Opportunities for coppice management at the landscape level: the Italian experience

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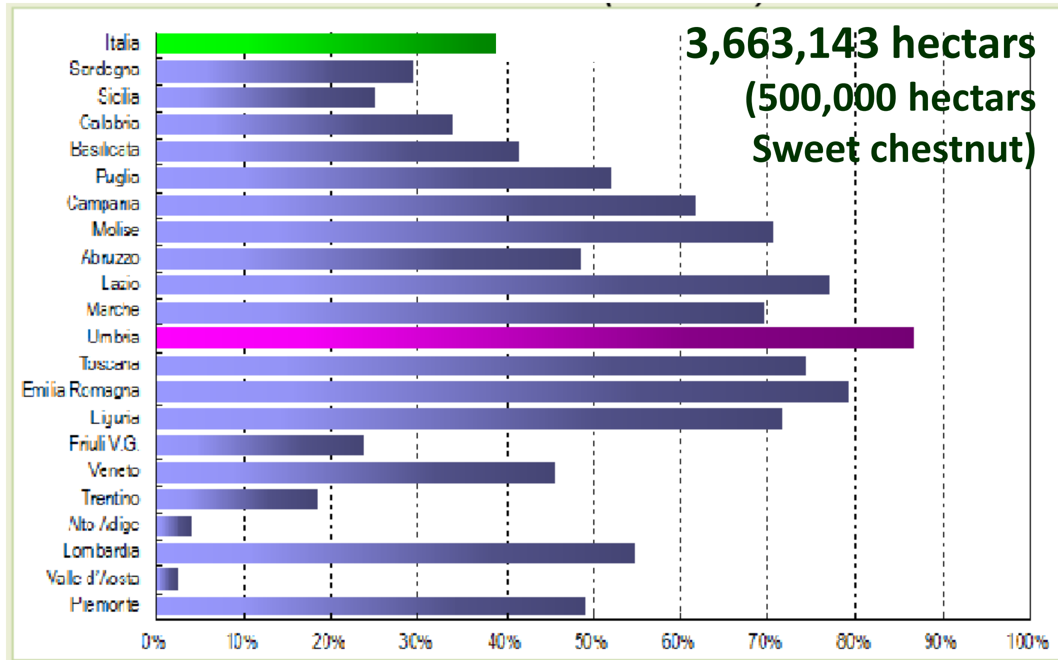
Piussi 1979, Amorini and Fabbio 2009, Piussi and Redon 2001
«ancient woodlands»

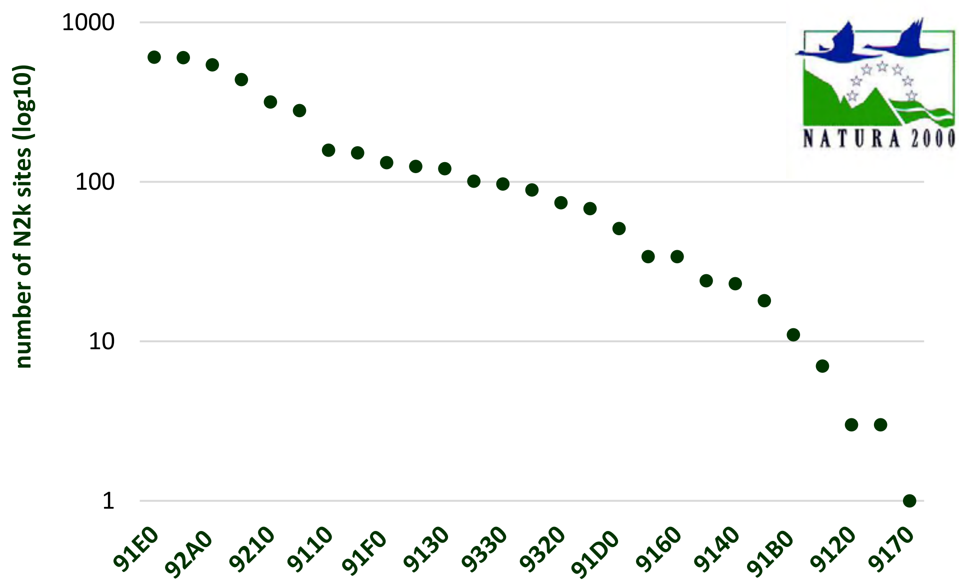
Coppice woodlands in Italy (INFC 2005)

