COMPARATIVE ANALYSIS OF FOREST CHARACTERISTICS PERCEPTIONS BY MOUNTAIN POPULATION IN ITALY AND UKRAINE

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Aim of study

- Growing popularity of the forests as settings for outdoor recreation across Europe poses new challenges for foresters to balance the social, economic, ecological, and cultural needs of present and future generations.

- New forest management paradigms require involving the society in a participatory forest management planning, because it can increase the social acceptance of the decisions and reduce conflict among forest users *(Cantiani 2012, Pelyukh et al. 2018).*

- **The aim of this study is to increase knowledge about people's preferences in Italy and Ukraine for different forest stand characteristics to overcome the current knowledge gaps and provide key information for decision makers which could help in increasing recreational attractiveness of forest stands.**
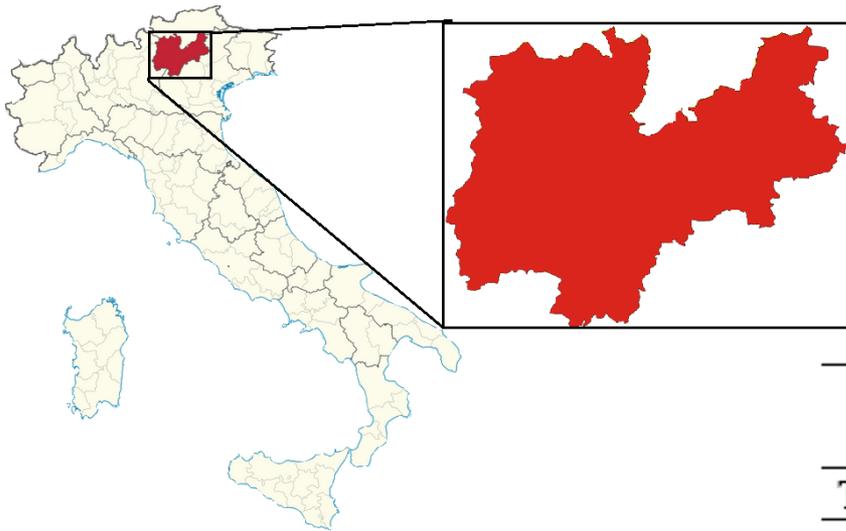
Study area

Parameters	Trentino province (Italy)	Rakhiv region (Ukraine)
Total surface (km²)	6,207	1,892
Forest surface (%)	63	66.5
Population (inh.)	539,175	93,053
Urban population (%)	35	42.2
Density of population (inh. /km²)	723	48
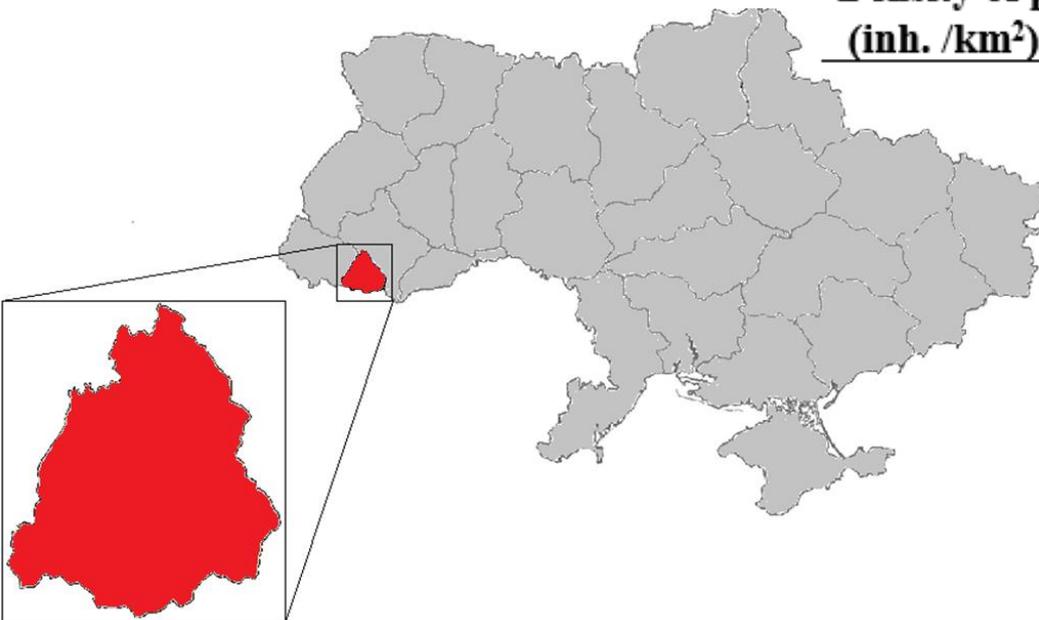
Questionnaire survey

