Report on the demand side: Citizens' preferences/demand for forest ES and biodiversity and consumer preferences/ demand for long-lived wood products

CLIMB-FOREST

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Introduction

Europe's forests supply a wide range of forest ecosystem services (FES) with material benefits such as timber, and non-material benefits such as biodiversity conservation. This broad suite of FES underpins the multifunctional character of forests (Winkel et al., 2022) and highlights their importance within EU climate and biodiversity strategies. Contributing not only through carbon sequestration and (long-term) storage but also by supplying renewable raw materials that can substitute more carbon-intensive products, forests have become a central component of the EU Circular Economy Act (European Commission, 2025a). At the same time, forests deliver a wide range of FES, including recreation, habitat provisioning, water regulation, and cultural values, which are increasingly being recognised in policy frameworks such as the EU Biodiversity strategy (European Commission, 2025b) and the EU Forest Strategy for 2030 (European Commission, 2023). This multifunctionality, however, also introduces complex trade-offs between production, conservation, and societal demand, which must be understood to design socially acceptable and effective forest-based policy solutions. In this context, the current deliverable presents the results of two discrete choice experiments (DCEs) used to empirically estimate preferences and demand for FES and long-lived wood products across Europe.

Societal acceptance and market uptake determine whether climate-smart forest pathways can be successfully implemented. First, valuing non-market FES is key for designing effective subsidy or payment for ecosystem service schemes (Forest Europe, 2014; Winkel et al., 2022). As non-market goods, many FES can only be valued in relation to their demand from society, making the elicitation of citizen preferences an important step in assigning value to services such as biodiversity and recreation. Beyond identifying the societal value of FES, it is important to consider public attitudes towards forest management strategies, as these attitudes influence the acceptability of policy measures targeting particular interventions. However, evidence from several contexts suggests that public attitudes towards management intensity may not always align with the FES outcomes they prioritise (Geijzendorffer et al., 2015; Müller et al., 2020; Syrbe and Grunewald, 2017; Vulturius and Gerger Swartling, 2015). Informing citizens about the benefits of active forest management may help address common misconceptions, ensuring alignment of values and attitudes for effective forest policies that balance production, carbon storage, and biodiversity objectives.

Second, consumer behaviour in markets for long-lived wood products influences the extent to which wood-based materials can substitute for more carbon-intensive alternatives. Embedded consumption patterns and pre-conceived prejudices may hinder consumption of long-lived wood products (Gold and Rubik, 2009), while sustainability labels and other informational cues can shape willingness-to-pay (WTP) for such products (Hansmann et al., 2006; Veisten, 2002). Across both material and non-material considerations, behavioural responses such as WTP, environmental attitudes, and reactions to information shape both demand and societal acceptance of forest policies.

To empirically assess demand and preferences for FES and long-lived wood products, and the various aspects that shape this, we apply the discrete choice experiment (DCE) methodology. As a stated preference technique, DCEs are commonly used to assess preferences for non-market goods (such as ecosystem services) and/or the influence of product attributes (e.g., sustainability claims) on demand for marketed goods. In this deliverable we report on the results of two distinct DCEs, one which assesses citizens' preferences and demand for FES linked to alternative forest management strategies, and a second to asses consumers' preference and demand for long-lived wood products and its associated benefits related to long-term carbon storage. The experiments were carried out in four study regions, Belgium (Flanders), the Czech Republic, Norway, and Spain; chosen to represent Europe's east-west and north-south gradients in forest types, management systems, and socio-cultural contexts.

This deliverable is structured into two main parts, **Part A** focusses on **citizen preferences for FES**, describing the methodological approach, summarizing the main findings, and discussing their implications. **Part B** follows the same structure but focusses on **consumer preferences for long-lived wood products**. Each part begins with a popular summary highlighting key findings and main take-aways. Both studies draw on data from the same four study regions, which are briefly described in a preparatory section. This is followed by a description of the sampling procedure followed within each study area to collect the data used in the findings. The deliverable concludes with a cross-cutting reflection synthesizing insights from both experiments.

Study areas

To assess citizen's preferences and demand for FES under alternative forest management strategies, and consumers' preference and demand for long-lived wood products, this study focuses on four European regions: Belgium (Flanders), the Czech Republic, Norway, and Spain. Figure 1 shows the location of these study regions within Europe. These study regions capture Europe's east–west and north–south gradients in forest types and composition, as well as differences in management systems, ownership structures, land-use and land-cover patterns (Figure 6, Appendix A: Study region description), and hazard exposure. Their forests also provide varying levels of regulating and maintenance services (e.g., carbon sequestration, hazard mitigation), provisioning services (e.g., timber and non-timber products), and cultural services (e.g., outdoor recreation, access). The regions further differ in socio-cultural contexts, legislative frameworks, population size and density. These differences and similitudes, which are described in Appendix A: Study region description, make them particularly suitable for comparative analysis.

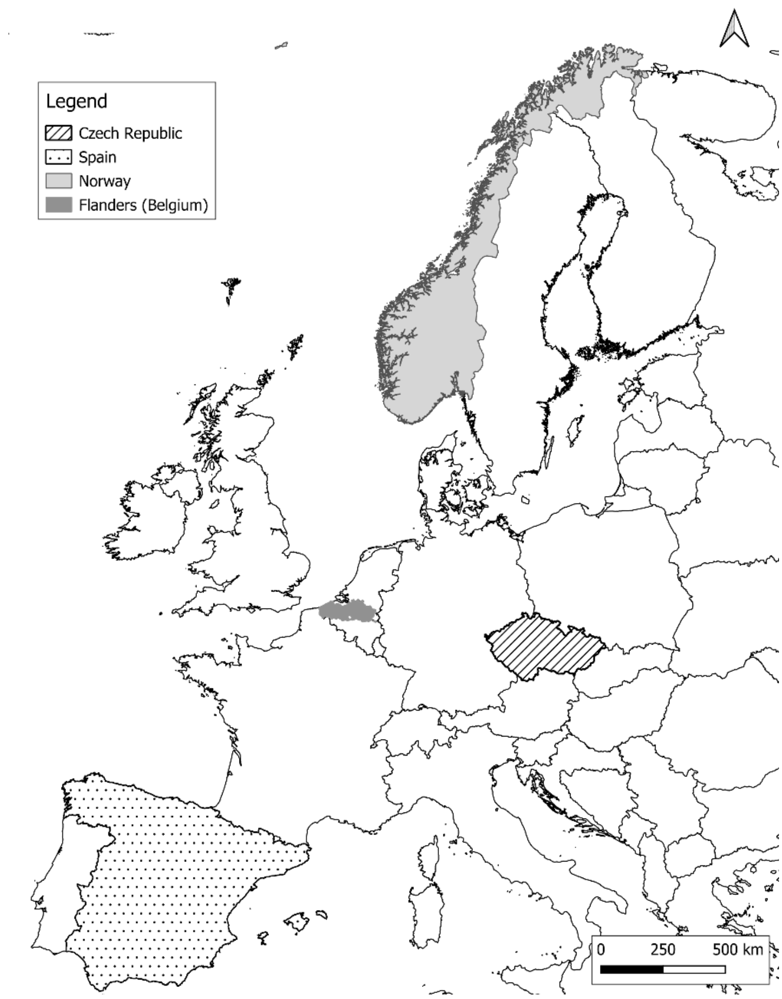

Figure 1: Overview of the study regions

Part A: Citizens’ preferences/demand for forest ES

Popular summary

To assess preferences and estimate value for forest ecosystem services (FES) derived from various forest management interventions, a discrete choice experiment (DCE) is carried out with citizen in Belgium (Flanders), Czech Republic, Norway and Spain. Paired with additional questions on attitudes towards forest management strategies and an information treatment describing the effect of active management of FES provisioning, we are able to answer three main research questions:

1. Which FES are most important to citizens, and how do these preferences differ between geographic regions?
2. What is the societal value of (a bundle of) FES, and how is this influenced by the type contribution citizens are expected to make (i.e., through taxes vs voluntary donations)?
3. Do citizens’ attitudes towards forest management intensity match their demand for FES, and can this be influenced by providing information about the benefits of active management?

Across all four study regions we find clear preferences for multifunctional forests that deliver a mix of provisioning, regulating and maintaining, and cultural FES. We measure strong and positive preferences for both increased timber provisioning and natural hazard protection across all study regions, while the importance of cultural FES such as accessibility and landscape diversity is generally less uniform and less pronounced. Although cultural FES matter to citizens, their relevance seems subject to local conditions. Forest conditions, legal frameworks, demographic characteristics, and recent exposure to extreme natural disturbances all influence how citizens assess management options and related FES. When citizens are informed about forest functions, they tend to prefer management strategies that ensure forest health, resilience, and continued multifunctionality.

The consistent support for multifunctional management strategies suggests that multifunctional forest management closely aligns with societal expectations of forest benefits. Our findings hold important implications for EU-level policy coherence. On the one hand, citizens’ strong support for multifunctional forests aligns well with EU policies emphasizing biodiversity, climate change mitigation, and environmental resilience. On the other hand, our results highlight a potential tension with more production-oriented policy frameworks such as the EU’s Circular Economy Act (European Commission, 2025a), which encourages greater substitution of fossil-based materials with renewable resources such as timber. This tension, combined with the context-dependent preferences observed in this study suggest that a one-size-fits-all approach to forest policy at the EU level may not be appropriate. Instead, the findings point toward the value of a regionalized approach. In summary, the results suggest that multifunctional management should remain the backbone of EU forest governance, but that intensification should be strategically targeted and regionally adapted. Awareness of cultural FES remains important, but our findings indicate that their societal demand can be addressed effectively within the broader multifunctional framework rather than through explicit priority-setting at EU level.

