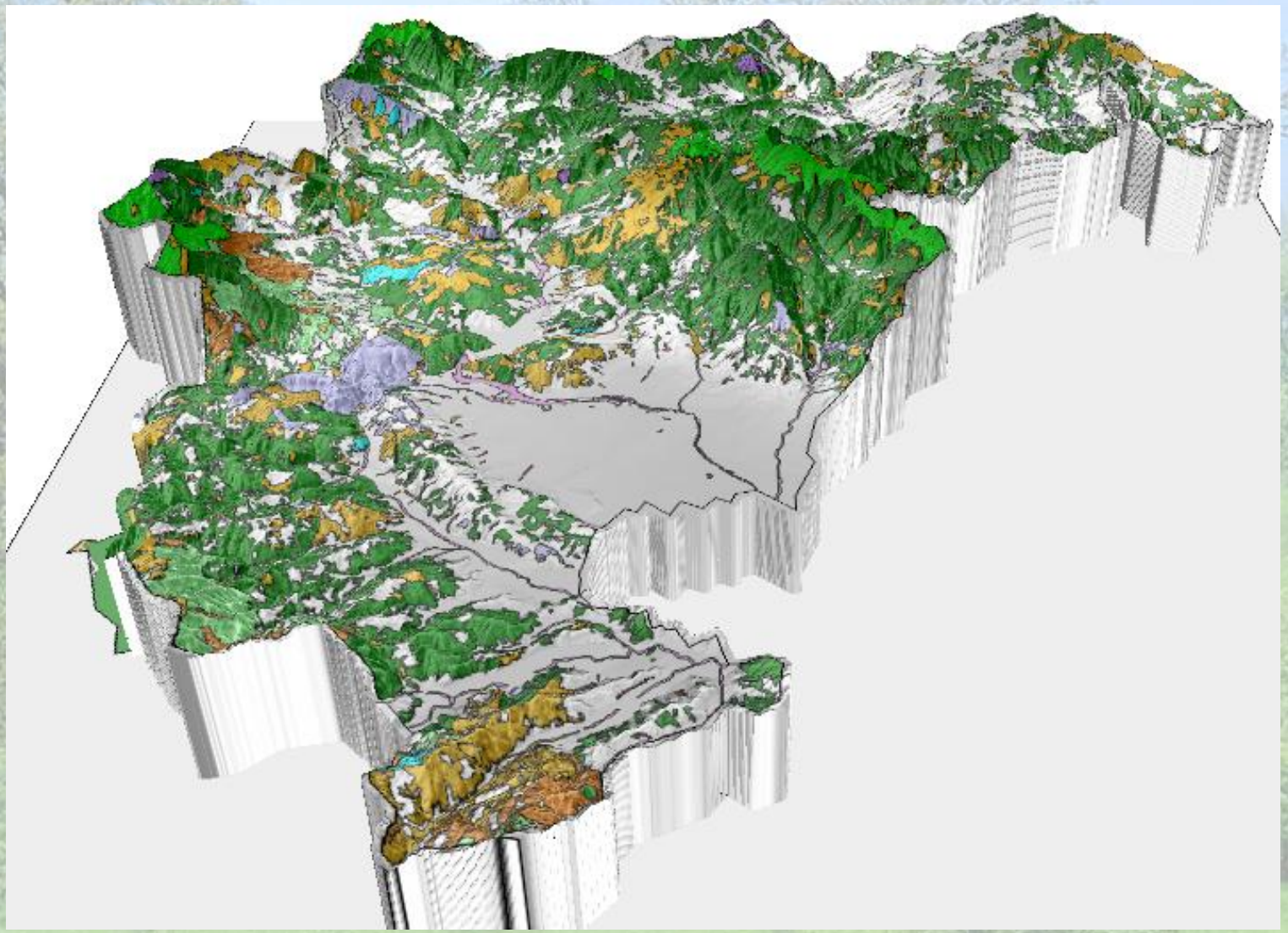
- Area 660 km^2 across North Apennines
- The territory is almost completely covered by woodlands (wood index of 61%).
- Usable Agricultural Surface is 35%
- **The most common silvicultural system is coppice (more the 80%).**