- **The questionnaire was structured in 10 questions and subdivided into two sections:**

- personal characteristics of respondents (gender, age, level of education, job and residence);

- people's perceptions regarding forest stand characteristics as well as the recreational attractiveness of a forest.

| Question	Type of question	Answer option
1. What kind of tree species do you prefer in a forest?	Single choice question	1. Broadleaf forest with less than 20% evergreen 2. Evergreen forest with less than 20% broadleaf 3. Mixed forest
2. Which kind of forest structure do you prefer?	Single choice question	1. Regular distribution of trees in the space; trees with similar diameters and heights 2. Random distribution of trees in the space; trees with similar diameters and heights 3. Random distribution of trees in the space; trees with a variety of diameters and heights
3. Do you prefer open or closed forest?	Single choice question	1. Open forest (10–40% canopy cover) 2. Closed forest (more than 40% canopy cover)
4. In your opinion, what kind of recreational resources do you find important in a forest?	Specifying level of importance using 10-point Likert scale (1 = very low importance, 10 = very high importance)	1. Paths 2. Picnic benches and tables and barbecues 3. Fitness trails and sports equipment 4. Panoramic views 5. Food vendors 6. Unspoiled nature 7. Parking areas 8. Places of historical and religious interest
5. What goods and services do you look for in a forest?	Specifying level of importance using 10-point Likert scale (1 = very low importance, 10 = very high importance)	1. Hiking and trekking 2. Hunting activities 3. Sporting activities 4. Cultural heritage 5. Relaxation 6. Landscape contemplation 7. Naturalness 8. Timber and firewood harvesting 9. Harvesting of nonwood forest products (edible nuts, berries, fruits, mushrooms, herbs, spices and condiments, aromatic plants)

Data analysis

- The collected data were statistically processed with respect to respondents' gender, age, level of education and location, highlighting the differences by study area.

- The χ^2 test was used to test the differences among the socio-demographic groups of respondents.

- The Kruskal-Wallis and Mann–Whitney non-parametric tests were used to highlight the influence of socio-demographic characteristics of respondents on the answers collected by Likert scale response format.

- All statistical analysis of collected data was carried out using XLStat 2012.

Socio-demographic characteristics of respondents in two study areas

Characteristics	Trentino province (Italy)		Rakhiv region (Ukraine)		Total	
	n	%	n	%	n	%
Gender:	346		308		654	
Male	232	67.05	147	47.73	379	57.95
Female	114	32.95	161	52.27	275	42.05
Age:	344		308		652	
18-35 years old	48	13.95	57	18.51	105	16.10
36-55 years old	139	40.41	123	39.94	262	40.19
56-75 years old	120	34.88	99	32.14	219	33.59
>75 years old	37	10.76	29	9.42	66	10.12
Level of education:	341		308		649	
None	4	1.17	2	0.65	6	0.92
Elementary school	109	31.96	22	7.14	131	20.19
High school	158	46.33	123	39.94	281	43.20
University or post-University degree	70	20.53	161	52.27	231	35.60
Residence:	318		308		626	
Urban area	244	70.52	122	39.61	366	58.47
Rural area	74	21.39	186	60.39	260	41.53