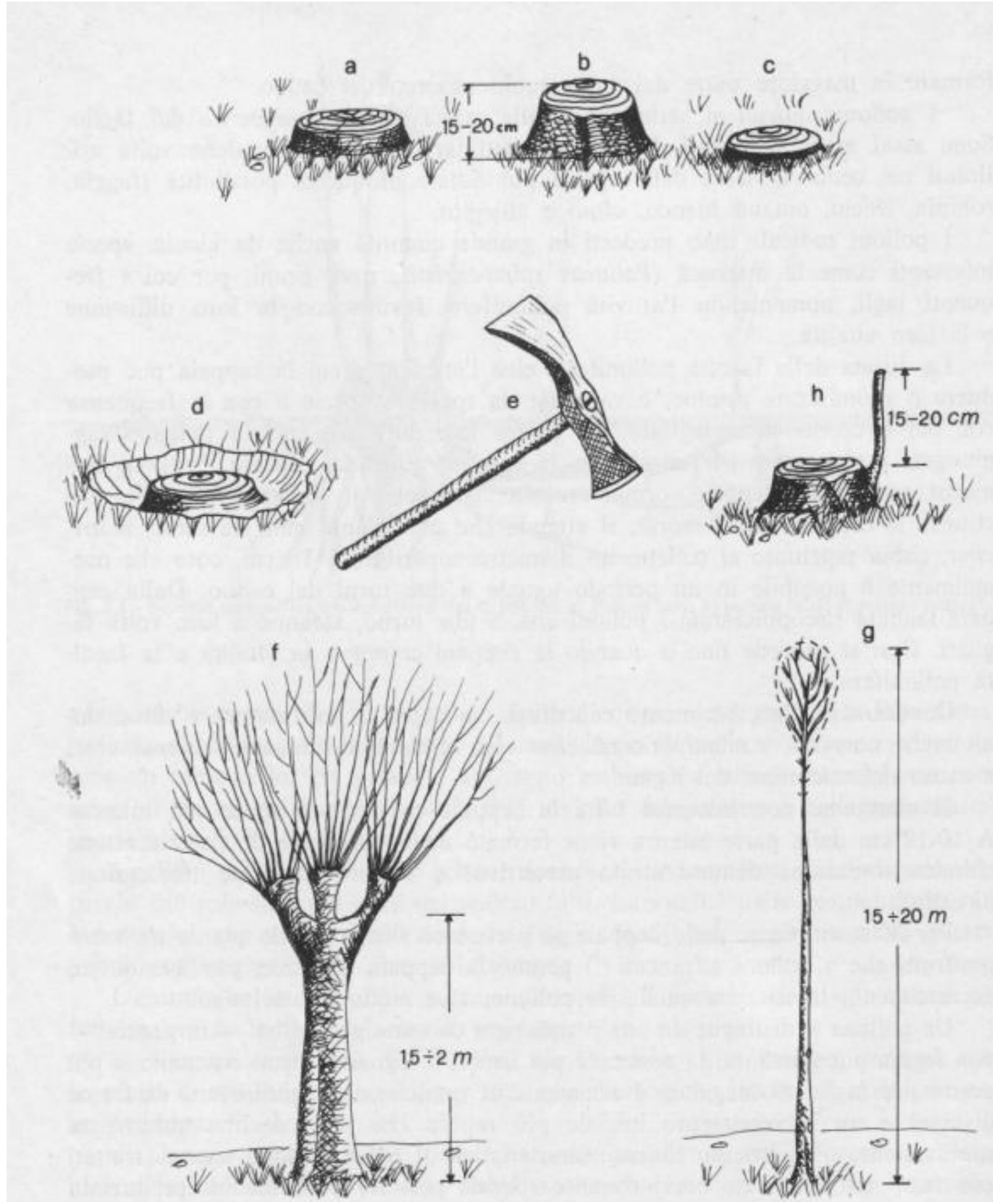


3,663,143 hectars (500,000 hectars Sweet chestnut)

Beech	**14.4**
Deciduos Quercus sp	**19.4**
Evergreen Quercus sp	**5.5**
Hornbeam	**11.6**
Other sp.	**21.9**
Coppices with conifers	**2.9**

Frequency of N2k forest habitat types





Different modes of stump cutting, pollarding and pruning associated with coppice

Historical multifunctional silvo-pastoral systems for animal husbandry and production of timber, firewood, charcoal, NWP





Current management approaches…

Uprooting of beech stools in a coppice under conversion following snow (Urbinati et al ForestPas 2000)

Uprooting of sweet chestnut overstood stool following heavy rain (Bischetti et al Pro.Ce.D.I 2013)

(Bischetti et al Pro.Ce.D.I 2013)

Innovative silvicultural systems for coppice woodlands…

Selection of standards to be retained can be challenging. This not only includes the number of trees selected to grow to larger sizes than the shoots, but also concerns setting the density and the spatial arrangement as well as the age/size distribution of standards within the stand, guided by informed silvicultural choices.