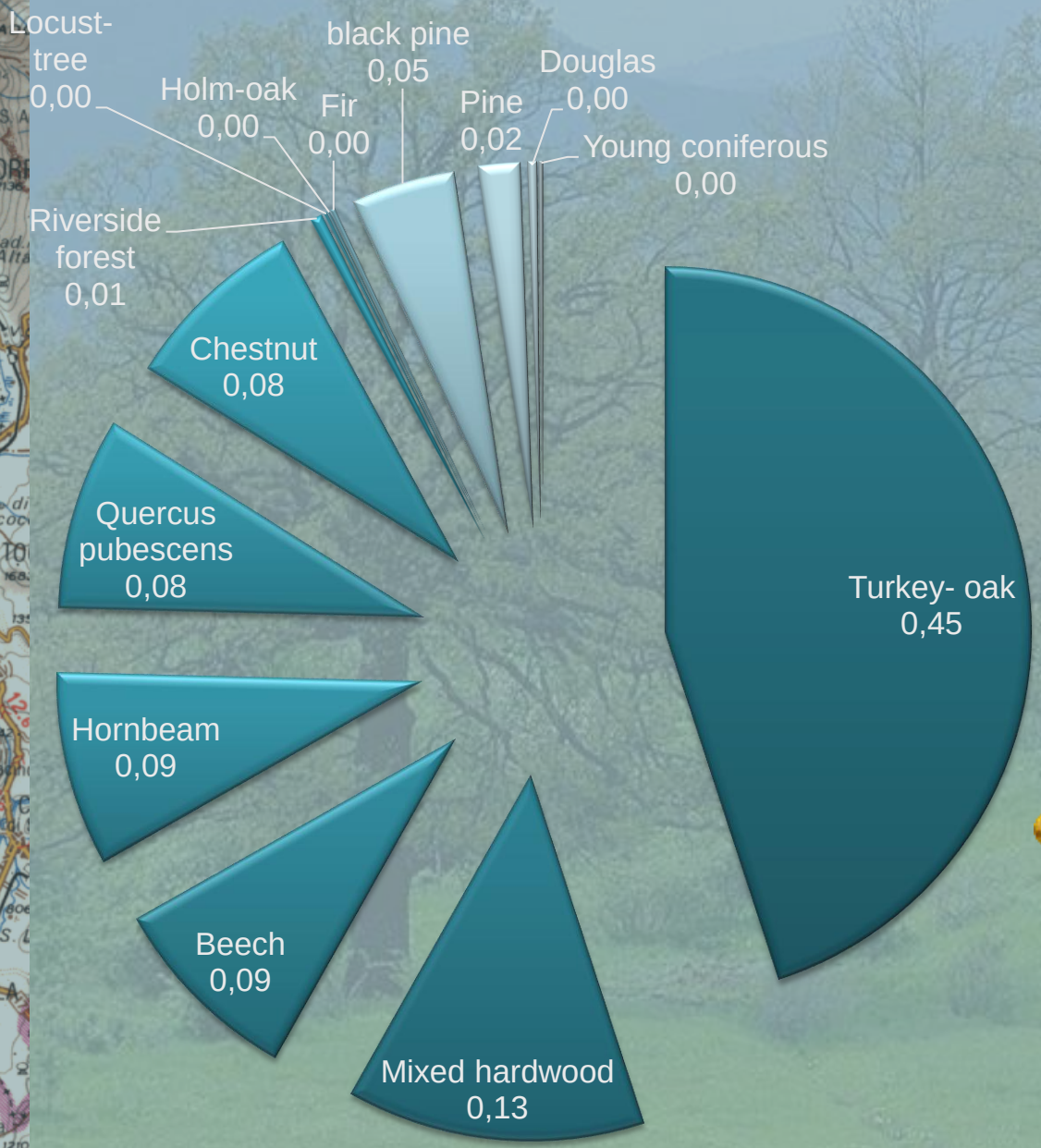
Typical agricultural products

- Tabacco Kentuky 1.709 hectares (11% UAS) – from which it derives the most production of Tuscan cigars
- 212 farms with 11,000 head of Chianina (production costs twice than any other beef breed)