Methodology

Preferences and demand for FES were elicited using a DCE in which respondents were presented with a set of six consecutive choice tasks, each consisting of a single choice card presenting two hypothetical forests (alternatives) and an opt-out option. The hypothetical forests were all defined by the same set of six FES (attributes), with the level of ecosystem service provisioning differing between the alternatives. The attributes incorporated in this DCE include: (1) timber provisioning, (2) carbon sequestration potential, (3) local temperature regulation, (4) accessibility, (5) landscape diversity, (6) natural hazard protection, (6) payment vehicle. Based on the levels of FES provisioning, respondents were asked to indicate which of the two forests alternatives they preferred. The opt-out option in the choice task allowed respondents to refrain from selecting either of the two presented hypothetical forests. Respondents repeated the choice task six times, each time being presented with two different hypothetical forest alternatives (as shown in Figure 2). This allows us to estimate individual and sample mean preferences for different levels of FES provisioning, alongside variation in preferences (heterogeneity), and demand for said ecosystem services in the form of willingness-to-pay (WTP). Appendix B: Methodology describes the design of the DCE, including the selection and description of the attributes and the composition of the choice cards, the components of the survey in which the DCE was embedded along with the sample cleaning procedure followed, and finally the econometric analyses used to estimate preferences and demand for FES.

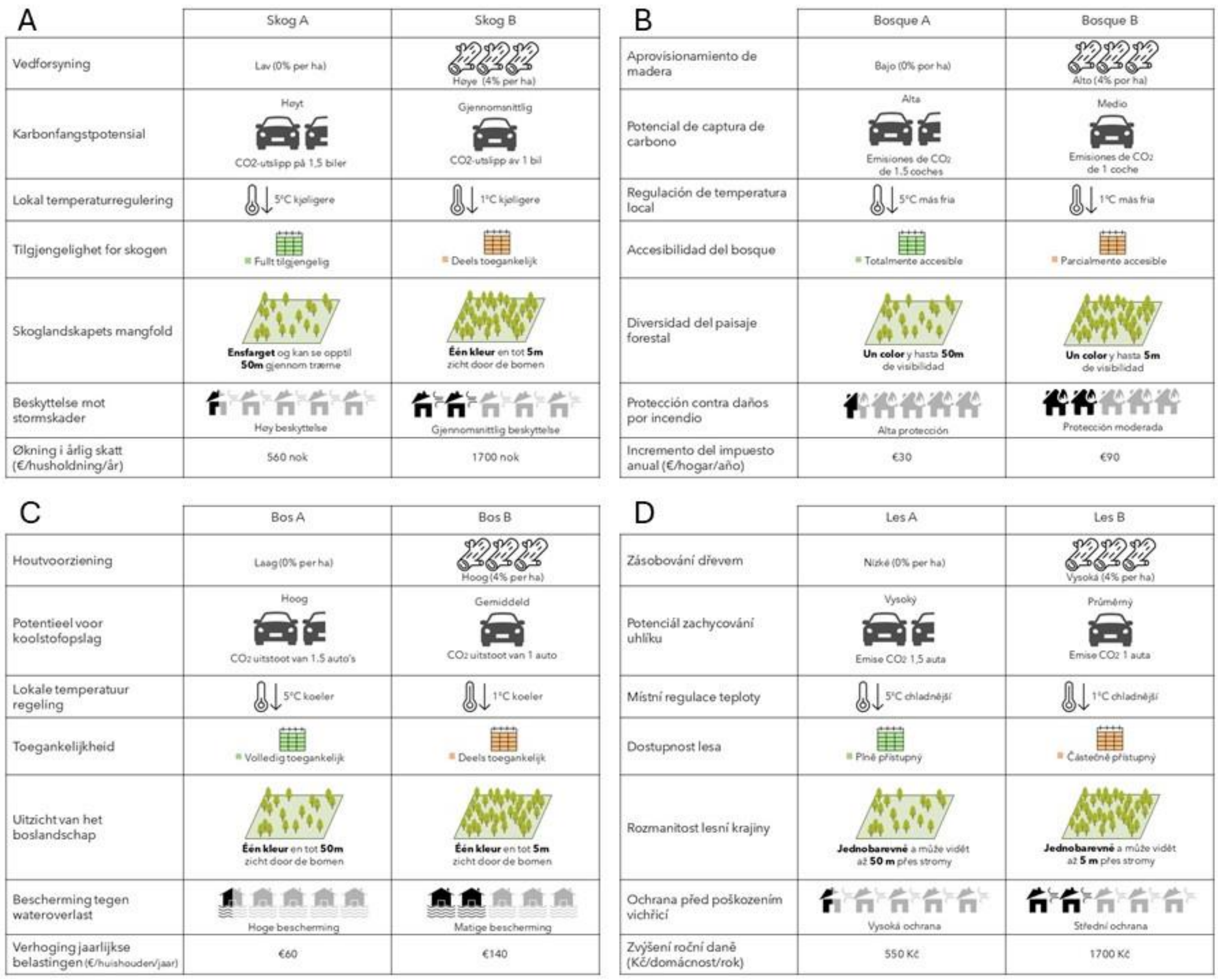

Figure 2. Sample choice card of DCE FES for study regions Norway (A), Spain (B), Belgium (C), Czech Republic (D)

Results

Sample description

The average age in the Belgian sample is significantly higher (55 years) than in the Czech (44 years), Norwegian (51 years) and Spanish (51) samples. The Czech sample was also found to be significantly younger than the remaining study regions. In the Czech sample we observe a particularly high share of respondents aged between 18-34, while in Belgium a significantly larger share of respondents are ages 55 or over. This is coupled with a significantly larger share of retired respondents in Belgium (40%) compared to the Czech (14%), Norwegian (22%) and Spanish (16%) samples.

Across all four samples the share of female respondents is roughly 51%. Education levels were found to differ somewhat between samples. In Belgium, Norway and Spain most respondents achieved a bachelor's degree as their highest level of education. The Czech sample has a significantly larger share of respondents with a secondary degree as their highest education level, and simultaneously a larger share of extremely highly education respondents who have achieved a master's degree (19%), compared to 3% in the Spanish sample.

Across all four study regions the largest share of respondents lives in either a rural setting or a small- to medium-sized city. Noteworthy differences are observed, however, in relation to respondents' proximity to forests. On average, respondents in the Czech and the Norwegian samples live close to a forest than respondents in the Belgian and Spanish sample. This is measured by the most common form of transportation used to travel to a nearby forest and the time taken to do so. In Belgium and Spain, a majority of respondents indicated traveling by car to the nearest forest, 39% and 48% respectively. Next to this, 37% of respondents in Belgium travel to a nearby forest by foot. Travel time in Belgium is roughly 23 minutes by car and 16 minutes walking. In Spain, 40% travels to a nearby forest by foot, taking roughly 26 minutes walking and 40 minutes by car to reach their destination. In the Czech Republic and Norway a majority of respondents travel by foot, 54% and 67% respectively, with an average travel time of 20 minutes in the Czech sample and 10 minutes in the Norwegian sample. The increased proximity to a forest measured in the Czech and Norwegian sample is also reflected in the higher visitation rates: in both cases roughly 40% of respondents visited a forest more than 20 minutes in the past 12 months. This is notably different from the Belgian and Spanish sample, where roughly 45% visited a forest between 2-10 times in the past 12 months. In Sain, 15% of respondents indicated not having visited a forest at all in the past 12 months.

A more detailed description of the four samples included in the current analysis are provided in Appendix D: Sample description FES DCE.

Preferences for FES

A combination of three MXL models are estimated to compile a comprehensive overview of citizens' preferences for FES (Table 1). First, we estimate overall preferences through split-sample modelling for each study region separately, pooling responses before and after the information treatment. This highlights some noteworthy differences, as well as similarities, between countries. Across all study regions we observe similar preference structures for the ASC, timber production, natural hazard protection, and the payment vehicle. Specifically, respondents across all study regions hold a significant and positive preference for the ASC, indicating they prefer to select one of the two hypothetical forest presented rather than selecting the opt-out (i.e., refraining from making a choice). As expected, we also find a significant and negative preference for the payment vehicle across all four study regions, indicating respondents are not willing to face increased tax levels for their choice(s). More noteworthy are the similarities in preferences observed for timber production and natural hazard protection. We find positive preferences for increased levels of timber production (both medium and high compared to low) as well as for increased levels of natural hazard protection (both medium and high compared to low) across all four study areas.

Table 1. MXL results estimated for individual study regions (pooled before and after information treatment).

	Belgium		Czech Republic		Norway		Spain	
	β	**SD**	***β***	**SD**	***β***	**SD**	***β***	**SD**
ASC (dummy-coded)	1.975***	2.296***	4.865***	3.686***	4.570***	3.559***	3.367***	3.330***
ASC (effects-coded)	4.039***	2.457***	3.844***	3.137***	5.139***	3.333***	6.064***	3.857***
Timber [Low]								
Medium	0.337***	0.104	0.294***	0.177	0.327***	0.207*	0.268***	0.010
High	0.544***	0.756***	0.236***	0.562***	0.517***	0.375**	0.193***	0.487***
Carbon sequestration [low]								
Medium	0.475***	0.377***	0.165**	0.113	-0.002	0.262	0.054	0.269**
High	0.839***	1.105***	0.305***	0.646***	0.004	0.672***	0.006	0.891***
Temperature	0.069***	0.069***	0.031***	0.017	0.009	0.053***	0.028***	0.025
Accessibility [partially accessible]								
Both	0.163*	0.174	0.163**	0.103	0.260***	0.020	0.115*	0.021
Full	0.014	0.288*	0.328***	0.415***	0.370***	0.352***	0.315***	0.445***
Landscape diversity [single + 50m]								
Single + 5m	0.163	0.307	0.110	0.322**	0.282***	0.117	0.031	0.339**
Multiple + 50m	0.308**	0.540***	0.365***	0.218	0.308***	0.304**	0.137*	0.048
Multiple + 5m	0.288**	0.158	0.278***	0.186	0.145	0.526***	0.244***	0.229*
Hazard protection [low]								
Medium	0.991***	0.264*	0.433***	0.022	0.406***	0.288*	0.841***	0.258***
High	1.355***	1.392***	0.664***	0.642***	0.512***	0.558***	1.203***	0.718***
Payment (€)	-0.003***	0.003**	-0.009***	0.008***	-0.010***	0.013***	-0.012***	0.013***
Observations (N)	6,084		8,280		9,180		12,312	
Log-likelihood	-1403.04		-1937.47		-2154.55		-3022.92	
BIC	3050.045		4127.542		4564.599		6309.556	

Note: * p<0.1, ** p<0.05, *** p<0.01

Differences in preferences between study regions are mainly observed for the remaining regulation and maintenance FES (carbon sequestration and local temperature regulation), and for the cultural FES (i.e., accessibility and visual landscape diversity).

