Analysis of the potential of NWFPs for forest owners - a case study comparison

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Rowan
(Sorbus aucuparia)


Stone pine
(Pinus cembra)


Mushrooms
(Boletus pinophilus)


Cork
(Quercus suber)


Chestnut
(Castanea sativa)


Honey
(Apis mellifera)

Introduction

We used the modelling framework designed by Huber et al (2016) and applied a **mix of multi-criteria decision making (MCDM) methods**, to systematically evaluate both qualitative and quantitative criteria and alternatives by means of pairwise comparisons (Fig. 1).

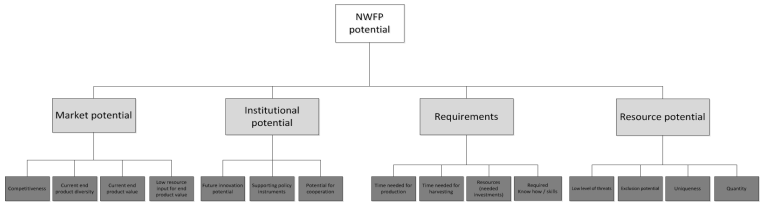

Figure 1: Hierarchy of the decision problem structured into goal (white box), regionally explicit criteria (light-grey boxes) and forest owner dependent sub-criteria (dark-grey boxes)

The model is able to take into account the specific environmental and socio-economic conditions in different regions in Europe and varying forest owner preferences.

Building on **stakeholder interaction** processes, the weights for the criteria were defined in a participatory manner (Table 1). Weights for the subcriteria built on 4 distinct forest owner profiles (Fig. 2)

Table 1: Regional weightings for the criteria per case study region

Region	Market potential	Institutional potential	Requirements	Resource potential
Alentejo	**0,373**	0,155	0,209	0,264
Catalonia	**0,283**	0,211	0,233	0,273
Extremadura	**0,314**	0,200	0,243	0,243
N-Karelia	0,230	0,210	0,230	**0,330**
Styria	**0,350**	0,075	0,275	0,300
Transylvania	0,300	0,100	0,200	**0,400**

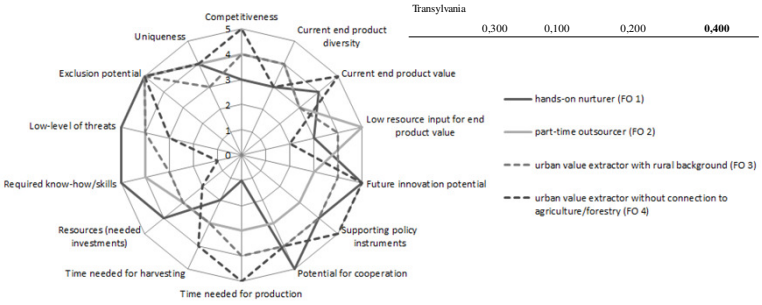

Figure 2: Spider diagram for forest owner profiles and related preferences towards sub-criteria (5=very high, 4=high, 3=medium, 2=low, 1=very low)

Results

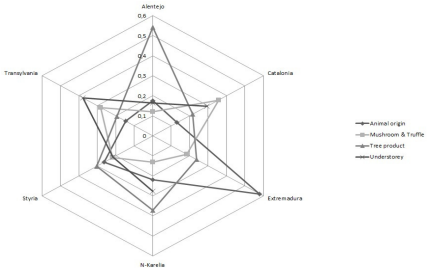

Figure 3: Analysis of the overall performance (i.e. sum of global priorities) of the four NWFP categories across case studies under "equal" weighting scenario

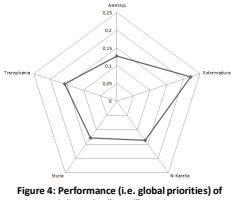

Figure 4: Performance (i.e. global priorities) of Boletus edulis under "equal" weighting scenario

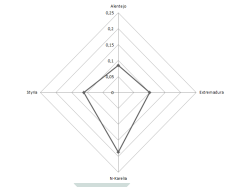

Figure 5: Performance (i.e. global priorities) of Apis mellifera under "equal" weighting scenario

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Case study design

In order to test the applicability of this approach in a range of socio-economic and environmental contexts, we evaluated **selected NWFP species across four defined NWFP categories** (i.e. mushrooms & truffles, understorey plants, tree products and animal origin) in **six case study regions (CSR) in different biogeographical zones**: a) Mediterranean (Alentejo, Extremadura, Catalonia), b) Alpine as well as c) Continental (Styria, Transylvania) and d) Boreal (N-Karelia) covering the three major biomes (i.e. Subtropical, Temperate, Boreal) in Europe. The following tasks had to be conducted in each of the case study regions iteratively: i) nomination of case study responsible persons, ii) identification of NWFP sector experts and NWFP stakeholders, iii) selection of regionally relevant NWFPs, iv) forest owner profile selection, and v) expert consultation.