VALTIBERINA FOREST 1/2



VALTIBERINA FOREST 2/2

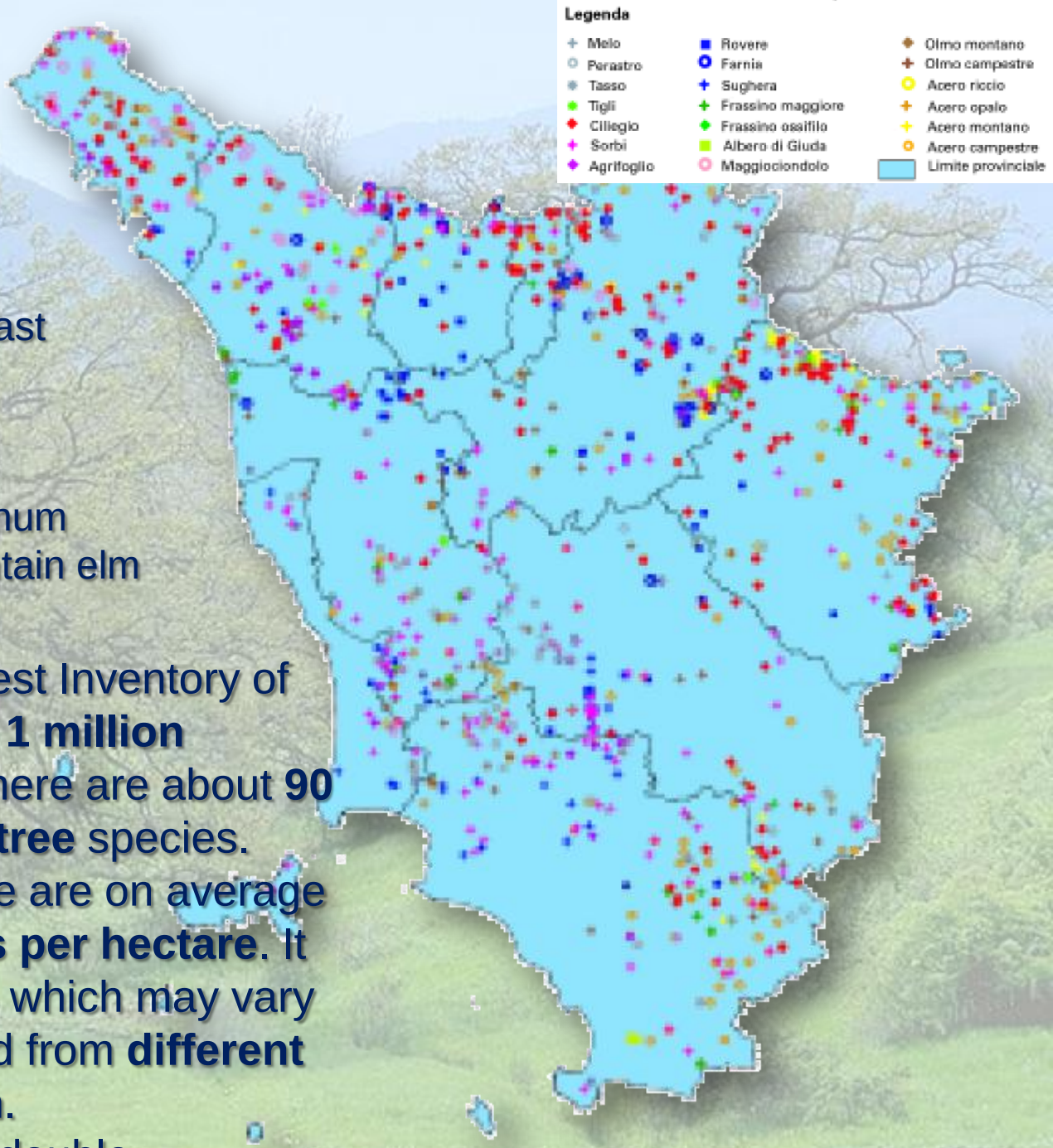


Wood Components

- The most common silvicultural system is coppice (more than 80%).