In the **Belgian** sample, we find consistently positive preferences for higher levels of provisioning as well as regulation and maintenance FES, but observe variation in the preferences for cultural FES. Next to higher levels of timber provisioning, carbon sequestration, temperature regulation, and natural hazard protection, Flemish citizens prefer visually diverse forests (multiple colours) both with dense (visibility up to 5m) and sparsely (visibility up to 50m) populated stands as opposed to a forest landscape typified by a sparsely populated single species stand (single colour with visibility up to 50m). Combined with the limited significant preferences estimated for the accessibility of the forest, this indicates that Flemish citizens hold stronger preferences for the visual aesthetic of the forest rather than the direct recreational access.

Preference estimates for the **Czech** sample demonstrate that citizens generally hold positive preference for increased levels of all FES categories; provisioning, regulation & maintenance, as well as cultural. Next to positive preferences for medium and high timber provisioning (compared to low), we find positive preferences for higher levels of carbon sequestration, natural hazard protection, and increased local temperature regulation. Similarly, estimates show that Czech citizens hold significant and positive preferences for the cultural FES. We find positive and significant preferences for forests that have limited access during ecologically vulnerable periods and are full accessibly otherwise (*access both*), as opposed to forests that are only partially accessible all year round. Even larger significantly positive preferences (in magnitude) are estimated for forests that are fully accessible all year round, as opposed to only partially accessible throughout the year. This, combined with the positive preferences estimated for visually diverse forests both with dense (visibility up to 5m) and sparsely (visibility up to 50m) populated stands (as opposed to sparsely populated single species stands, *single + 50m*), indicate Czech citizens strongly value the recreational benefits provided by forests.

Of the four considered study areas, the preferences estimated for the **Norwegian** sample are most distinct. We once again find positive preferences for higher levels of timber provisioning, and natural hazard protection. Similarly to the Czech sample, we see that Norwegian citizens prefer increased levels of accessibility, demonstrating positive and significant preferences for forests that are either fully accessible all year round or that have limited access during ecologically vulnerable periods and are full accessibly otherwise (*access both*), as opposed to forests that are partially accessible all year round. As opposed to the positive preferences estimated for carbon sequestration and local temperature regulation in Belgium and Czech Republic, we find that preferences for said FES in Norway are insignificant. Also different from the other study regions are the preferences estimated for landscape diversity. In Norway, we find significant preferences for both densely populated single species stands (*single + 5m*) and sparsely populated diversified stands (*multiple + 50m*), as opposed to sparsely populated single species stands (*single + 50m*). Simultaneously we find insignificant preferences for sparsely populated diversified stands (*multiple + 50m*).

As for all study areas, we observe positive preferences for higher levels of timber provisioning and natural hazard protection in **Spain**. Similar to Norway, Spanish citizens are indifferent towards higher levels of carbon sequestration. We do, however, find significant positive preferences for higher levels of local temperature regulation, increased accessibility, and diversified forest stands either densely (*multiple + 5m*) or sparsely (*multiple + 50m*) populated as opposed to sparsely populated single species stands; similar to the preferences observed in the Belgian and Czech samples.

Though we observe some notable differences between the study regions in the estimates reported in Table 1, we are not able to described significant differences between regions as the models have been independently estimated. For this, we estimate a pooled-sample G-MNL model with interaction effects for the study regions (Table 2).

Table 2. G-MNL model estimates with interaction effect for Czech Republic (CZK), Norway (NOR), and Spain (ESP), with Belgium coded as the main effects (MAIN).

	β_{MAIN}	SD	β_{CZK}	β_{NOR}	β_{ESP}
ASC (dummy-coded)	1.947***	2.790***	2.004***	1.290***	0.825***
ASC (effects-coded)	3.719***	2.850***	0.959***	0.467**	-0.040
Timber [Low]					
Medium	0.380***	0.045	-0.153	-0.102	-0.111
High	0.714***	0.218***	-0.588***	-0.241	-0.461***
Carbon sequestration [low]					
Medium	0.487***	0.104*	-0.335**	-0.513***	-0.585***
High	0.989***	0.524***	-0.659***	-0.977***	-1.169***
Temperature	0.084***	0.005	-0.048***	-0.070***	-0.057***
Accessibility [partially accessible]					
Both	0.332***	0.010	-0.136	-0.133	-0.255*
Full	0.205*	0.230***	0.256*	0.173	0.156
Landscape diversity [single + 50m]					
Single + 5m	0.107	0.025	-0.213	0.194	-0.009
Multiple + 50m	0.334**	0.175**	-0.211	0.019	-0.134
Multiple + 5m	0.392***	0.064	-0.347**	-0.264	-0.090
Hazard protection [low]					
Medium	1.331***	0.110*	-0.840***	-0.824***	-0.418***
High	1.905***	0.013	-1.086***	-1.261***	-0.603***
Payment (€)	-0.003***	0.010***	-0.008***	-0.007***	-0.011***
τ	0.888***				
Observations (N)	35,856				
Log-likelihood	-8949.26				
BIC	18643.11				

Note: *p<0.1, **p<0.05, ***p<0.01

Across the Czech, Norwegian and Spanish samples we consistently find significantly smaller preferences for increased levels of carbon sequestration, local temperature regulation, and natural hazard protection compared to the Belgian main effects. Respondents are also more price sensitive compared to the Belgian sample (payment) and have a stronger preference for selecting one of the presented hypothetical forests (ASC). **This implies lower overall preferences towards regulation and maintenance FES in Czech Republic, Norway and Spain compared to Belgium**. We find minimal differences between regions for provisioning FES, with significantly lower preferences for high (as opposed to low) timber provisioning levels in Czech Republic and Spain. Minor differences are also observed in the preferences for cultural FES. Specifically, we observe lower preferences for forests with limited accessibility during ecologically vulnerable periods and full accessibility otherwise (*access both*) in Spain, and lower preferences for fully accessible forests in Czech Republic, compared to Belgium. In the Czech Republic we also find lower positive preferences for densely populated mixed species stand (*multiple + 5m*) compared to Belgium.

To test for differences between the Spanish, Norwegian and Czech samples, we estimate the pooled-sample model with interaction effects again, this time defining Spain as the main effects. Model estimates can are reported in Appendix E: Additional econometric estimations. Results from this estimation confirm that preferences estimated for the Belgian sample differ most from all three considered study areas.

Box 1: Are preferences for FES susceptible to information?

Interviews conducted with forest managers within the CLIMBFOREST project highlighted the tendency for citizens to be misinformed about the benefits associated with active forest management. We assess whether providing information to respondents in the form on a 1-minute video can successfully overcome this by evaluating its impact on stated preferences for FES as well as on attitudes towards forest management strategies. Though limited, we find some effect of the information on preferences for FES across all four study regions. More notable, however, is the impact on attitudes toward management strategies. Full results can be found in Table 17 and Table 18 in Appendix E: Additional econometric estimations.

As with the preferences, the information ameliorates the attitudes towards the management strategies at the extremes of the intensity-spectrum (Figure 9). Before the information treatment, close-to-nature forestry is consistently most preferred in all study areas, followed by multifunctional forestry and unmanaged forestry. The two intensive strategies are consistently disliked, with attitudes towards intensive production for timber being lower than those for intensive production for bioenergy. After the information treatment, we see that the order of strategies from most to least preferred stays largely the same across the countries, but the magnitude of attitudes changes. In Belgium, Czech Republic and Spain, the attitudes towards less intensive strategies become less positive, while attitudes towards intensive management become less negative. In Spain in particular this change is most extreme: attitudes towards unmanaged forests become negative while attitudes towards intensive management for bioenergy become positive. While for both strategies attitudes among Spanish citizens switch direction after information, it must be noted that these generally remain close to neutral, both before and after information. In Norway we observe a slightly different trend. Attitudes for less intensive strategies become more positive, noteworthily also for multifunctional forests for which attitudes in the other study regions do not differ significantly after information. Simultaneously, attitudes towards intensive strategies do not differ significantly after the information treatment. These shifts in attitudes are also reflected in the shift in preferences for FES, suggesting there is no mismatch between demand for FES and perception of management strategies.

The most noticeable differences emerge between Norway and both Belgium and Spain after the information treatment. Overall, this suggests that Norwegians exhibit stronger positive attitudes toward forest management strategies—both medium- and high-intensity—compared to Belgian and Spanish citizens. However, their attitudes toward high-intensity strategies align more closely with those of Czech respondents. This pattern is perhaps unsurprising, given the significant role the forestry sector plays in the economies of Norway and the Czech Republic, in contrast to its relatively smaller contribution in Belgium

Demand: willingness-to-pay

The MWTP estimates can be interpreted as the societal demand for FES. Figure 3 reports the MWTP estimates for each attribute level (i.e., FES) for each of the four considered study areas (full results are reported in Appendix E: Additional econometric estimations, Table 19). The MWTP estimates largely mirror the preference estimates, with significant and positive values estimated for timber provisioning, local temperature regulation, accessibility, and natural hazard protection. As a general trend, though this is not the case for all attribute levels, we observe the highest MWTP values for Belgium and Spain, and the lowest for Norway. The highest significant MWTP is estimated for natural hazard protection, both medium and high compared to low, and the lowest is estimated for local temperature regulation. In Belgium, respondents are willing to pay between €72 and €108 to increase the natural hazard protection capacity in the area from low to medium and high, respectively. In Spain, respondents are willing to pay even more, between €96 and €134, respectively. The MWTP in the Czech Republic and Norway is noticeably lower, between €33 and €60 in the Czech Republic, and €25 and €43 in Norway. This may be attributed to the severity of the impact of natural hazard in Belgium (damage from flooding) and Spain (wildfires) in recent years. More consistent across study areas is the MWTP for local temperature regulation, which ranges from €1 in Norway, through €3 in Czech Republic and Spain, to €4 in Belgium per 1°C cooling offered by the forest in summer. Here, the relatively stable temperature in Norway and the large population density (paired with limited forested area) in Belgium explain the four-time increase in willingness to pay from Norwegian to Belgian citizens.

