
*Relationship between forest ecosystem
services and civil society. A survey in the
Western Alps*

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THE CONTEXT

Forest ecosystem services (FES) are “*the multiple benefits that a forest provides to humans*”



Millennium Ecosystem Assessment classification



SUPPORTING



PROVISIONING



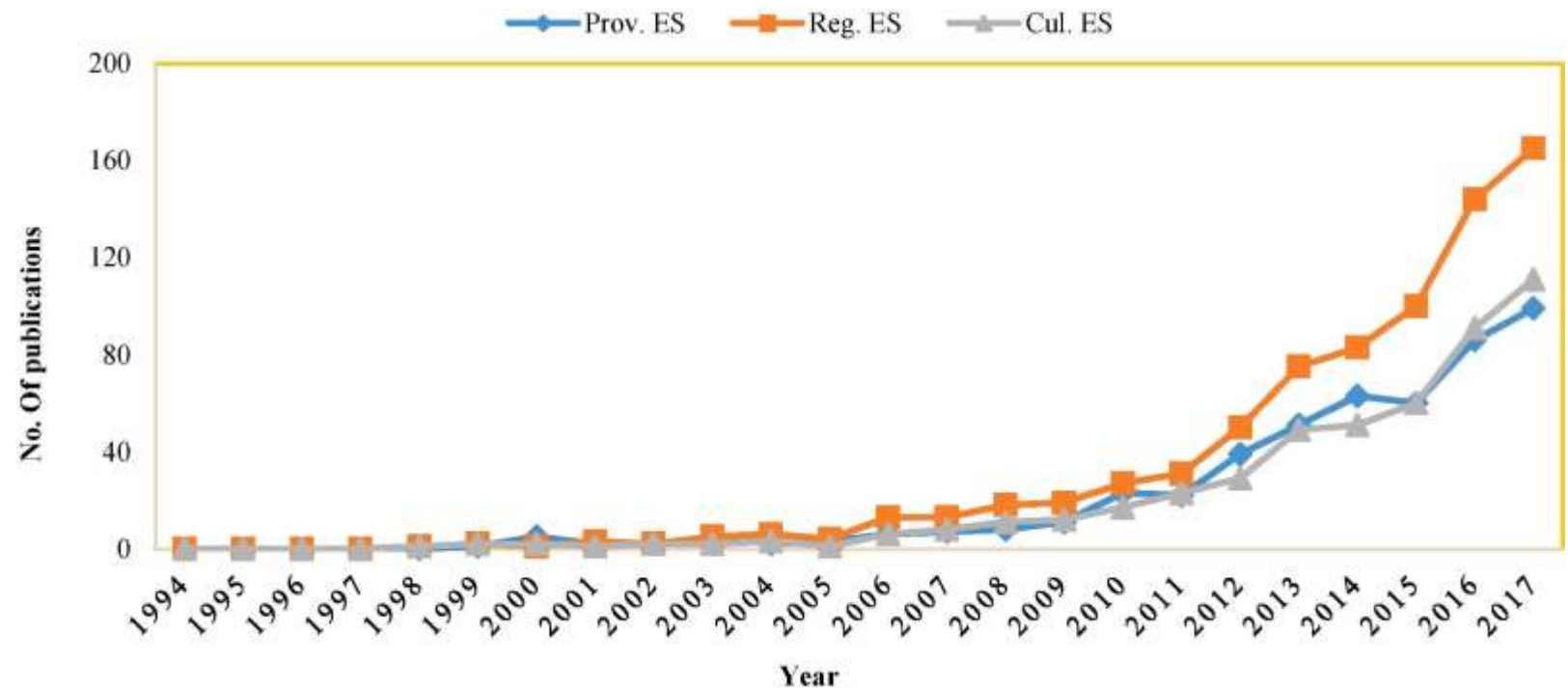
REGULATING



CULTURAL

GLOBAL TREND OF FES EVALUATION

Mountain and forest ecosystems play a fundamental role, recognised both at EU level with the new **EU Forest Strategy 2030** and internationally with the UN Sustainable Development Goals (**SDG**)



Acharya *et al.* (2019)

MAIN RESEARCH GOALS

- **RQ1:** How have civil society's awareness and perception of FES ?
- **RQ2:** Are there different patterns of attitudes and behaviour in civil society, regarding preferences for FES?