Sporadic tree species

- mountain maple
- linden tree
- ash tree
- yew tree
- maple
- apple
- cherry
- sorb
- durmast
- oak
- holly
- corck
- laburnum
- Mountain elm
- elm



1. According to the Forest Inventory of Tuscany (IFR) within **1 million hectares of forest** there are about **90 million of sporadic tree** species.
2. This means that there are on average **more than 80 plants per hectare**. It is an indicative value which may vary from area to area and from **different Silvicultural system**.
3. In coppice is usually double.

Pine and Black pine

Matsucoccus feytaudi Ducasse

(cochineal)

Leptographium sp

transported by bark beetles

Strategic actions

- **Existing forests**
  Aged coppices with lower value (turkey-oak and hornbeam), and mediterranean coniferous forests

- Transition forests.
  coppice, with estensive groups of valuable species introduced by renewal groups and High Forest Cutting

- Quality Forests
  mesophile hardwood species with mountain maple, linden, durmast, ash, etc..

How is it possible..from economic point of view?

…Opportunities are related to **energy sector**

- In the short term, the development of **forest-wood-energy chain**, can certainly be an **interesting opportunity for the economic improvement of forest resources** of Valtiberina.
- This is a **complementary chain to the traditional firewood** chain, which uses raw materials from :
  - **Wood thinning** in conifers wood;
  - **High forest cutting**;
  - **Clear cutting** in coppice and high forest;
  - **Cutting in riparian wood**;
  - **urban green** pruning;
  - **agricultural tree crops** pruning **(grapevine, olive).**

Forest regulation point of view

Coppice

- Production of **traditional timber assortments** to which we associate the production of **wood chips** deriving from the residues of the forest harvesting.

Tukey-oak coppice
(fire wood+chips)