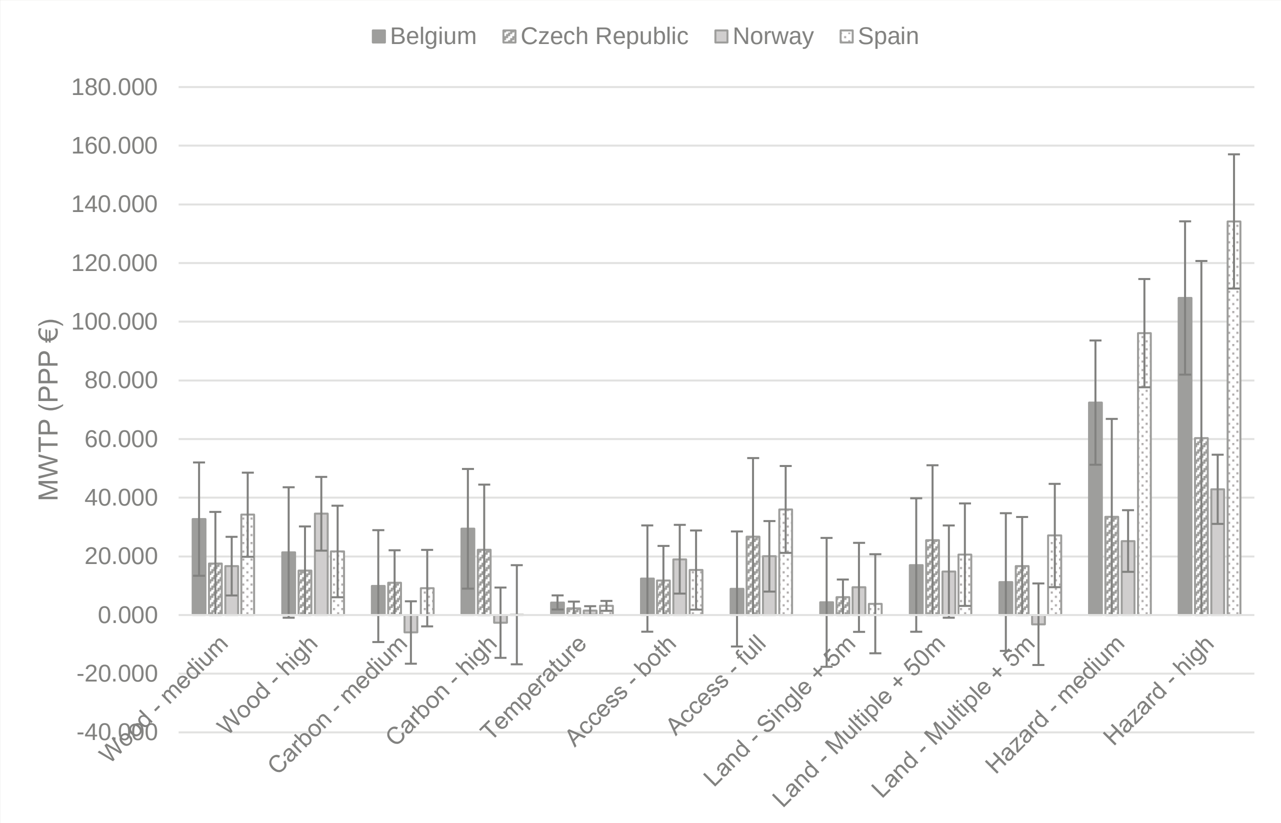

Figure 3. Marginal willingness-to-pay (MWTP) expressed in PPP corrected euros (€)

Across all four study areas respondent are willing to pay for increased levels of timber provisioning. In Belgium, Czech Republic and Spain, respondents are willing to pay most to move from low to medium levels, and less (though still positive) to move to high levels. In Norway we observe the opposite, respondents are willing to pay up to €17 to move from low to medium levels of timber provisioning, and up to €35 to move to high levels. For carbon sequestration, Spanish and Norwegian respondents are not willing to pay. In Belgium, respondents are willing to pay up to €29 only for an increase from low to high levels of carbon sequestration, but not for an increase to medium. In the Czech Republic, respondents are willing to pay for both, €11 for an increase from low to medium and €22 for an increase to high. Willingness to pay for cultural FES (i.e., accessibility and landscape diversity) varies more noticeably between study regions. In Belgium, respondents are not willing to pay for any of the considered cultural FES. In the Czech sample, respondents are willing to pay for increased accessibility – €12 to shift from partial accessibility to limited accessibility during vulnerable periods and full accessibility otherwise, and €26 to shift to full accessibility all year round – and for a more diversified forest stand - €26 to shift from sparsely populated single species stands (*single + 50m*) to sparsely population diversified stands (*multiple + 50m*) and €17 to shift to densely populated diversified stands. A similar pattern is observed amongst the Spanish sample, with respondents willing to pay up to €35 to increase accessibility levels, and up to €27 to increase stand diversity. In Norway, respondents are similarly willing to pay for increased accessibility, up to €20 for full access all year round, but they are only willing to pay to shift from sparsely populated single species stands to sparsely populated diversified stands, €25.

Using the MWTP estimates we calculate the compensating surplus (CS). The CS represents the social demand, or social value, of the bundle of FES delivered by a management strategy. The CS is calculated by bundling the MWTP according to Table 1, followed by transforming the resulting CS expressed as PPP € per household per year to PPP € per hectare as a function of the average household size within each sample (2.36 in Belgium, 2.86 in Czech Republic, 2.35 in Norway, and 2.79 in Spain), the total population size and the total forested area in hectares in each study area. The CS thus represents the relationship between the supply of and the demand for FES in each study area under a given management strategy. Important to note is that the CS is calculated using the study area population, meaning that it represents population demand and does not consider demand for example through international tourism and travel.

Table 3. Compensating surplus (CS) of five management strategies for each study area.

	Belgium (PPP €/ha)	**Czech Republic (PPP €/ha)**	**Norway (PPP €/ha)**	**Spain (PPP €/ha)**
Unmanaged	2459	104	8	108
Close-to-nature	3451	196	13	200
Multifunctional	2964	172	15	193
Timber production	2319	105	14	136
Biomass production	494	25	7	23

From Table 3 we see that CS across all study areas is highest for the less intensive management strategies and lowest for the most intensive strategies. CS in Czech Republic and Spain are mostly similar, both in magnitude and ranking; close-to-nature and multifunctional forests provide the highest CS, followed by intensive management for timber production. The lowest CS values are calculated for unmanaged forests and intensive biomass production, the two most extreme management strategies in terms of intensity. This can be primarily attributed to the relatively high MWTP estimates for medium levels of carbon sequestration and medium levels of natural hazard protection in the Czech Republic and Spain. In Belgium the highest CS is also observed for close-to-nature forestry followed by multifunctional forestry, while the lowest CS is observed for biomass production. Contrary to Czech Republic, Spain, and also Norway, the CS calculated for intensive timber production in Belgium is relatively low compared to the other management strategies.

Norway is perhaps most distinctive in that the highest CS is calculated for multifunctional forestry, followed by intensive timber production, and close-to-nature forestry. Observing the CS calculated for Norway also highlights a major difference in the magnitude of the CS between the study areas. This is reflective of the supply-demand mismatch in some of the considering study areas. CS differences between Belgium and Norway best exemplify this. In Norway, with a population of 5.5 million inhabitants and 12.1 million hectares of forest, the supply of FES greatly exceeds the demand for FES, with a ratio of 2.2 ha of forest per inhabitant. For comparison, in Belgium (focusing only on the Flemish region), the ratio decreases to 0.02 ha of forest per inhabitant – Flanders has a similar population size to Norway (6.8 million) but only 152 thousand hectares of forested area. Here, the demand for FES greatly exceeds the supply due to the population density and limited forested area, resulting in high value estimates for FES in the region.

Box 2: Insights on the payment vehicle - evidence from Belgium

Many ecosystem services, including FES, are often not valued through markets. This means that we cannot directly infer value through observed preferences. While stated preference techniques, such as DCEs, provide a powerful tool to overcome this challenge by eliciting preferences, and by extension, monetary value, value estimates have been proven to be sensitive to design choices. The choice of payment vehicle has been shown to have a significant effect on the MWTP estimates. For this reason, we incorporated a between-sample treatment in the Belgian sample only, in which half of the sample was presented with a payment vehicle expressed as a tax increase while the other half was presented with a voluntary annual donation to a non-specific forest fund.

To ensure equivalence between the two payment vehicles, the voluntary donation amount (D) was calculated using the formula $D = x/0.55$, where x represents the corresponding tax level. This adjustment accounts for the 45% tax deductibility of charitable donations from taxable income in Flanders, Belgium, thereby ensuring identical out-of-pocket payments across treatments. We estimate the effect of a reformulation of the payment vehicle on MWTP and CS for a bundle of FES supplied by different management strategies. MWTP estimates are obtained using a MXL model estimated in WTP-space (equation 6) and CS calculated according to equation 7. FES supply rates are attributed to the considered management strategies according to Table 12. To keep the main body of this deliverable concise, the results of these estimations are included in Table 21, Table 22 and Figure 11 in Appendix E: Additional econometric estimations.

When estimating MWTP for the payment vehicle treatments, we find that expressing the payment vehicle as a tax consistently decreases the MWTP compared to a donation. This difference is mostly significant for timber provisioning, carbon sequestration, and natural hazard protection. The choice of payment vehicle can thus have significant implications for the estimated value attributed to the considered FES; more so for regulating and maintaining services than for provisioning and cultural FES. This observation holds significant implications as other valuation approaches can be employed for provisioning FES (i.e., market-based approaches) and cultural FES (i.e., observed preferences such as travel cost), but regulating and maintaining services are far more complicated to value. The CS, which represents the total social value of the bundle of FES provided by the management strategy, also vary greatly between the treatments. Expressed as PPP €/ha, the CS calculated when estimating MWTP as a donation is three- to five-times larger than when estimating MWTP as a tax.