Hypothesis: In recent years, partly due to the current pandemic, cultural services have become the most demanded FES by civil society

METHODOLOGY

BEST-WORST SCALING (BWS): choice-based approach used to detect individuals' preferences

FOREST ECOSYSTEM SERVICES CONSIDERED

PROVISIONING

- Drinking water
- Food
- Fuel
- Raw material

REGULATING

- Biodiversity
- Climate change mitigation
- Disaster reduction
- Protection against natural hazards

CULTURAL

- Aesthetic quality of the landscape
- Psychophysical health
- Recreational tourism
- Spiritual and religious

August 2021 for data collection -> **480 questionnaires** collected, face-to-face survey

METHODOLOGY

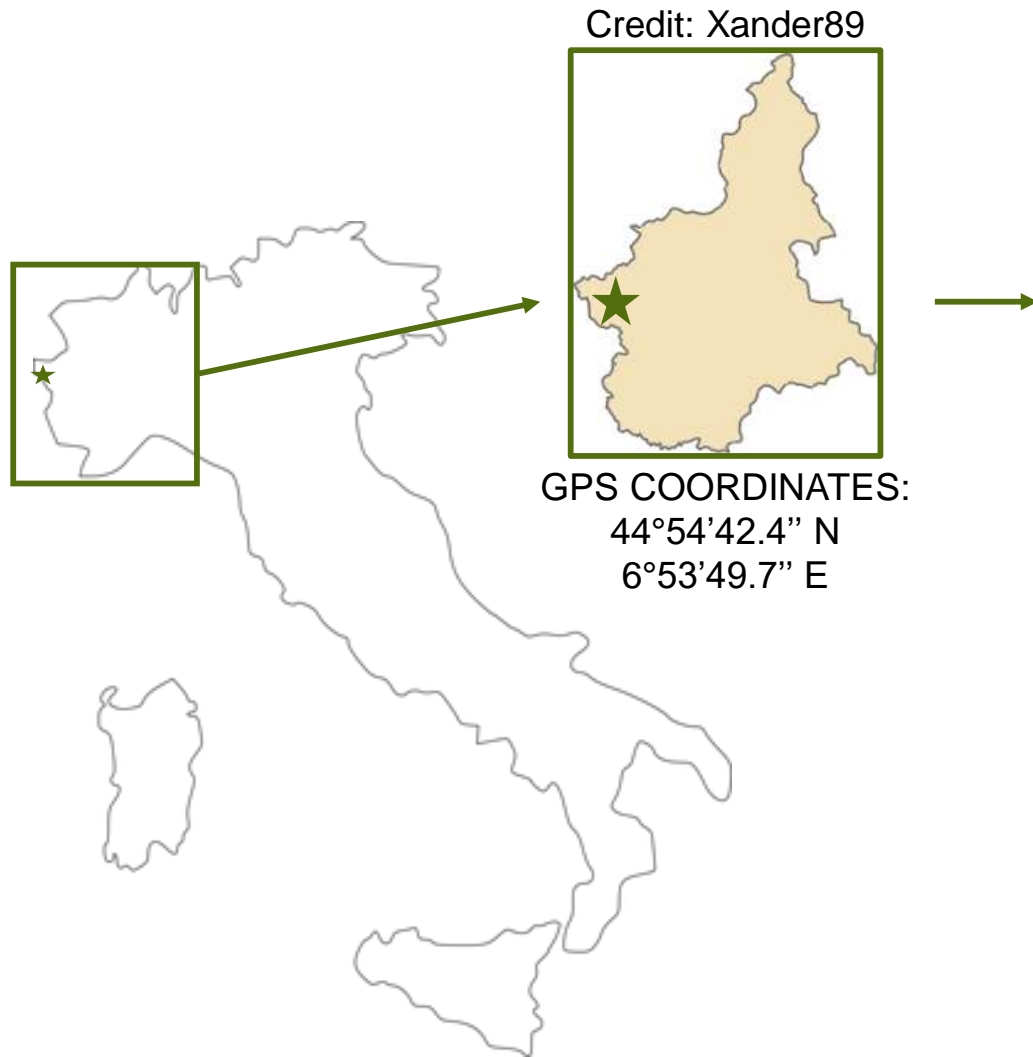
CHOICE SET

BEST	Which forest ecosystem service do you prefer?	WORST
<input type="radio"/>	Food	<input type="radio"/>
<input type="radio"/>	Protection against natural hazards	<input type="radio"/>
<input type="radio"/>	Biodiversity	<input type="radio"/>
<input type="radio"/>	Landscape	<input type="radio"/>

Questionnaire: 9 choice sets -> each containing different combinations of 4 forest ecosystem services

LATENT CLASS ANALYSIS (LCA): The same responses scores were used to define the clusters