Sporadic tree species

- Spreading of the tree tecnique, with gradual thinning round **target plants**

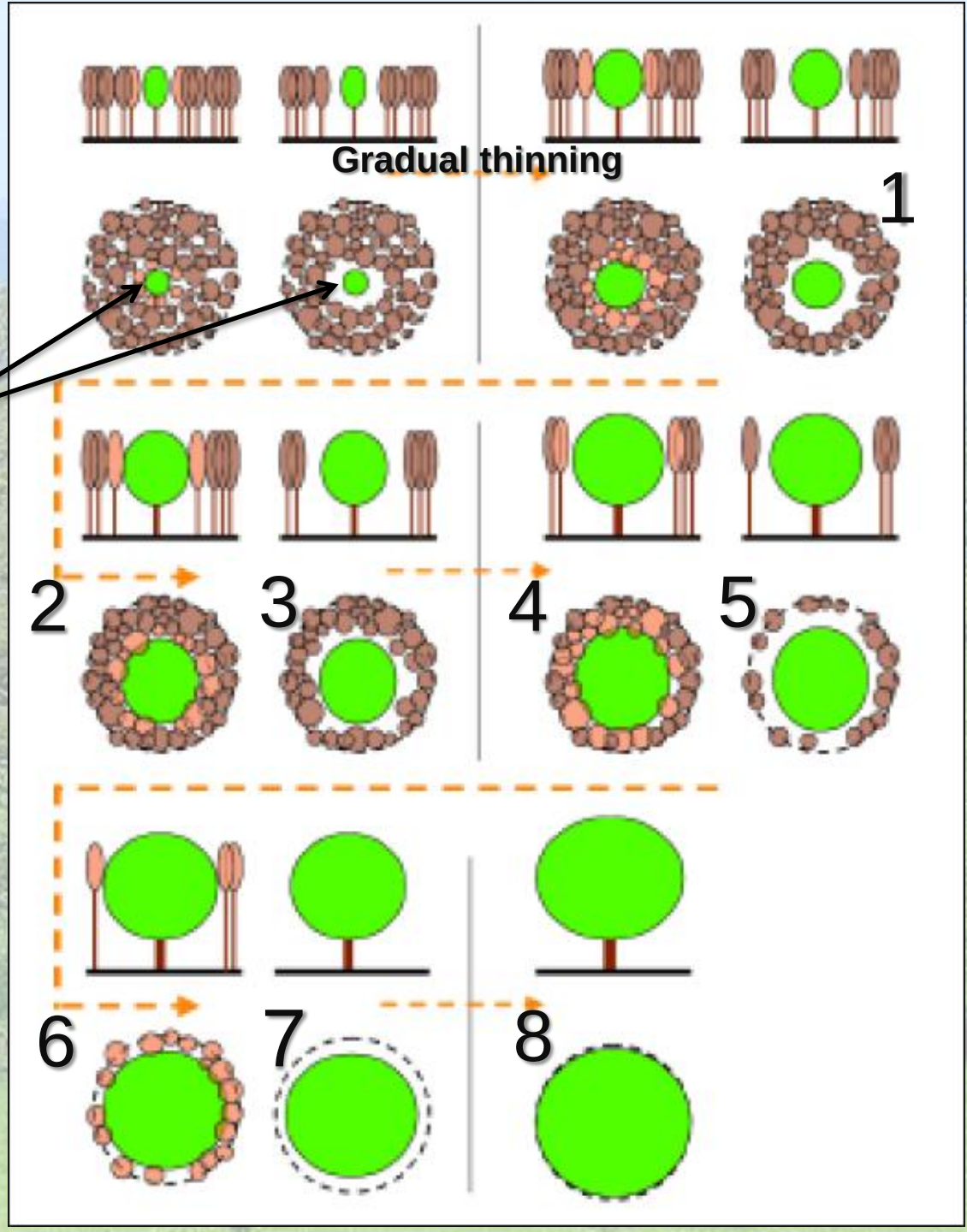
Target plant

Mix Beech coppice
with sporadic elms

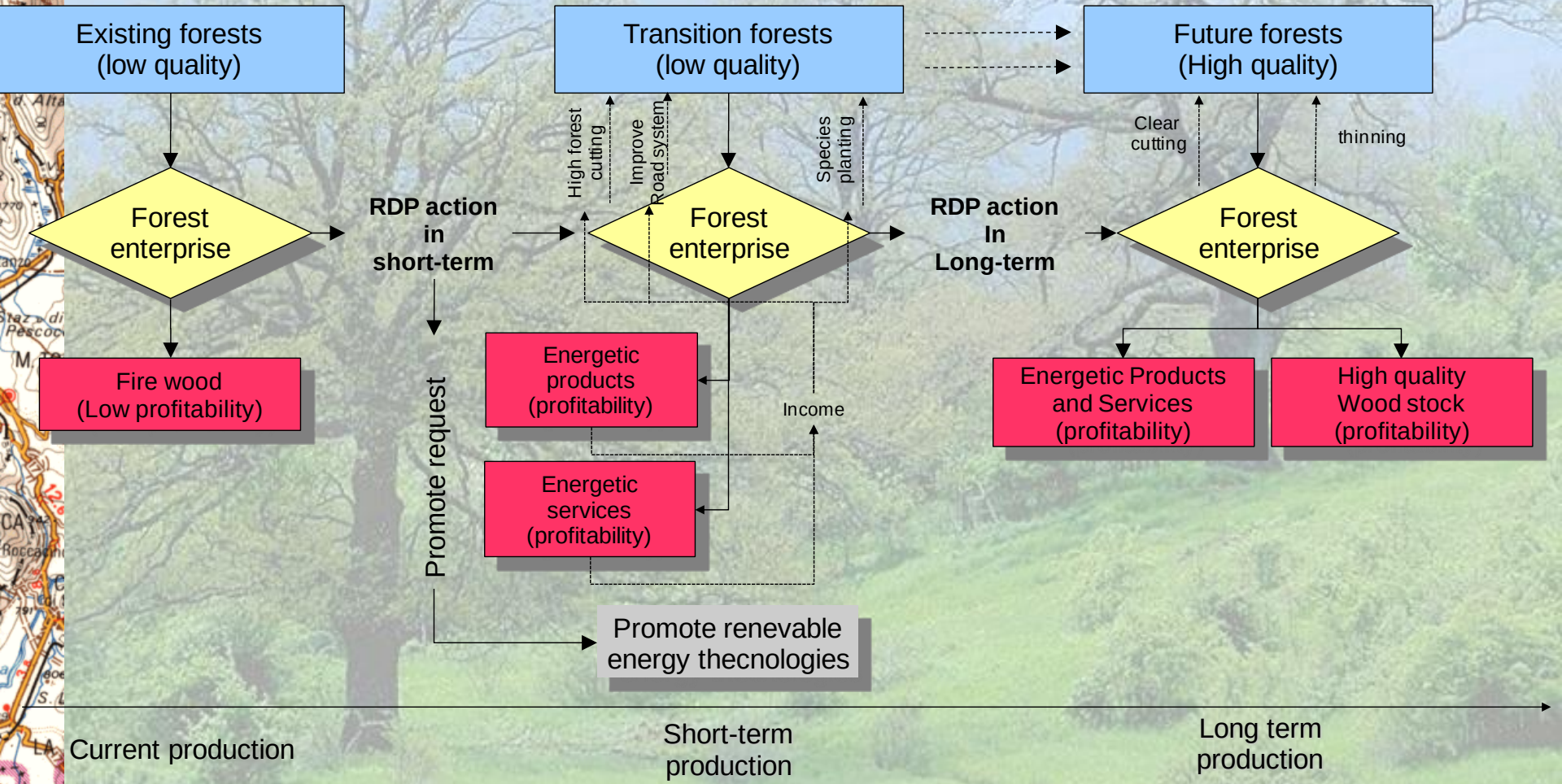
Ex: TECNICAL APPROACH TO SPORADIC TREE SPECIES

(SPREADING OF THE TREE)

- identification of target plants and relative crown cover
- During coppice harvesting…Clear cutting, high forest conversion, thinning



Local development model



Methodology to define strategies and actions

Dinamic SWOT

1. PEST Analysis

Collected information through focus groups and stakeholder concerning:

1. Political and regolatory factors
2. Economic factors
3. Social factors
4. Technological factors

2. SWOT Analysis