- ✓ **Group of standards retention**

Summacop - Sustainable and multifunctional management of Umbria coppices

LIFE99 ENV/IT/000003

- ✓ **Single tree silviculture**

P.Pro.SPO.T. - Policy and Protection of Sporadic tree species in Tuscany forest

LIFE09 ENV/IT/000087

- ✓ **New silvicultural system for sweet chestnut coppices**

CHESUD Project (Contract ERBIC 15 CT 98 0149)

ManFor C.BD. - Managing forests for multiple purposes: carbo
biodiversity and socio-economic wellbeing

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Summacop - Sustainable and multifunctional management of Umbria coppices

LIFE99 ENV/IT/000003

Group of standards retention

Frattegiani et al 2000

Grohman et al 2002

Savini et al 2015

- ✓ **100 m^2 ±; 25-30 individuals bounded by the more mechanically stable ones; possibly including sporadic tree species**
- ✓ **average distance 15-20 m within the coupe (10-15% of coupe extent)**
- ✓ **density and spatial arrangement according to terrain/site and stand conditions**

Summacop - Sustainable and multifunctional management of Umbria coppices

LIFE99 ENV/IT/000003

Group of standards retention

Frattegiani et al 2000

Grohman et al 2002

Savini et al 2015

- ✓ individual tree and stand mechanical stability protection of soil from erosion
- ✓ sufficient light for shoots growth
- ✓ tree species diversity
- ✓ within-coupe heterogeneity (creation of microhabitats)
- ✓ more commercially valuable timber
- ✓ easing of timber and firewood extraction
- ✓ aestethics (mitigation of the visual impact of coppicing

P.Pro.SPO.T. - Policy and Protection of Sporadic tree species in Tuscany forest
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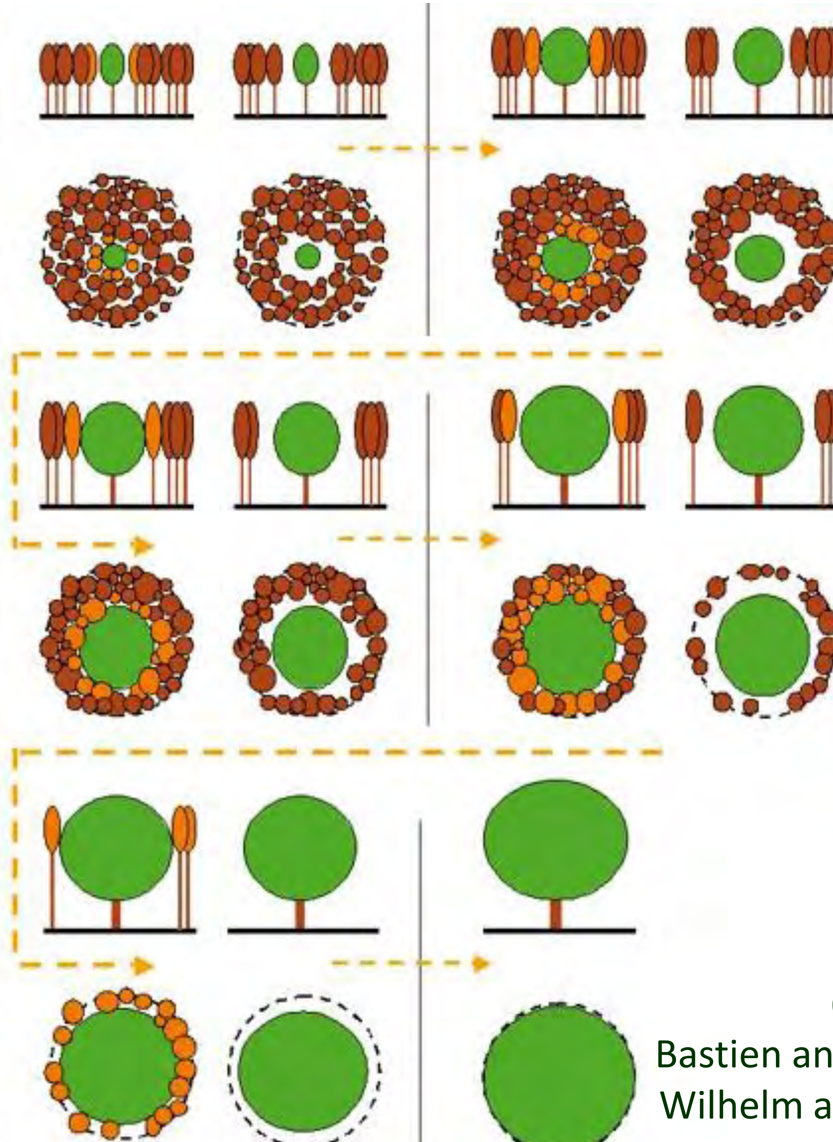
Single tree silviculture (for sporadic species) in ageing coppices