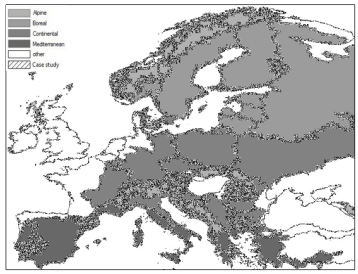

Figure 2: Overview of the Case Study regions in Europe including relevant biogeographical zones

Table 2: Performance (i.e. global priorities) of NFWPs (including categories) in the case study regions according to different weighting scenarios

CSR	Category	Species	equal	regional	FO1	FO2	FO3	FO4
Alentejo	Mushroom & Truffle	Boletus edulis	0,121	0,111	0,127	0,112	0,110	0,096
	Tree product	**Quercus suber**	**0,263**	**0,270**	**0,261**	**0,259**	**0,265**	**0,296**
	Tree product	Pinus pinea	0,177	0,176	0,170	0,168	0,170	0,195
	Tree product	Pinus spp.	0,102	0,106	0,111	0,119	0,112	0,089
	Understorey	Lavandula viridis	0,163	0,168	0,175	0,174	0,168	0,137
	Animal origin	Apis mellifera	0,095	0,093	0,085	0,092	0,096	0,103
	Animal origin	Oryctolagus cuniculus	0,080	0,076	0,071	0,075	0,078	0,084
Catalonia	Mushroom & Truffle	Lactarius deliciosus	0,142	0,135	0,150	0,135	0,132	0,108
		Tuber melanosporum	0,215	0,207	0,201	0,209	0,210	0,231
	Tree product	Quercus suber	0,217	0,207	0,205	0,204	0,206	0,223
	Understorey	**Gentiana lutea**	**0,294**	**0,324**	**0,336**	**0,329**	**0,316**	**0,295**
	Animal origin	Sus scrofa	0,132	0,127	0,107	0,123	0,135	0,142
Extremadura	Mushroom & Truffle	Boletus edulis	0,183	0,190	0,222	0,205	0,189	0,135
	Tree product	Quercus suber	0,237	0,232	0,239	0,230	0,228	0,238
	Animal origin	**Sus scrofa dom.**	**0,368**	**0,369**	**0,356**	**0,357**	**0,366**	**0,403**
		Cervus elaphus	0,096	0,094	0,082	0,091	0,096	0,102
		Apis mellifera	0,116	0,115	0,100	0,116	0,121	0,123
N-Karelia	Mushroom & Truffle	Boletus edulis	0,131	0,125	0,137	0,124	0,121	0,110
	Tree product	Betula pendula	0,153	0,166	0,163	0,168	0,171	0,169
		Inonotus obliquus	0,219	0,230	0,232	0,234	0,227	0,234
	Understorey	**Vaccinium myrtillus**	**0,277**	**0,270**	**0,281**	**0,263**	**0,261**	**0,255**
	Animal origin	Apis mellifera	0,219	0,210	0,187	0,211	0,220	0,232
Styria	Mushroom & Truffle	Boletus edulis	0,110	0,118	0,129	0,116	0,111	0,112
		Cantharellus cibarius	0,108	0,114	0,121	0,113	0,108	0,107
	Understorey	Vaccinium myrtillus	0,102	0,100	0,110	0,101	0,099	0,086
		Allium ursinum	0,113	0,114	0,117	0,112	0,112	0,106
	Tree product	**Larix decidua**	0,142	0,151	**0,165**	0,149	0,149	0,156
		Abies nordmanniana	**0,162**	**0,153**	0,138	**0,157**	**0,161**	**0,168**
	Animal origin	Cervus elaphus	0,120	0,119	0,110	0,122	0,125	0,129
		Apis mellifera	0,143	0,131	0,111	0,129	0,135	0,136
Transylvania	Mushroom & Truffle	Boletus edulis	0,167	0,155	0,157	0,150	0,148	0,163
		Cantharellus cibarius	0,114	0,102	0,100	0,099	0,099	0,107
	Tree product	Picea abies	0,079	0,077	0,082	0,079	0,078	0,078
		Abies alba	0,116	0,120	0,130	0,129	0,124	0,104
	Understorey	Rosa canina	0,161	0,144	0,138	0,139	0,142	0,141
		Vaccinium myrtillus	**0,216**	**0,214**	**0,215**	**0,211**	**0,209**	**0,211**
	Animal origin	Sus scrofa	0,084	0,110	0,102	0,111	0,116	0,115
		Lepus europeaus	0,063	0,077	0,077	0,081	0,084	0,082

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