The SWOT analysis is used to evaluate the positive and negative factors within the forest sector

- ❑Strenghts
- ❑Weaknesses
- ❑Opportunities
- ❑Threats

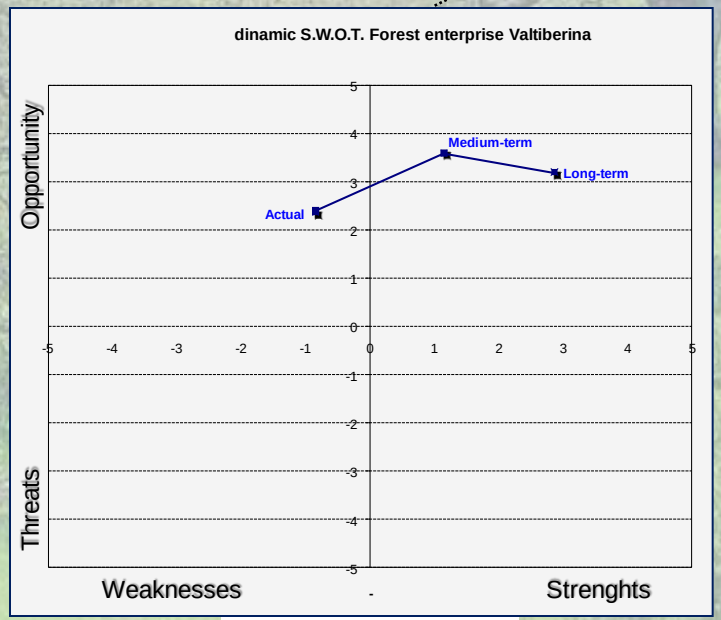
From PEST analysis information

3. Knowledge Map

Knowledge maps are used to highlight the present, mid-term and long -term scenario for three types of chains:

The current scenario
The medium-term scenario
The long-term scenario

	Filiera 1	Filiera 2	Filiera 3
Scen. 1	Know. Map 11	Know. Map 21	Know. Map 31
Scen 2	Know. Map 12	Know. Map 22	Know. Map 32
Scen 3	Know. Map 13	Know. Map 23	Know. Map 33



Knowledge Map

Chain 1
self-production and consumption of agro-forestry biomass

Chain 2
production and sale of agro-forestry biomass

Chain 3
"integrated" chain of energetic services.