Comparing MWTP values estimated using a tax versus a donation highlights the core challenge of incentive compatibility and its link to hypothetical bias in DCEs. Incentive compatibility, the incentive for respondents to truthfully reveal their preferences, depends on design features such as the payment vehicle. If the payment vehicle is not sufficiently consequential, respondents are less likely to make genuine trade-offs, reducing estimate accuracy. As a result, their choices remain largely hypothetical and should be extrapolated beyond the experiment context with caution. The higher MWTP estimates obtained using the donation payment vehicle illustrate a reduced price sensitivity among respondents in this sample, translating to higher value estimates and ultimately higher CS calculations. The MWTP and CS calculated for the sample treated with the donation payment vehicle is therefore likely a large overestimation of true willingness to pay, and by extension of the social value of FES. We conclude that the tax, as a more coercive payment vehicle, likely results in more accurate MWTP estimates, and, by extension, more true-to-life FES (bundle) value estimates.

Discussion

The results of the DCE reinforce the central role of FES in shaping societal expectations for Europe's forests. Across all four study regions respondents expressed **clear preferences for multifunctional forests that deliver a mix of provisioning, regulating and maintaining, and cultural FES**. At the same time, the consistent price sensitivity highlights a reluctance to accept higher taxes as a means of securing these benefits. While cultural FES such as accessibility and landscape diversity are valued in several study regions, their importance is found to be generally less uniform and less pronounced than other FES. This suggests that although cultural FES matter to citizens, as is confirmed by other studies such as Ciesielski and Stereńczak (2018), and Varela et al. (2017), their relevance seems subject to local conditions, such as population density and cultural traditions. Interestingly, this nuance distinguishes this study from findings in earlier project work that identifies a uniformly strong demand for cultural FES across Europe (deliverable D3.1). These relatively subtle preferences for cultural FES compared to regulating and maintaining and/or provisioning FES implies that **forest management strategies do not need to explicitly target cultural FES as standalone objectives**. Rather, cultural FES can be effectively supported as co-benefits when forests are managed in a multifunctional manner. Our results indicate that policies aimed at balancing multiple objectives, such as the EU Forest Strategy for 2030 which stresses the need for management systems capable of simultaneously delivering climate mitigation, resilience, biodiversity conservation, and socio-economic benefits, are likely to be supported by citizens across diverse European contexts.

The variability in preferences for cultural FES found across the study regions highlights the importance of local context in shaping societal expectations of forests. Forest conditions, legal frameworks, demographic characteristics, and recent exposure to extreme natural disturbances all influence how citizens assess management options and related FES. Our results demonstrate that local availability of forests, baseline supply of FES, and demographic characteristics combined shape marginal valuations. In Belgium (Flanders), limited forest area paired with an extremely high population density increase the recreational pressure on forests which is reflected in the increased demand for accessibility and local cooling capacity. In contrast, abundant forests in Norway, combined with the constitutional Right to Roam (*allemannsretten*) which ensures universal access to forests, reduces the marginal value of many cultural FES. Exposure to natural hazards likely also significantly influences the regional differences in preferences observed. Recent wildfire events in Spain and flood events in Belgium (describe in Appendix A: Study region description) have likely increased support for hazard-mitigating management, while recent bark beetle outbreaks heighten demand for forest health and active management, for example through diversifying tree stands in Czech Republic. Norway has seen less extreme hazard occurrences in recent years compared to the other three study regions, which is reflected in the significantly lower preferences for natural hazard protection found here.

The results from the information treatment demonstrate that when citizens are informed about forest functions and how these relate to management interventions, they tend to prefer management strategies that ensure forest health, resilience, and continued multifunctionality. However, the way in which this is expressed is similarly informed by regional context. In Belgium, the Czech Republic and Spain the treatment tends to decrease support for very low-intensity strategies and soften negative attitudes towards highly intensive strategies. By contrast, in Norway, the treatment slightly strengthens support for less intensive strategies, including multifunctional forestry, suggesting that where forest resources are abundant and public access is guaranteed, citizens respond differently to information regarding management.

Our findings hold important implications for EU-level policy coherence. On the one hand, citizens' strong support for multifunctional forests aligns well with EU policies emphasizing biodiversity, climate change mitigation, and environmental resilience, e.g., the EU Forest Strategy for 2030 and the EU Biodiversity Strategy. On the other hand, our results highlight a potential tension with more production-oriented policy frameworks such as the EU’s Circular Economy Act (European Commission, 2025a), which encourages greater substitution of fossil-based materials with renewable resources such as timber. Scaling up the supply of long-lived wood products or biomass within a circular economy framework may require more intensively managed systems, which we find is not likely to be supported by citizens. This tension has been empirically mapped in the Norwegian context by Vergarechea et al. (2023).

This tension, combined with the context-dependent preferences observed in this study suggest that a one-size-fits-all approach to forest policy at the EU level may not be appropriate. Instead, the findings point toward the value of a regionalized approach. In the forest-scarce, densely populated regions of Western Europe, where demand for recreation, hazard protection, and other non-provisioning FES is high, multifunctional and/or close-to-nature forestry seems to better align with societal preferences. In the more forest-dense regions of Northern and Western Europe, where marginal the value of cultural FES is lower and the baseline support for active forest management is relatively high, more intensive or production-oriented management may be more socially acceptable. Still considering the demand for cultural FES in these regions, this would potentially be most successful if accompanied by zoning, where specific areas close to urban centres are dedicated to cultural and recreational functions. Such differentiated approaches would allow the EU to uphold its biodiversity and climate objectives while also enabling regions with abundant forest resources to contribute more substantially to the circular bioeconomy. This could improve social acceptance by ensuring that management regimes reflect local ecological conditions, disturbance histories, institutional frameworks, and societal priorities.

Part B: Consumer preferences/demand for long-lived wood products

Popular summary

To assess preferences and demand for long-lived wood products, we conducted a discrete choice experiment (DCE) in four countries: Belgium (Flanders), the Czech Republic, Norway, and Spain. Respondents completed 16 choice cards, each requiring them to select one of three side-table options. These options varied by material (solid wood, non-solid wood, or metal), production location (local, European, or outside Europe), carbon footprint (low, medium, or high), and price. Participants were randomly assigned to a treatment or control group; the treatment group was shown a brief information figure highlighting the carbon-storage potential of long-lived wood products. Combined with additional questions on certifications, climate change attitudes, and eco-friendly behaviours, the DCE enabled us to evaluate respondents' preferences and willingness to pay for different side-table attributes across all four study regions.

Our findings suggest a consistent material preference pattern for side-tables across study areas, **with higher preferences for solid wood, followed by non-solid wood, and then metal side-tables**. WTP followed the same ordering, with respondents generally willing to pay more for solid wood, then non-solid wood, and least for metal, although some heterogeneity between study regions exists. **Respondents in all study regions preferred locally-produced and then European-produced** over the information not been disclosed and where willing to pay higher premium for side tables produced locally and regionally, although some differences can also be found between countries. Preferences and demand for the carbon footprint attribute indicate that, **although all regions value low and punish high carbon footprint disclosure, the intensity of preference or aversion varies across countries**, with Norwegian and Spanish respondents showing the greatest sensitivity to these attributes.

In addition, **the treatment information consistently increased preferences for solid-wood side tables** across all study regions and had localised effects on production location attribute (only in Spain and Belgium) and only impacted positively Spain carbon footprint preferences. This proves that while such concise messaging may not be sufficient to shift preferences for production location or carbon footprint in all regions, the results show that even brief, low-intensity information treatments can enhance preferences for solid-wood products, even for regions that score lower on certification statements and eco-friendly behaviours. Thus, relatively simple communication efforts may be useful to help boost demand for long lived wood products.

While focused on side-tables, our findings hold significant implications for the production-oriented policy frameworks, such as the EU Bioeconomy Strategy and the Circular Economy Act, that encourage greater substitution of fossil-based materials with renewable resources such as timber. High societal acceptance of solid-wood products across regions suggests strong potential to scale up long-lived wood furniture and respondents' preferences and willingness to pay for locally or European-made wood products further support EU manufacturing goals.

Methodology

Preferences and demand for long-lived wood products were also elicited using a DCE in which respondents were presented with a set of eight consecutive choice tasks, each consisting of a single choice card presenting three labelled side-table alternatives and an opt-out option. The side-tables were all defined by the same set of three characteristics (attributes), with the levels differing between the labelled alternatives. The attributes incorporated in this DCE include: (1) production origin, (2) carbon footprint, and (3) price. Based on the levels of the attributes, respondents were asked to indicate which of the three side-tables they would chose to purchase. The opt-out option in the choice task allowed respondents to refrain from making a choice. Respondents repeated the choice task eight times, each time being presented with three different side-tables (as shown in Figure 4). Appendix B: Methodology describes the design of the DCE, including the selection and description of the attributes and the composition of the choice cards, the components of the survey in which the DCE was embedded along with the sample cleaning procedure followed, and finally the econometric analyses used to estimate preferences and demand for long-lived wood products.