Pelleri et al 2000
Mori and Pelleri 2014



dètourage
(mutuated from
Bastien and Wilhelm 2000
Wilhelm and Rieger 2013)

Main characteristics of the single tree silvicultural models for coppices (Marone et al 2014)

Silvicultural model	Target trees number n ha^{-1}	Target trees DBH cm	Sporadic target trees yield m^3	Return period yrs	Coppice rotation period yrs
A-Oak coppice	20	48-68	0.9-1.2	8	24
B-Oak coppice	20	48-68	0.9-1.2	6	24
C-Aged oak coppice	60	48-68	0.8-1.9	8	--
D-Aged chestnut coppice	96	48-68	0.5-1.1	8	48

- ✓ **Different combinations of thinning regimes according to different tree species / stand initial conditions (e.g., reaction in terms of growth and competition/stand dynamics)**

- ✓ **Suitable to different woodlands (mixed oak, chestnut and beech) of coppice origin (including aged/converted to high forests stands)**

CHESUD Project (Contract ERBIC 15 CT 98 0149)

New silvicultural system for sweet chestnut coppices

Amorini et al 2000
Amorini and Manetti 2002
Fabbio et al 2015

ManFor C.BD. - Managing forests for multiple purposes: carbon, biodiversity and socio-economic wellbeing

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- ✓ **Lengthening of rotation time (to 30 or 50 years)**
- ✓ **Selection and tending of stems**
- ✓ **Early (starting at 10th year) frequent (every 6-7 years) thinnings from below-mixed/medium-high intensity**

10 years

30 years

50 years

Successful in the recovery of neglected woods with overstood stools and in maintaining a balanced dominant cohort, functionally responding to the biological characteristics of this species and coppice dynamics (i.e. shade-intolerant, fast growing, active social organisation, tendency to create even-aged structures)

Main characteristics of the medium and long rotation models for chestnut coppices

Medium rotation		Before thinning			Intensity		After thinning			M	CAI
Age yrs	DH m	Ns n ha^{-1}	BA $m^2\ ha^{-1}$	DBH cm	N (%)	BA (%)	Ns n ha^{-1}	BA $m^2\ ha^{-1}$	DBH cm	(%)	$m^2\ ha^{-1}\ yr^{-1}$
10	> 10	5500	26.9	7.9	50	35	2750	17.5	9.0		
										4.0	1.9
15	13.5-15.5	2640	27.0	11.4	50	30	1320	18.9	13.5		
										2.0	1.6
22	16.5-18.0	1294	30.1	17.2	40	30	776	21.1	18.6		
										1.0	1.4
30	19.0-20.0	786	32.3	23.1							