Preferred forest stand characteristics by Trentino province and Rakhiv region respondents
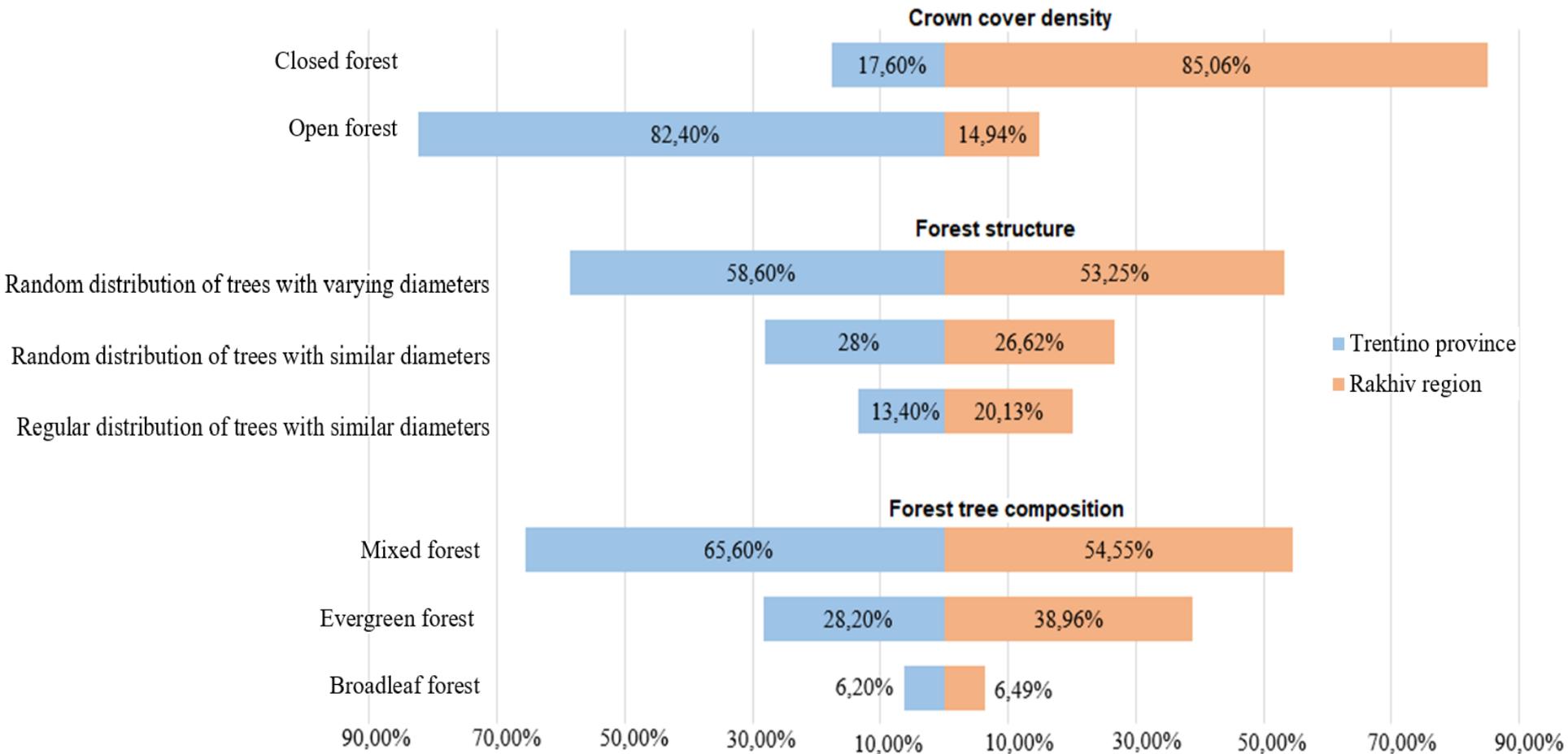