THE STUDY AREA

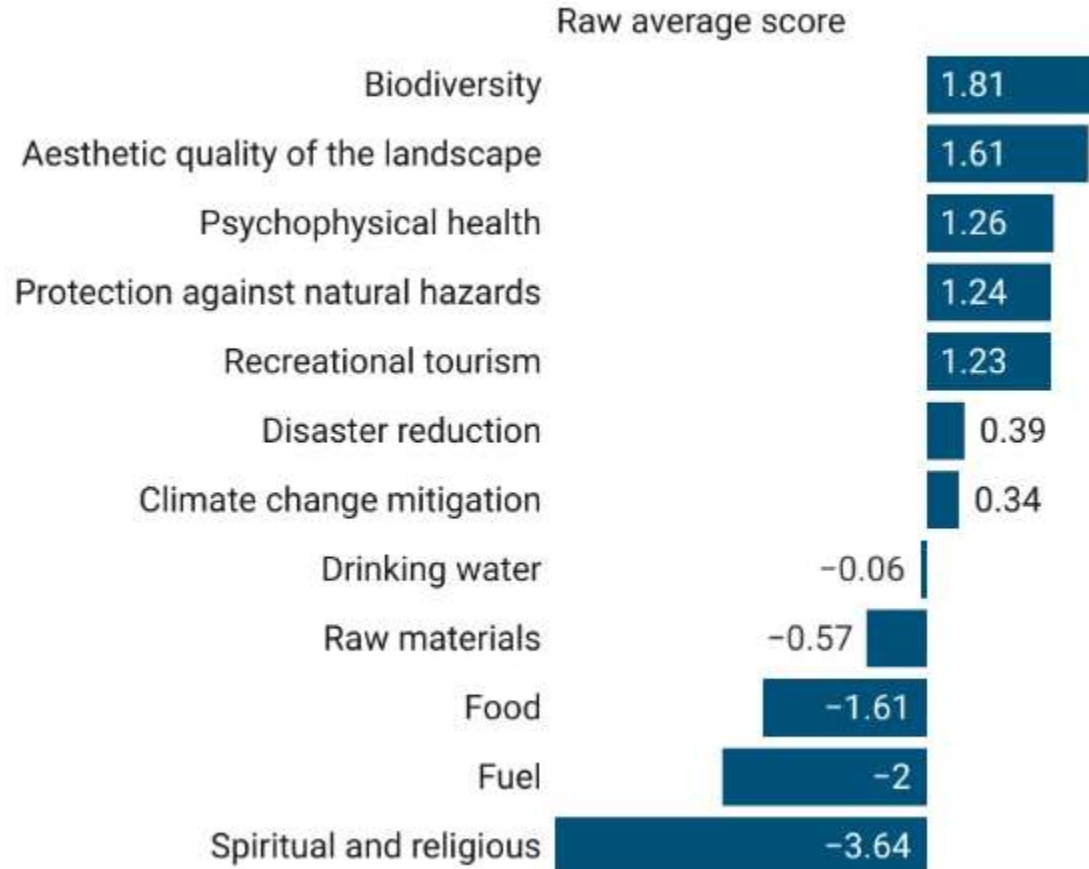


ARGENTERA VALLEY

340 hectares of surface area and Site of Community Importance (SCI)

RESULTS – BW SCORES

Main interest in livelihood,
cultural and well-being
attributes



LCA RESULTS – CLUSTER ANALYSIS

Cluster name	Average Raw Score					
	<i>Hedonistic</i>	<i>Individualist with cultural and health interests</i>	<i>Sensitive to regulatory and utilitarian functions</i>	<i>Climate change sensitive</i>	<i>Livelihood and hedonistic wellbeing</i>	
Cluster size	25,8%	22,4%	19,8%	18,0%	14,1%	
Attribute						
Food	1.636	a 2.055	a,b 2.773	b 4.323	c 7.092	d
Drinking water	1.564	a 9.169	b 7.680	b 9.907	b,c 12.831	d
Raw materials	4.645	b 8.071	d 1.146	a 5.780	b,c 9.628	c
Fuel	1.179	a 1.656	b 2.923	c 2.396	c 4.435	d
Climate change mitigation	6.663	b 2.914	a 11.900	c 16.758	d 5.576	b
Disaster reduction	7.982	b 2.266	a 14.880	d 10.836	c 10.231	b
Protection against natural hazards	11.693	b 4.760	a 18.824	d 13.482	c 11.203	b
Biodiversity	15.158	c 11.560	b 16.126	c 15.599	c 9.437	a
Aesthetic quality of the landscape	17.684	c 18.315	c 6.387	a 6.896	a 12.547	b
Recreational tourism	16.148	c 17.938	c 10.091	b 1.697	a 12.322	b
Spiritual and religious	0.530	a 1.761	b 0.768	a 0.744	a 1.996	b
Psychophysical health	15.117	d 19.535	e 6.501	b 11.583	c 2.703	a

a–d: preference averages (rescaled scores) within a row with different superscripts differ ($P < 0.05$) for Tukey post-hoc test.