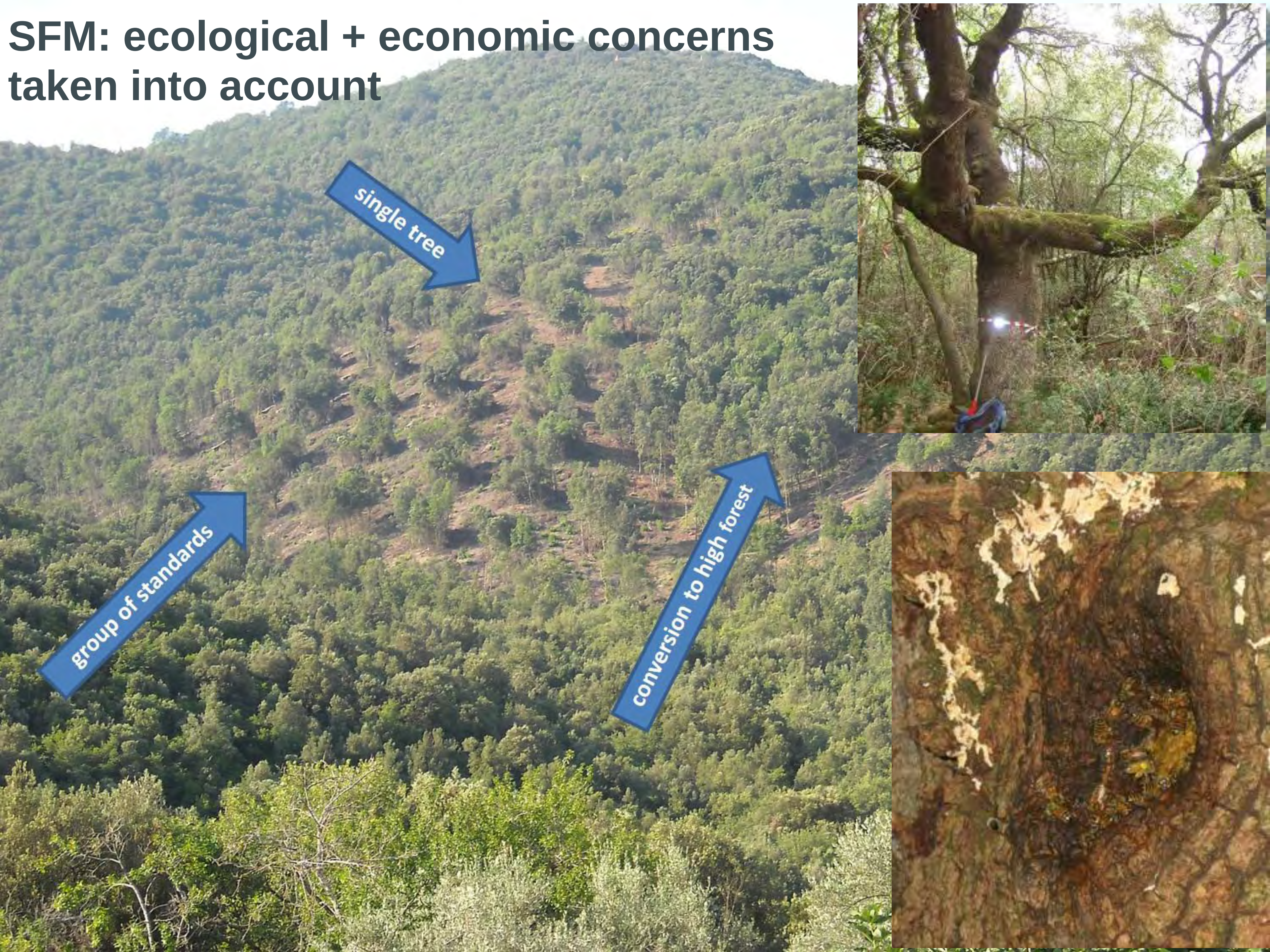
Long rotation		Before thinning			Intensity		After thinning			M	CAI
Age yrs	DH m	Ns n ha^{-1}	BA $m^2\ ha^{-1}$	D cm	N (%)	BA (%)	Ns n ha^{-1}	BA $m^2\ ha^{-1}$	D cm	(%)	$m^2\ ha^{-1}\ yr^{-1}$
15	> 13	3900	31.5	10.1	50	35	1950	20.5	11.6		
										3.0	1.6
22	16.5-18.0	1892	31.7	14.6	40	27	1135	23.1	16.1		
										2.0	1.4
30	19.0-20.0	1112	34.3	19.8	30	22	779	26.8	20.9		
										1.5	1.4
37	21.0-22.0	767	35.2	24.2	30	22	537	27.4	25.5		
										1.0	1.2
44	22.5-23.0	531	35.8	29.3	30	25	372	26.9	30.3		
										0.0	1.0
50	23.5-24.0	370	32.9	33.6							