The non-parametric χ^2 test results

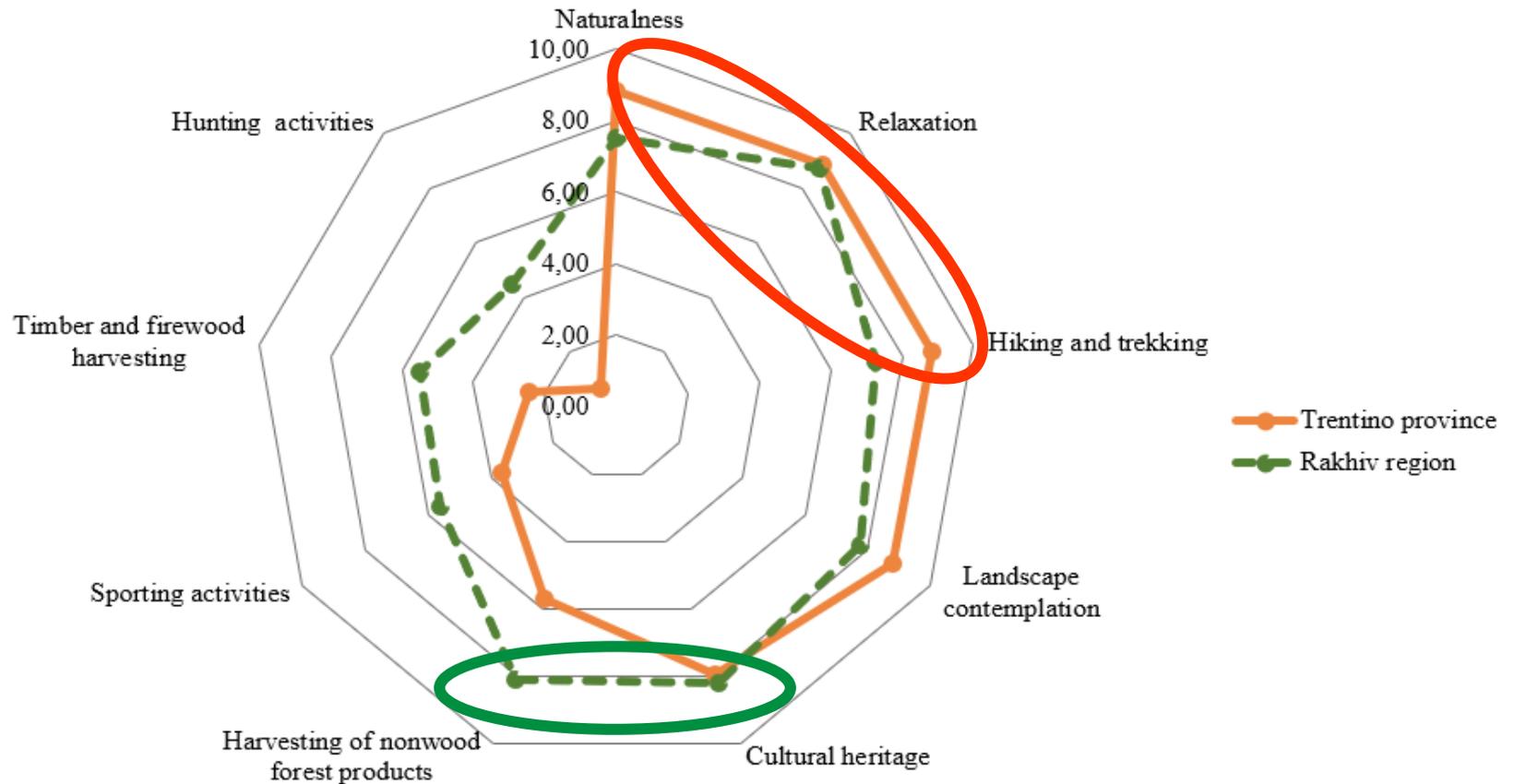A statistically significant difference was observed