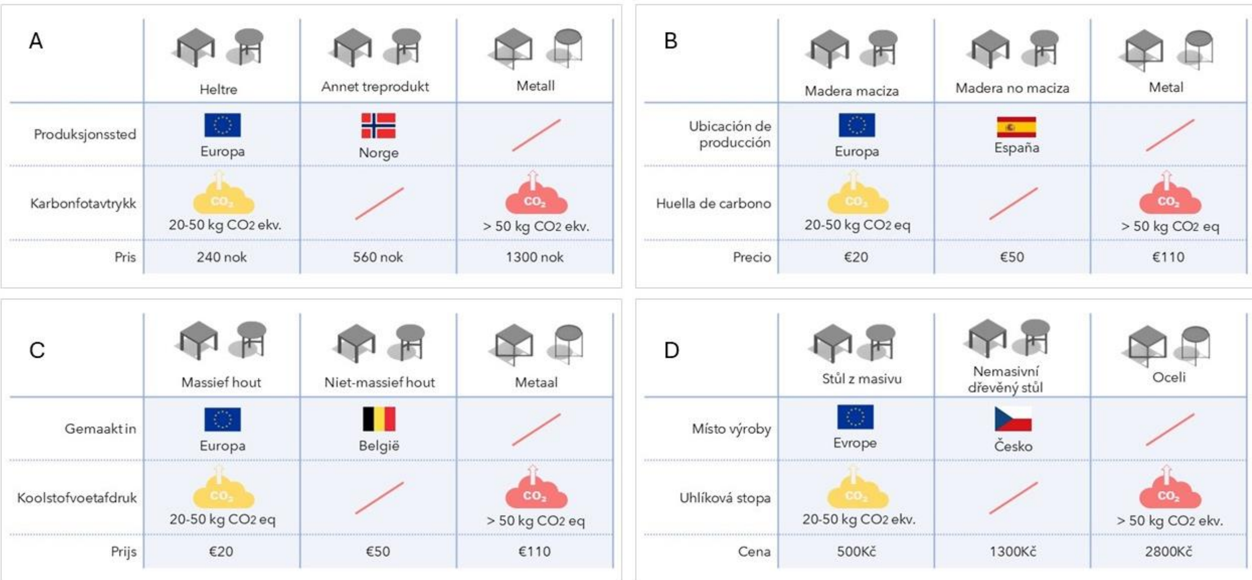

Figure 4. Sample choice card for DCE LLWP for study regions Norway (A), Spain (B), Belgium (C), Czech Republic (D)

Results

Sample Description

This section provides a brief description of the samples across the four study regions, showcasing the number of observations, main characteristics and, where relevant, any statistically significant differences between the treatment and control group. In the final section, we also present a brief overview of respondents' attitudes towards certifications, climate change statements, and ethical and eco-friendly purchasing behaviour. The socio-demographic information for all four study regions can be found in Table 23, Table 24, Table 25 and Table 26 in Appendix F: Sample Description long-lived wood products.

In **Belgium**, the DCE was conducted in the Flemish region. A total of 214 participants took part in the DCE, although following the cleaning of the sample, only 186 respondents remained. Among these, 51.61% received the information treatment. The sample population comprised 50.54% of male respondents, and the mean age for the full sample was 56 years, which is thirteen years more than the national average. Furthermore, 41.94%

of the participants had a low level of education, 32.8% had a medium level of education and 13.98% had a high level of education. With regard to job status, the majority of the participants were either employed (full-time or part-time) (44.62%) or retired (40.32%).

A total of 545 respondents took part in the DCE in the **Czech Republic**. However, after cleaning the sample, only 219 respondents remained. Of these, 52.05% received the information treatment. The sample consisted of 45.21% male respondents, and the mean age for the full sample was 44 year, which is comparable to the national average. Regarding education levels, 48.4% of respondents had a low level of education, 33.33% a medium level, and 16.89% a high level. In terms of employment status, most were employed either full- or part-time (66.67%), followed by self-employed (8.22%) and retired participants (8.22%).

In **Norway** a total of 406 people took part in the DCE, although after cleaning the sample, 296 respondents remained. Of these, 49.32% received the information treatment. The sample consisted of 51.53% male respondents, and the average age across all respondents was 51 years, which is ten years older than the national average. Regarding education levels, 36.82% of respondents had a low level of education, 42.91% a medium level, and 15.54% a high level. In terms of employment status, about half of the sample was employed either full-time or part-tile (55.74%), followed by retired participants (23.31%) or respondents not been able to work (11.82%).

A total of 536 respondents participated in the DCE in **Spain**. After data cleaning, the final sample consisted of 219 respondents, of whom 51.04% received the information treatment. Within this sample, 45.05% were male and the mean age was 51 years, which is seven years older than the national average. Regarding education levels, 14.25% of respondents had a low level of education, 83.16% a medium level, and 2.33% a high level. In terms of employment status, the majority were employed either part-time or full-time (61.14%), followed by retired respondents (15.54%) and unemployed individuals (both looking and not looking for a job) (13.99%).

Finally, respondents' **attitudes** towards certification schemes, ethical and/or eco-friendly consumer behaviour, and their perception of climate change were measured using pre-existing scales on a 5-point Likert scale (1 = Totally Disagree / Never true, 5 = Totally Agree / Always true). Each scale is composed of various components measuring different aspects of a scale. Across these components, a mean value can be estimated representing overall attitude of perception towards the topic being considered. Table 4 reports the mean value estimates for the three considered scales. The break-down of estimates towards the different components of each scale are described in Table 28, Appendix G: Additional econometric estimation. A one-way ANOVA followed by a Tukey post-hoc test was used to estimate statistical differences in attitudes between countries.

Table 4 outlines that Belgium and Spain had consistently stronger positive attitudes towards the certification statements (3.71 and 3.52 respectively) and climate change statement (4.03 and 4.11 respectively) than Norway and Czech Republic. Moreover, when it comes to eco-friendly and ethical purchasing behaviour, Spain had the highest overall average score (3.08), followed by Belgium (2.91), the Czech Republic (2.82), and Norway (2.77). The p-value suggests that the Spanish sample had statistically significantly higher scores than those in the Czech Republic and Norway. However, it is worth noticing that these scores indicate neutral agreement, as they are around the midpoint of the scale.

Table 4. Mean attitudes and test statistics towards certifications, climate change perception and purchasing behaviours in Belgium (BEL; 1), Czech Republic (CZK; 2), Norway (NOR; 3) and Spain (ESP; 4)

	Mean attitudes				**Country comparison test statistic (p-value)**					
	BEL (1)	CZK (2)	NOR (3)	ESP (4)	1-2	1-3	1-4	2-4	2-3	3-4
Certification	3.71	3.11	3.24	3.52	0.000	0.000	0.107	0.000	0.411	0.001
Climate Change Perception	4.03	3.64	3.61	4.11	0.002	0.000	0.800	0.000	0.992	0.000

Purchasing behaviour	2.91	2.82	2.77	3.08	0.861	0.536	0.257	0.024	0.957	0.001

Note: *p<0.1, **p<0.05, ***p<0.01

Attitude was measured using a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly Agree) for certification statements and climate change statements and from 1 (Never True) to 5 (Always True) for purchasing behaviour.

The p-values are derived from a an ANOVA test followed by a Tukey post-hoc test

Preferences for long-lived wood products

A combination of MXL models are estimated to compile a comprehensive overview of consumers preferences for long-lived wood products. We begin by estimating overall preferences for each study region using three models: a full-sample model, and separate models for the treatment and control groups. The full-sample estimates (Table 5) highlight some differences and similarities between countries. Across all study regions, we observe similar preference patterns for the ASC and for price. Respondents in all countries show significant positive preferences for **wood, solid wood,** and **metal** side tables, indicating a clear preference for purchasing one of these options rather than opting out. Preferences are consistently highest for solid wood tables, followed by non-solid wood tables, and then metal tables, reflecting a consistent ranking of material types. As expected, significant and negative preference for price indicates that respondents in all countries show aversion towards a price increase.

Similarities in preferences are also found in the **production location** attribute. Respondents in all four countries show significant and positive preferences for side tables made locally and within Europe, compared to cases in which the production location is not disclosed. Differences emerge when the furniture is produced outside Europe. In the Czech Republic and Spain, respondents display small but statistically significant positive preferences for side tables made outside Europe relative to having no information on the production location. In contrast, respondents in Belgium and Norway are indifferent between side tables produced outside Europe and those with undisclosed production location**.**

Preferences regarding the **carbon footprint** attribute also show both commonalities and differences across countries. Respondents in all four countries show positive and significant preferences for side tables with a low carbon footprint, indicating that they value the disclosure of a low carbon footprint compared to cases where no carbon footprint information is provided. All samples also display significant and negative preferences for side tables with a high carbon footprint relative to no disclosure . For medium carbon footprint levels, cross-country differences become more pronounced. Respondents in the Czech Republic and Norway show significant negative preferences, suggesting aversion to medium carbon footprint labels compared to no information. In contrast, respondents in Belgium and Spain are indifferent between a medium carbon footprint being displayed and no disclosure.

Table 5: MXL results estimated for individual study regions (pooled before and after information treatment).

	Belgium		Czech Republic		Norway		Spain	
	β	**SD**	**β**	**SD**	**β**	**SD**	**β**	**SD**
Material [not buying]								
Solid wood (ASC dummy coded)	4.145***	1.849***	4.257***	1.729***	3.544***	1.929***	3.301***	1.703***
Solid wood (ASC effect coded)	4.891***	1.812***	4.624***	1.920***	3.609***	1.884***	4.039***	1.791***
Non-solid wood (ASC dummy coded)	2.670***	1.783***	3.154***	1.504***	2.045***	1.479***	2.615***	1.663***
Non-solid wood (ASC effect coded)	3.266***	2.011***	3.819***	0.912***	2.139***	1.491***	3.306***	1.614***
Metal (ASC dummy coded)	1.433***	3.391***	2.007***	2.411***	1.202***	1.813***	1.988***	1.390***
Metal (ASC effect coded)	2.178***	3.455***	2.218***	2.555***	1.319***	1.815***	2.690***	1.487***
Production location [not disclosed]								
Local	1.621***	0.294	1.168***	0.828***	1.166***	-0.599***	1.418***	-0.821***
Europe	1.047***	0.084	0.573***	-0.060	0.321***	0.011	0.791***	-0.090
Outside Europe	0.159	0.828***	0.261**	-0.249	0.032	0.046	0.333***	-0.473***
Carbon footprint [not disclosed]								
Low (<20 kg CO2 eq.)	0.642***	-0.016	0.255**	0.885***	0.685***	-0.063	1.013***	0.985***
Medium (20-50 kg CO2 eq.)	-0.066	0.649***	-0.379***	0.318*	-0.307***	-0.399***	0.018	-0.190
High (>50 kg CO2 eq.)	-0.449*	-0.474	-0.527**	0.719**	-1.526***	0.644*	-0.545***	0.676**
Price (PPP €)	-3.806***	2.961***	-2.767***	2.311***	-2.317***	1.88***	-3.170***	2.811***
Observations	5,952		7,008		9,472		12,352	
Log-likelihood	-1179.31		-1466.56		-1970.39		-2680.63	
BIC	2532.46		3110.22		4123.90		5549.68	

Note: *p<0.10, **p<0.05, ***p<0.01

To test whether the differences in estimates observed in Table 5 are statistically significant, we estimate a pooled sample G-MNL model which includes interaction terms for the study regions, while accounting for potential scale heterogeneity (Table 6). Dummy variables were included only for Czech Republic, Spain and Norway, meaning that β_{MAIN} is the baseline and englobes parameters reflecting preferences in the Belgian sample.