SWOT

	S.W.O.T. (Strenghts-Weaknesses-Opportunities-Threats)	
Internal analysis	 Strenghts	 Weaknesses,
External analysis	 Opportunities	 Threats

SWOT ON THE PRESENT SITUATION

- The four points of view of SWOT will be now examined considering:
  - the present conditions of the firms' structures;
  - the current typology of forest stands;
  - the present market for the wood products (selling of fire wood on the local market).

MEDIUM TERM SWOT

Now let us see the four points of view of the SWOT, **hypothesizing the introduction of actions from RDP**, with the aims of:

- Favoring the **diversification of the production**, stimulating the production of **wood chips** for energetic use
- Improving the quality of forest elements through interventions regarding the **high forest cutting** (mainly in the beech coppices),
- Specific improvement of the hilly forest stands with **durmast**;
- Improvement of the forest stands with valuable broad-leaves (Mountain maple, lime tree, ash tree, yew tree);
- Improving of the **forest roads**;
- **Updating knowledge of the forest workers**;
- **Favoring the installation** of **heating plants** fed with wood chips in the public buildings;
- Favoring the **acquisition of technologies** for the forest-wood-energy chain.

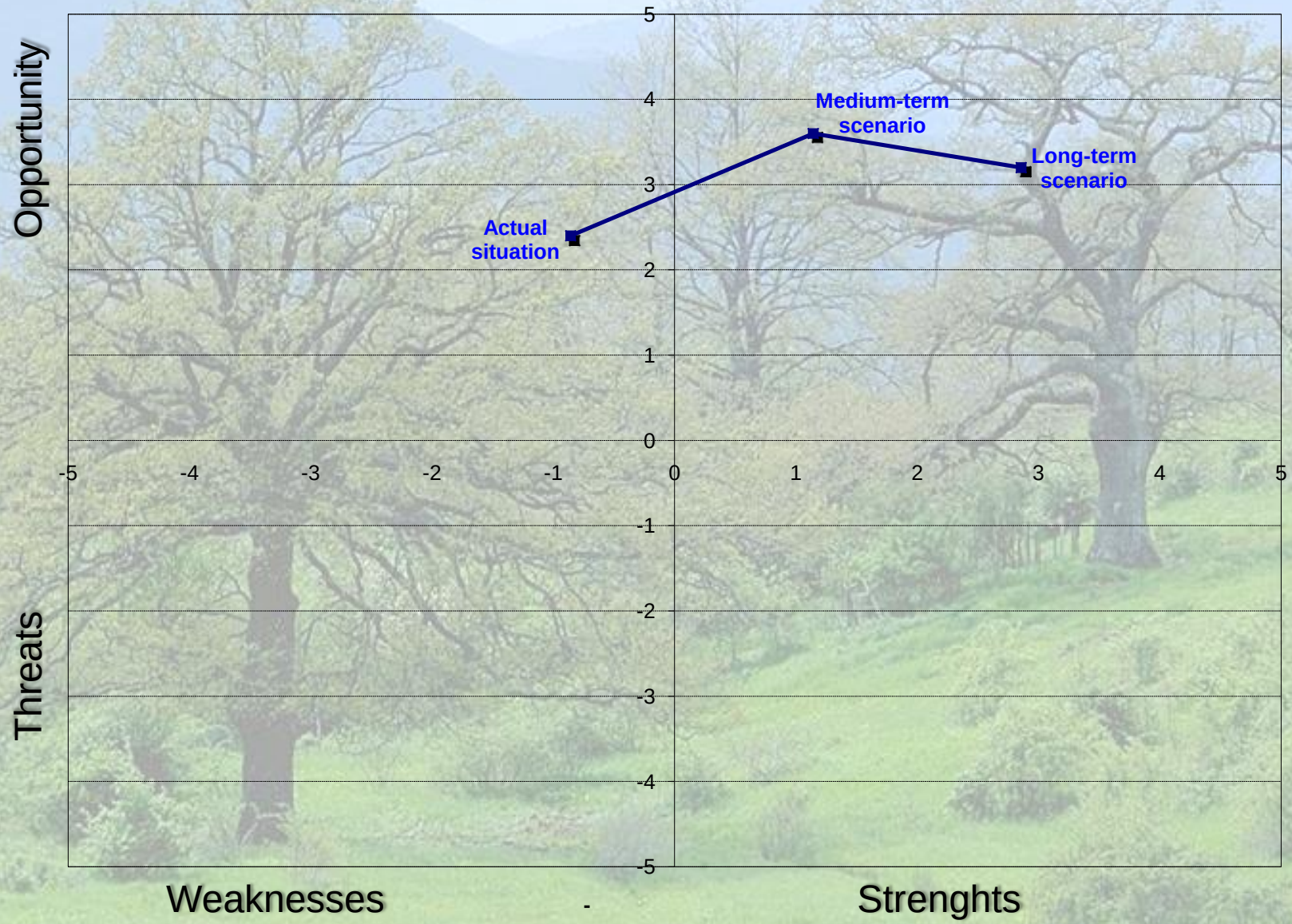
LONG TERM SWOT

- The four points of view of SWOT are **evaluated considering the effects that the actions of RDP may have in the long-term.**
- In this case the **enterprises' structures should have adequated themselves for a diversified production** (such as lumbers from valuable species, energetic products and services – including cogeneration).

KNOWLEDGE MAPS

- **The cognitive maps allow the visual evaluation of the strengths and weaknesses, opportunities and threats** of a specific enterprise project.
- Through these maps **it is possible to have a clear perception of the results, which derives from PEST and SWOT analysis** and to have a **clear evidence of the future sector dynamics**.
- These maps are **created evaluating the contribution that each factor gives to the definition of the degree of strength or weakness** of the **enterprise** or the **opportunities or threats from the external factors**.
- The contribution of each parameter has been evaluated through a scale of linguistic quantifiers:
  - **5**= very important, **4**= important, **3**= medium, **2**= scarce, **1**= not important

dinamic S.W.O.T. Forest enterprise Valtiberina




DINAMIC SWOT RESULTS

Action: (defined specific incentives for RDP)

For Harvest enterprise:

- Incentive to buy technologies for the development of the forest-wood-energy chain.
- Training of forest workers;

For forest enterprise

- Incentive to **increase diffusion of mesophile species** in the forest stand (Durmast, ash, linden ,etc);
- **Improving of the forest roads system**.
- Incentive for **high forest cutting** (mainly in the beech coppices), and **substitution conifers with specific re-naturalization**
- Incentive for **forest planting** (mesophile species)

To increase chips demand

- **Incentives to buy heating plants fueld by biomass in public buildings**, and private-public buildings

Estimated Economic effect (Valtiberina)

scenari	Gross Domestic Product Energetic production and Heating service (€)	Thermical power (Mwh/yr)	Volume Heated (mc)	Fuel saved (l/yr)
only with Actual forest residues	3,168,000	39,600	264,000	4,666,667
With potential forest residues	4,732,032	59,150	394,336	6,970,586
forest and agricultural residues	5,472,346	68,404	456,029	8,061,115
Chipping residues ad fire-wood	14,400,000	180,000	1,200,000	21,212,121

* considerando 3 Mwt al netto perdite di sistema e vendita calore a 80 €/Mwterm (prezzo corrente servizio)

** considerando le sole utilizzazioni attualmente effettuate

More then 1.400 tanker

Annual thermic consumption of the main city of the area : 320.000 Mw (Arezzo)

thanks for your attention

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Esempio: contracting – vendita calore

Modulo mobile (plug&play), con caldaia a cippato fino a 150 kW, particolarmente idoneo al contracting agroforestale

10% di iva

- **Legge finanziaria 2006**, comma 423 dell'art. 1
- **Legge 11 marzo 2006 n°81 (Gazzetta Ufficiale n. 59 del 11 marzo 2006 - Supplemento Ordinario n. 58)**
- **Legge finanziaria 2007**

Produrre **energia elettrica e termica da fonti agroforestali** da parte di **imprenditori agricoli** che utilizzano materie prime prodotte **prevalentemente** dalla proprie aziende agricole è riconosciuta **attività agricola connessa ed assoggettata a reddito agrario**.