➢ among the **age groups** concerning tree species composition perceptions:

▪ elder people preferred conifer forests in Trentino province ($p = 0.003$, $\alpha = 0.05$) and Rakhiv region ($p = 0.001$, $\alpha = 0.05$).

➢ among the **gender groups** concerning forest age structure and canopy cover perceptions:

▪ women showing a stronger preference for uneven-aged forests in Trentino province ($p = 0.045$, $\alpha = 0.05$) and Rakhiv region ($p = 0.005$, $\alpha = 0.05$).

▪ Italian women showing an even higher preference for open forests than men ($p = 0.048$, $\alpha = 0.05$);

▪ Ukrainian men prefer closed forest higher than that of women in Rakhiv region ($p = 0.344$, $\alpha = 0.05$).

Perceived importance of recreational resources in forests by Trentino province and Rakhiv region respondents
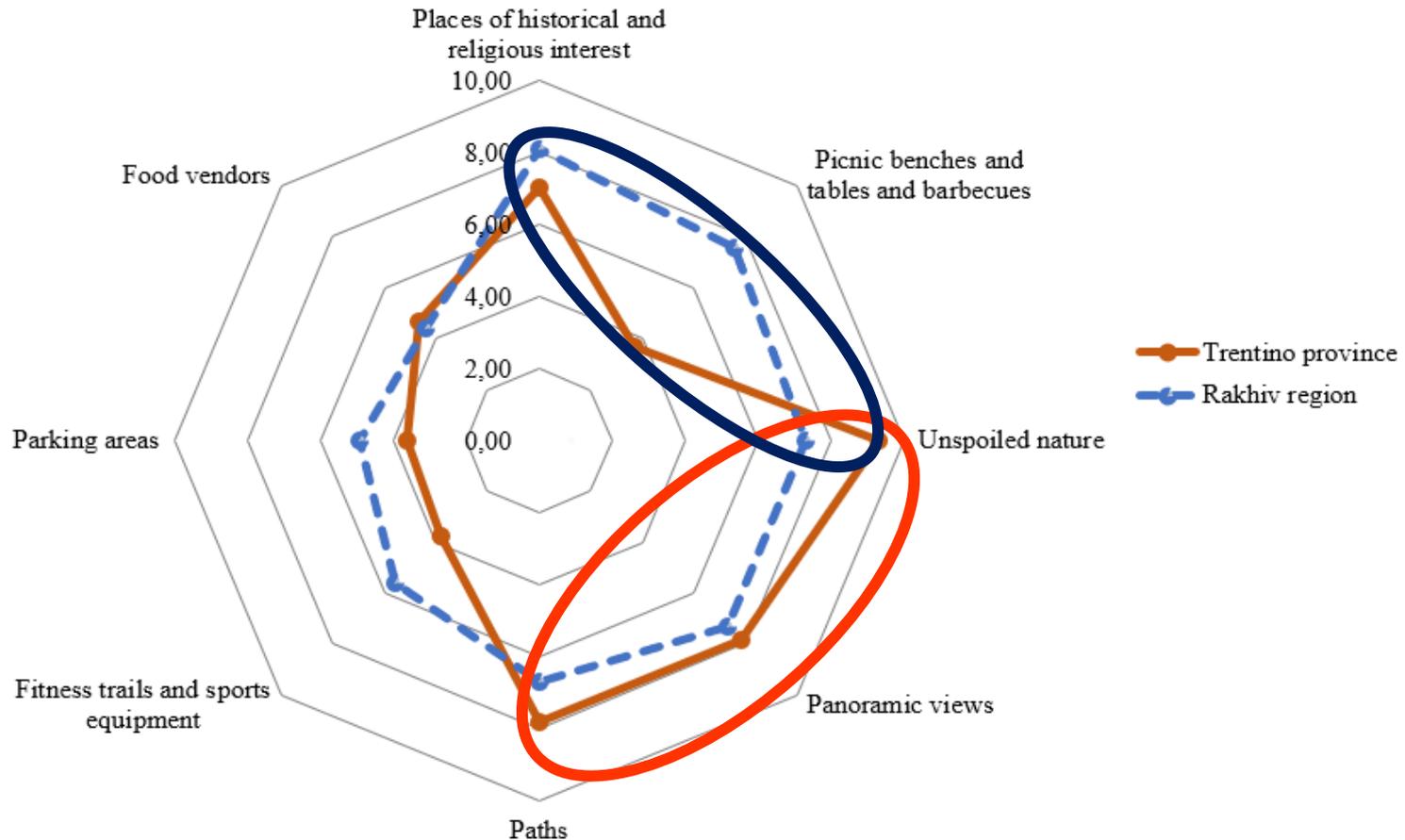
Values present the mean of scores on a 10-point scale (from 1 = very low to 10 = very high value).

Perceived importance of forest goods and services by Trentino province and Rakhiv region respondents

Values present the mean of scores on a 10-point scale (from 1 = very low to 10 = very high value).

The non-parametric Kruskal-Wallis test results

Taking **education groups** into account a significant statistical difference was found

➢ in answers of Trentino province respondents with regard to:

- **naturalness** (p = 0.009, α = 0.01);
- **nonwood forest products** (p = 0.001, α = 0.01).

➢ in answers of Rakhiv region respondents with regard to:

- **sporting** (p = <0.0001, α = 0.01),
- **cultural heritage** (p = 0.002, α = 0.01);
- **landscape contemplation** (p = 0.004, α = 0.01).

Unlike those with a tertiary education, people with lower levels of education assigned a higher value to all services.

The non-parametric Mann–Whitney test results

Taking **gender groups** into account a significant statistical differences was found between answers of women and men:

➤ women expressed a preference for walking and hiking ($p = 0.002$, $\alpha = 0.01$); men expressed one for hunting ($p = 0.000$, $\alpha = 0.01$).

Taking **geographical location groups** into account a significant statistical differences was found between answers of urban and rural inhabitants:

➤ rural inhabitants have preferred forest goods and services related to the direct use (timber and firewood collection ($p = <0.0001$, $\alpha = 0.01$), nonwood forest products harvesting ($p = <0.0001$, $\alpha = 0.01$)).

Comparative table of the preferences towards forest stands characteristics by mountain population in Trentino province and Rakhiv region

Forest stand characteristics	Trentino province (Italy)	Rakhiv region (Ukraine)
Tree species composition	Mixed forest	Mixed forest
Age structure	Random distribution of trees in the space; trees with a variety of diameters and heights	Random distribution of trees in the space; trees with a variety of diameters and heights
Canopy cover	Open forest (10–40% canopy cover)	Closed forest (more than 40% canopy cover)
Recreation resources in a forest	Unspoiled nature Panoramic views Paths	Places of historical and religious interest Picnic benches and tables and barbecues Unspoiled nature
Forest goods and services	Naturalness Hiking and trekking Relaxation	Naturalness Relaxation Harvesting of nonwood forest products

Conclusion

The presented results allow us:

- to understand local people's values towards different forest stand characteristics and integrate the obtained information into multi-use forestry planning;

- to avoid possible conflicts between main forest users due to recognition of their interests.

This combination of findings provides some support for conceptual premise of policy and management strategies formation aimed at sustainable forest management in the Italian Alps and Ukrainian Carpathians.

Thanks for your attention!!