For all **material** attributes, the baseline parameters are positive and statistically significant, with the highest preference observed for solid wood side tables, followed by non–solid wood, and the lowest for metal side tables. For solid wood tables, the only statistically significant and negative interaction effect appears in the Norwegian sample. Respondents in this sample show a weaker positive preference for solid wood tables (relative to not purchasing a table) compared to the baseline. For non–solid wood side tables, the Czech Republic shows positive and statistically significant interaction effects, indicating that respondents in this country have stronger preferences for non–solid wood tables (relative to not buying) compared to the baseline. In contrast, Norway shows a significant negative interaction effect, suggesting lower preferences for non–solid wood tables compared to the baseline. A similar pattern appears for metal side tables. The only significant interaction is found for the Norwegian sample, where the negative coefficient indicates lower positive preferences for this type of side tables relative to the baseline.

Baseline preferences for the **production location** attribute are positive and statistically significant for both locally- and Europe-made side tables. Moreover, the only significant estimate is the interaction between Norway and Europe-made side tables, which is negative. This suggests that respondents in Norway show comparatively lower preferences for Europe-made side tables than the baseline scenario, while the remaining preferences for production location are similar across study areas.

For the **carbon footprint** attribute, the low carbon footprint attribute is positive and significant in the baseline scenario, indicating that respondents prefer a low carbon footprint compared to the footprint not been disclosed. The interaction for Spain is significantly positive, suggesting that respondents in this sample have stronger positive preferences for a low carbon footprint label compared to the baseline group. Furthermore, the high carbon footprint in negative and significant for the baseline scenario. The interaction between Norway and the high carbon footprint attribute is negative and significant, indicating that Norwegian respondents show a stronger aversion toward high carbon footprint tables compared to when the footprint is not disclosed.

As expected, negative preferences for **price** increases are indicated for the baseline scenario. Regarding price sensitivity, the Belgian and Spanish samples are most price sensitive, followed by the Czech Republic and Norway.

Table 6: G-MNL model estimates with interaction effect for Czech Republic (CZK), Norway (NOR), Spain (ESP), with main effects (MAIN) estimated for Belgium.

	β_{MAIN}	SD	β_{CZK}	β_{NOR}	β_{ESP}
Material [not buying]					
Solid wood (ASC dummy coded)	2.765***	1.056***	0.629**	0.286	-0.066
Solid wood (ASC effect coded)	3.378***	1.016***	0.288	-0.470**	0.016
Non-solid wood (ASC dummy coded)	2.049***	0.981***	0.745**	-0.174	0.203
Non-solid wood (ASC effect coded)	2.638***	0.989***	0.425*	-0.901***	0.306
Metal (ASC dummy coded)	1.681***	1.269***	-0.082	-0.500*	-0.095
Metal (ASC effect coded)	2.253***	1.229***	-0.349	-1.133***	0.062
Production location [not disclosed]					
Local	1.043***	0.209	-0.163	-0.128	0.046

Europe	0.640***	0.151	-0.172	-0.380**	-0.065
Outside Europe	0.066	-0.073	0.048	-0.225	0.065
Carbon footprint [not disclosed]					
Low (<20 kg CO2 eq.)	0.563***	-0.067	-0.170	0.057	0.314**
Medium (20-50 kg CO2 eq.)	0.025	0.053	-0.199	-0.305*	0.127
High (>50 kg CO2 eq.)	-0.366*	-0.167	0.087	-1.080***	0.080
Price (PPP €)	-0.029***	0.0128***	0.007***	0.006**	0.004
τ	0.660***				
Observations (N)	34784				
Log-likelihood	-8051.49				
BIC	16636.3				

Note: *p<0.10, **p<0.05, ***p<0.01

To assess the effect of the information treatment on preferences, we estimate a model for each country separately that includes an interaction effect between the attributes and whether respondents received the treatment (Table 7). Overall, the information treatment strengthened preferences for side-table attributes, particularly solid wood tables. Preferences for metal tables varied, decreasing in Norway but increased in Czech Republic and Spain, highlighting some heterogeneity in responses. Despite this differences, the ranking of material attribute across countries remained largely the same: preferences are consistently highest for solid wood tables, followed by non-solid wood tables, and then metal tables. For the production location attribute, effects of the information treatment were observed in Belgium and Spain, while effects on carbon footprint appeared only in Spain. Furthermore, the information treatment also increased sensitivity to price across all samples.

In the **Belgian sample**, the interaction between the information treatment and solid wood side tables is positive and significant, indicating that the information treatment increases the preferences for purchasing a solid-wood side table. The treatment also increased preferences for European-made tables while decreasing preferences for tables produced outside Europe, both in comparison to the production location not being disclosed. No significant effect was observed for carbon footprint.

In the **Czech Republic**, the information treatment positively and significantly increased preferences for all types of side tables, including solid wood, non-solid wood, and metal, relative to not purchasing. Although as in the rest of the study regions, the ranking stayed the same, meaning that preferences are consistently highest for solid wood tables, followed by non-solid wood tables, and then metal tables. The treatment did not significantly affect preferences for the production location or carbon footprint attributes.

In **Norway**, the treatment increased preferences for solid wood tables and decreased preferences for metal tables relative to not buying. Similar to Belgium and the Czech Republic, the treatment had no effect on production location or carbon footprint attributes.

In **Spain**, the information treatment led to positive and significant increases in preferences for all types of side tables. For this sample the material ranking also stayed the same. The treatment also increased preferences for local and European produced tables in comparison to the production location not been disclosed. Unlike the other samples, the Spanish sample showed a small but significant positive effect of the treatment on low carbon footprint tables.

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Table 7: MXL model estimated with an interaction effect for information treatment estimated in Belgium, Czech Republic, Norway and Spain.

	Belgium			Czech Republic			Norway			Spain		
	β	**SD**	**β_{info}**	**β**	**SD**	**β_{info}**	**β**	**SD**	**β_{info}**	**β**	**SD**	**β_{info}**
Material [not buying]												
Solid wood (ASC dummy coded)	2.651***	1.172***	2.106***	2.630***	1.894***	1.823***	2.847***	1.246***	0.790**	2.744***	1.188***	1.355***
Solid wood (ASC effect coded)	3.074***	1.193***	2.657***	3.603***	1.581***	1.706***	3.022***	1.139***	0.840**	3.270***	0.764***	1.267***
Non-solid wood (ASC dummy coded)	2.169***	0.734***	0.934**	2.497***	0.527***	1.277**	1.928***	0.251*	-0.144	2.167***	0.568***	1.046***
Non-solid wood (ASC effect coded)	2.871***	0.812***	0.485	3.114***	0.579***	0.781*	2.029***	0.257	-0.189	2.341***	1.282***	1.492***
Metal (ASC dummy coded)	0.871**	-2.159***	-0.503	1.267***	1.571***	1.163***	1.390***	1.499***	-0.484	1.786***	0.408***	0.446
Metal (ASC effect coded)	1.708***	2.463***	-0.862	1.643***	-1.572***	0.860**	1.449***	1.409***	-0.741**	2.173***	0.871***	0.707**
Production location [not disclosed]												
Local	1.160***	0.138	0.565	0.933***	-0.037	0.240	0.960***	-0.300**	0.280	0.930***	-0.045	0.759***
Europe	0.674***	-0.192	0.612**	0.527***	-0.279*	0.099	0.245**	-0.080	0.026	0.496***	0.143	0.505**
Outside Europe	0.294*	0.107	-0.584*	0.263*	-0.008	-0.097	0.052	0.112	-0.057	0.120	-0.133	0.288
Carbon footprint [not disclosed]												
Low (<20 kg CO2 eq.)	0.593***	-0.176	0.052	0.274*	0.647***	0.133	0.517***	-0.381**	0.272	0.806***	0.127	0.370*
Medium (20-50 kg CO2 eq.)	0.028	0.102	-0.230	-0.445***	-0.170	0.186	-0.230**	-0.098	-0.041	0.010	-0.020	0.153
High (>50 kg CO2 eq.)	-0.367	-0.365	-0.926	-0.718**	0.432	0.155	-1.346***	0.169	0.117	-0.575***	-1.067***	-0.027
Price (PPP €)	-2.765***	1.873***	-1.640***	-2.115***	-0.690**	-1.104***	-1.765***	1.453***	-0.681**	-2.491***	1.847***	-1.413***
Observations (N)	5952			7,008			9,472			12,352		
Log-likelihood	-1216.97			-1492.90			-2053.02			-2697.65		
BIC	2781.60			3340.007			4472.27			5772.15		

Note: *p<0.100, **p<0.050, ***p<0.010

DCE models typically assume that respondents evaluate all the attributes presented when making their choices. However, evidence from recent studies shows that some respondents may focus only on a subset of attributes in a given choice task. This behaviour, called attribute non-attendance (AN-A), can introduce bias into the estimated preferences in DCEs (Nguyen et al., 2015). Table 8 presents the results of self-reported AN-A behaviour, showing the percentage of respondents who stated they had ignored an attribute for the four different countries. Overall, the AN-A results show that carbon footprint was one of the most frequently ignored attributes, especially in the Czech Republic and Norway, where more than one-third of respondents did not consider it when making their choices. Although carbon footprint is the most ignored attribute in Spain, relative to other countries, fewer respondents ignored this attribute. Similarly, the production location was less ignored in Belgium and Spain. As expected, price was one of the least ignored attribute across all four study regions, with similar levels of non-attendance ranging from 7.25% among Spanish respondents to 9.65% among Belgian respondents.