Our proposal…

Different options (including spontaneous development and conversion, and the application of innovative silvicultural models also in chestnut coppices) can be combined at the stand and sub-stand levels to:

- ✓ **prevent homogeneity**
- ✓ **add a finer scale heterogeneity to the mosaic of traditional coppice developmental stages**
- ✓ **increase overall system resilience and scope for (management) adaptation to new conditions**

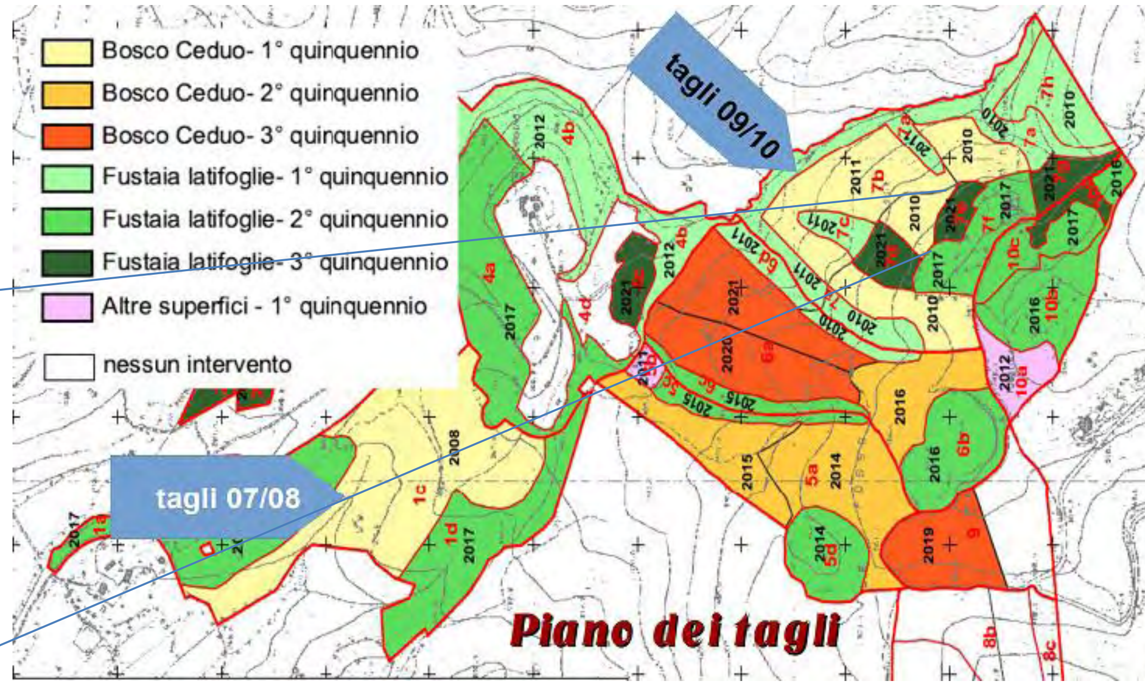
SFM: ecological + economic concerns taken into account



Requirements…

The combination of different options at the stand and sub-stand level and compliant with the principles of SFM, is challenging and requires:

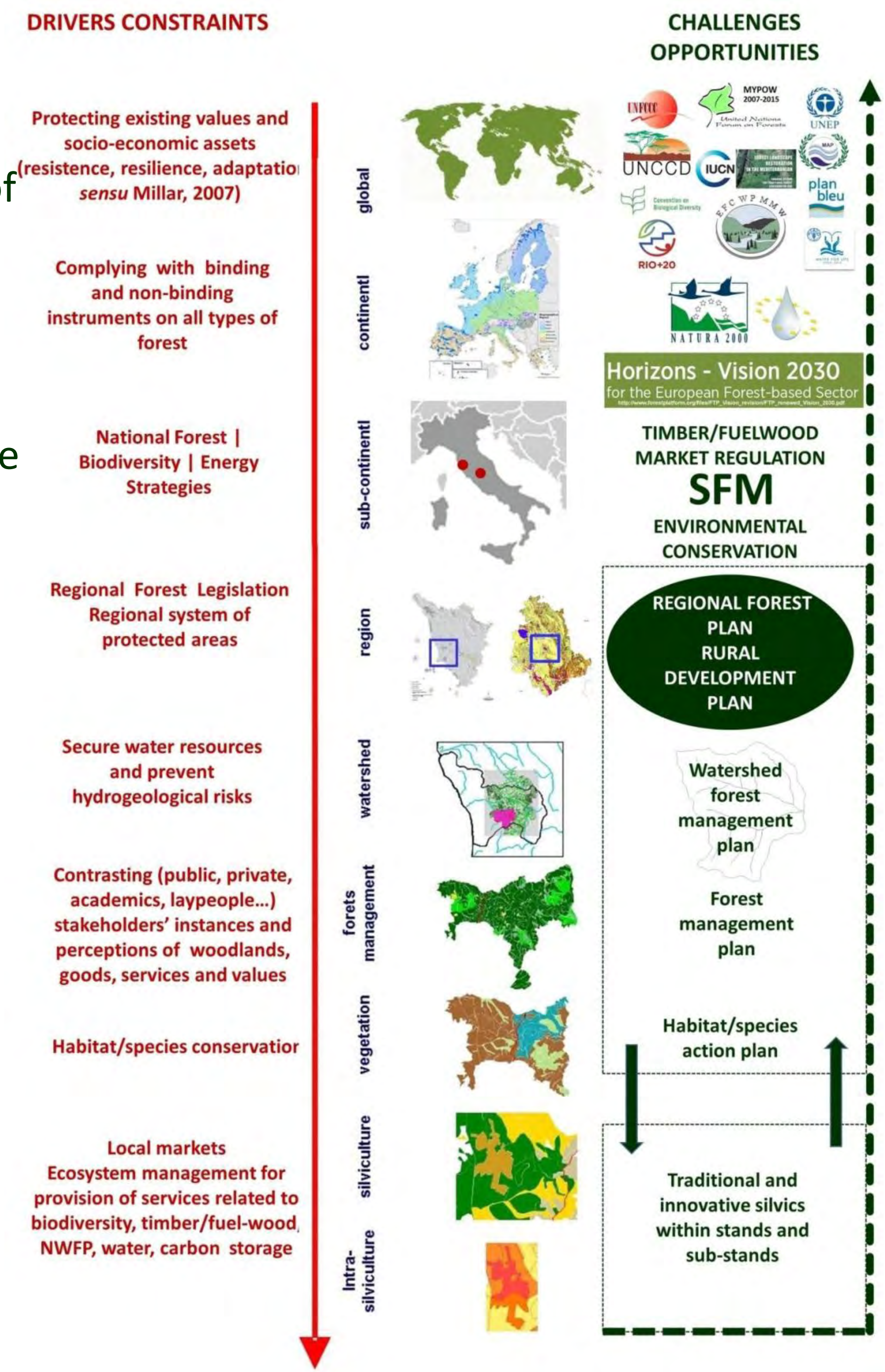
- ✓ **Regionally consistent administrative procedures ensuring a logical hierarchy in forest planning (sensu Baskent & Keles 2005) (e.g., those in force in the Regione Umbria, Grohmann 2005)**
- ✓ **Novel forest management plans (e.g., those devised for CWS in Umbria and Tuscany, Terradura & Consoli 2011, Fantoni et al. 2012),**



- ✓ **The existence of specialized and qualified operators at all levels (forestry technicians, workers, controllers) (e.g. vocational courses offered by the Regione Piemonte)**
- ✓ **The development of scenarios simulating the potential forest dynamics at different levels (cf. Mladenoff and Scheller 2007, Mairota et al 2006)**

Concluding remarks

- ✓ The proposed approach to coppice management responds to the need to consider the forest landscape as a whole, rather than an aggregation of discrete and disconnected individual forest stands and estates (Kohm & Franklin 1997);
- ✓ Goes in the direction of an ecological aesthetics (Gobster 1999) for forest landscape planning so as to reconciling scenic aesthetic/demands of urbanite communities with those of forest landscape functioning/biodiversity (cf. Hermy & Verheyen 2007) and of rural communities (cf. Ostrom 2009);
- ✓ Is applicable to Narura 2000 sites;
- ✓ Is in line with the so called “Options Forestry” (Bormann & Kiester 2004) strategy, that admits an uncertainty margin in connection with unpredictable changes that affect the system
- ✓ Is compliant with the new Framework Program for the Forestry Sector – Horizon 2020 (CO_2 fixation + SFM) to ensure productive, socio-economic and environmental functions in the future;
- ✓ **Represents the bottom up key that allows to respond to the socio-economic and environmental challenges affecting coppice silvicultural system.**



Acknowledgements

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