LCA RESULTS – CLUSTER ANALYSIS

Cluster name	<i>Hedonistic</i>	
Cluster size	25,8%	
Attribute		
Food	1.636	a
Drinking water	1.564	a
Raw materials	4.645	b
Fuel	1.179	a
Climate change mitigation	6.663	b
Disaster reduction	7.982	b
Protection against natural hazards	11.693	b
Biodiversity	15.158	c
Aesthetic quality of the landscape	17.684	c
Recreational tourism	16.148	c
Spiritual and religious	0.530	a
Psychophysical health	15.117	d

LCA RESULTS – CLUSTER ANALYSIS

Cluster name	<i>Individualist with cultural and health interests</i>	
Cluster size	22,4%	
Attribute		
Food	2.055	a,b
Drinking water	9.169	b
Raw materials	8.071	d
Fuel	1.656	b
Climate change mitigation	2.914	a
Disaster reduction	2.266	a
Protection against natural hazards	4.760	a
Biodiversity	11.560	b
Aesthetic quality of the landscape	18.315	c
Recreational tourism	17.938	c
Spiritual and religious	1.761	b
Psychophysical health	19.535	e

LCA RESULTS – CLUSTER ANALYSIS

Cluster name	<i>Sensitive to regulatory and utilitarian functions</i>	
Cluster size	19,8%	
Attribute		
Food	2.773	b
Drinking water	7.680	b
Raw materials	1.146	a
Fuel	2.923	c
Climate change mitigation	11.900	c
Disaster reduction	14.880	d
Protection against natural hazards	18.824	d
Biodiversity	16.126	c
Aesthetic quality of the landscape	6.387	a
Recreational tourism	10.091	b
Spiritual and religious	0.768	a
Psychophysical health	6.501	b

LCA RESULTS – CLUSTER ANALYSIS

Cluster name	<i>Climate change sensitive</i>	
Cluster size	18,0%	
Attribute		
Food	4.323	c
Drinking water	9.907	b,c
Raw materials	5.780	b,c
Fuel	2.396	c
Climate change mitigation	16.758	d
Disaster reduction	10.836	c
Protection against natural hazards	13.482	c
Biodiversity	15.599	c
Aesthetic quality of the landscape	6.896	a
Recreational tourism	1.697	a
Spiritual and religious	0.744	a
Psychophysical health	11.583	c

LCA RESULTS – CLUSTER ANALYSIS

Cluster name	<i>Livelihood and hedonistic wellbeing</i>	
Cluster size	14,1%	
Attribute		
Food	7.092	d
Drinking water	: 12.831	d
Raw materials	: 9.628	c
Fuel	4.435	d
Climate change mitigation	5.576	b
Disaster reduction	10.231	b
Protection against natural hazards	11.203	b
Biodiversity	9.437	a
Aesthetic quality of the landscape	12.547	b
Recreational tourism	12.322	b
Spiritual and religious	1.996	b
Psychophysical health	2.703	a

CONCLUSIONS

- The attributes: **Biodiversity and Aesthetic quality of the landscape** are common to three clusters, identifying the strategic centrality of the examined area for tourism activities
- Evolution of the concept of resource use and the **abandonment of the traditional functions** of forests
- The various groups show very **different lifestyles** among tourists: there are hedonistic attitudes linked to nature, altruistic attitudes, with an attention to climate change and also sensitivity to the regulatory functions of the forest.
- These attitudes can **direct stakeholders and policy-makers** to introduce the assessment of these services and strengthen their role in **planning tools** so as to optimise both the experience of tourists and their awareness of these important functions without forgetting the populations that live permanently in mountain environments.



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THANKS FOR THE ATTENTION!

REFERENCES AND CREDITS

- Acharya R.P., Maraseni T. and Cockfield G. (2019) - Global trend of forest ecosystem services valuation – An analysis of publications in *Ecosystem Services*, vol. 39. DOI: 10.1016/j.ecoser.2019.100979
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