In the Belgian sample, the most ignored attribute is the material (22.81%) followed by carbon footprint and production location. For both Czech Republic and Norway, the most ignored attribute was the carbon footprint (35.62% and 33.52%, respectively), followed by production location, price and then material. For Spain, the most ignored attribute was also the carbon footprint (19.2%), followed by production location, material and price. Despite their relevance, these self-reported AN-A patterns should be interpreted with caution. Self-reported AN-A information is often biased as respondents' stated processing strategies do not necessarily correspond to the strategies they actually use when completing the choice tasks (Espinosa-Goded et al., 2021; Hole et al., 2013). Actually, Hess and Hensher (2013) argue that when respondents state they ignore a particular attribute, they are not necessarily disregarding it entirely but rather assigning it lower importance. Thus, a higher likelihood of reporting that an attribute is ignored corresponds to a lower perceived importance of that attribute.

Table 8: Percentage of respondents that ignored an attribute (%)

Attributes	Belgium	Czech Republic	Norway	Spain
Material	22.81	6.16	6.70	10.14
Production Location	17.57	30.14	22.35	15.94
Carbon Footprint	18.42	35.62	33.52	19.20
Price	9.65	8.90	7.26	7.25

Demand for long-lived wood products: Willingness-to-Pay

Figure 5 plots the WTP estimates for the different attributes per country based on the estimates from the MXL model estimated in WTP-space. The full output of this model can be found in Table 27 (Appendix G: Additional econometric estimation). Error bars represent the 95% confidence intervals, and the Poe-test was used to test for significant differences in WTP between the countries. Results of the Poe-test are reported in boxes on the figure and the p-values can be found in Table 29 (Appendix G: Additional econometric estimation)[1].

Across all samples, the highest WTP was estimated for solid-wood **material** . Specifically Czech respondents were willing to pay the most for a side table made out of solid wood material (€155), followed by Norwegian respondents (€121), Spanish respondents (€104) and Belgian respondents (€92). WTP estimates across all samples are statistically different from each other, except for between Belgium and Spain. Non-solid wood tables are also positively valued but to a lesser degree than solid-wood tables. Czech Republic respondents

[1] The Poe test uses asymmetrical confidence bounds to calculate significant differences, whereas the MXL model estimated in WTP-space uses symmetrical bounds to calculate 95% confidence intervals. This results in a discrepancy between the significant differences in WTP found between countries using the Poe-test and the 95% confidence intervals shown in Figure 5.

were the willing to pay the most for non-solid wood tables (€95), followed by Spanish respondents (€77), Belgian respondents (€68) and Norwegian (€61). Worth noticing that the Czech Republic has significantly higher WTP for this attribute than respondents in all other countries. Metal side-tables also show positive WTP estimates, although lower than those for wooden alternatives. This indicates that while metal tables are accepted, solid wood and non-solid wood consistently holds higher perceived value. The respondents with the lowest WTP for metal side tables were in Norway (€22) and Belgium (€21), which are both significantly lower than the WTP of respondents in the Czech Republic (€55) and Spain (€51).

Regarding the **production location** attribute, respondents in all four countries are willing to pay more for tables made locally or within Europe. If locally produced, these premiums were higher for Norwegian respondents (€48) and Czech Republic respondents (€46), followed by Spanish respondents (€39) and Belgian respondents (€33). Despite these differences, the estimated WTP values for the locally produced attribute do not significantly differ across countries. If produced in Europe, Czech Republic respondents were willing to pay the most for this attribute (€20), followed by Belgian respondents (€19) and Spanish respondents (€13), all of which are statistically different from the premium Norwegian respondents are willing to pay for an Europe-made side table (€11). In contrast, across all samples respondents were generally willing to pay little to nothing for products produced outside Europe, suggesting that such products are valued substantially less by consumers.

For the **carbon footprint** attribute, we find that WTP differs depending on the carbon footprint intensity. A low carbon footprint is associated with a positive WTP in all countries. Particularly, Spanish (€38) and Norwegian (€27) respondents were willing to pay significantly more for low carbon footprint than Belgian (€18) and Czech Republic (€14) respondents. Medium carbon footprints result in values around zero, indicating relative indifference. In contrast, high carbon footprint products are consistently associated with strongly negative WTP estimates across all samples. This negative valuation is especially pronounced for Norwegian respondents (€-76), which has statistically higher than for Czech Republic (€-27), Belgian (€-15) and Spanish (€-6) respondents.

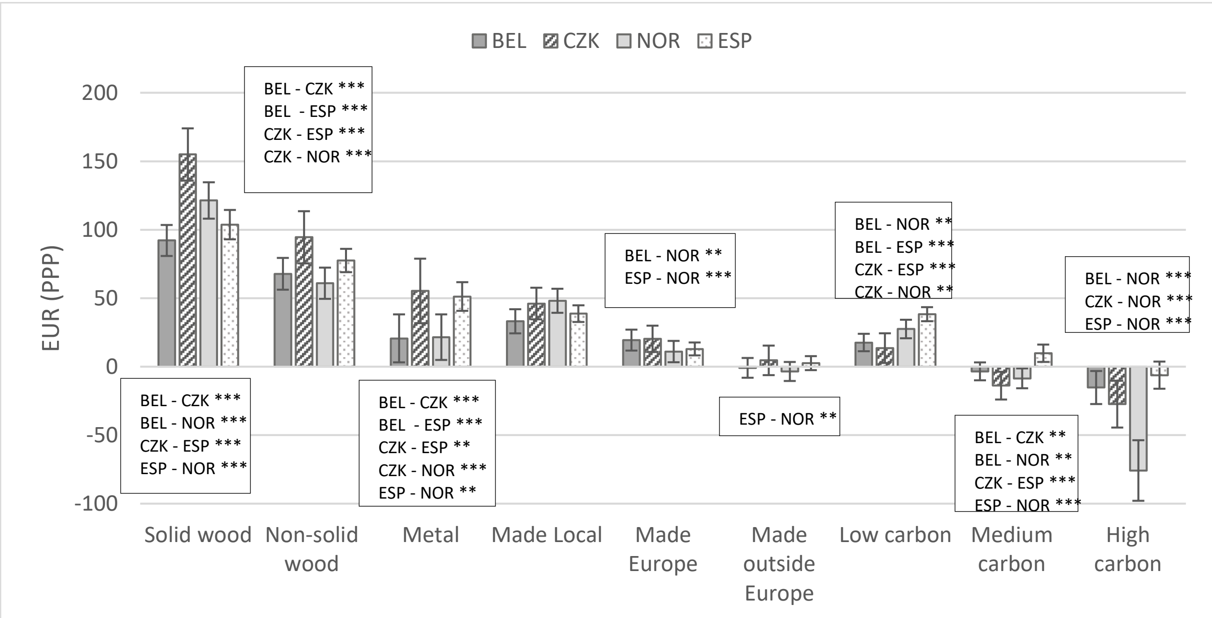

Figure 5: Willingness-to-Pay for the MXL for Belgium (BEL), Czech Republic (CZK), Norway (NOR) and Spain (ESP).[2]

[2] Note: Prices across countries were adjusted using Purchasing Power Parities (PPP) in 2024 with EU27 2020 as the reference (EU27_2020 = 1) (Eurostat, 2020), specifically applying the conversion factor for household furnishings, equipment, and maintenance.

Discussion

Assessing consumers preferences and demand for long lived wood products, particularly side-tables, revealed both similitudes and differences across the four study regions. Overall, respondents consistently ranked solid wood highest, followed by non-solid wood and metal tables, with positive and significant preferences for all materials. These results align with other studies showing that solid wood is generally preferred in European countries (Croatia and Slovakia) (Kaputa et al., 2018) and in the US and China (Cai and Aguilar, 2013). WTP followed the same ordering, with respondents generally willing to pay more for solid wood, then non-solid wood, and least for metal, although some heterogeneity between study regions exists. Interestingly, despite scoring lower on certification statements and eco-friendly behaviours, respondents in Norway and Czech Republic had the highest WTP for solid-wood tables. This suggests that, **even among consumers less engaged with certifications, the solid-wood side tables remain highly valued and preferred**. However, it is important to remain cautious when interpreting the WTP, especially for the solid-wood attribute. Wooden furniture is often perceived as high quality and expensive (Hakala et al., 2015; Valtonen, 2008), which may inflate WTP due to price–quality heuristics (i.e., assuming that higher-quality materials should be more expensive).

When comparing these results to each country's forest context, Czech Republic, Norway, and Spain have both large forest areas and strong timber industries. These countries also showed lower rates of ignoring the material attribute, whereas Belgium, who has the lowest industrial roundwood production, had the highest self-reported ignoring rates. While this pattern suggests that **respondents in more forested or wood-oriented economies may pay closer attention to material attributes**, it does not imply that respondents in these economies prefer wooden side-tables. For instance, Norwegian respondents had consistently lower preferences for solid-wood and non-solid wood side tables in comparison to the opt-out alternative.

Disclosing the production location to consumers can significantly shape consumers preferences (Cai and Aguilar, 2013; Verlegh et al., 2005; Verlegh and Steenkamp, 1999). Despite differences in the size and capacity of the furniture industry across the study regions (Appendix A: Study region description), all four countries showed a consistent pattern: respondents preferred locally produced side tables over products with no production information. They also expressed positive and significant preferences for Europe-produced side tables relative to the undisclosed alternative. In terms of willingness to pay, respondents across all regions were willing to pay premiums for locally produced side tables, followed by Europe-produced ones. Both preferences and WTP across study regions reflect well-documented consumer tendencies to favour domestic or locally produced goods (Aguilar and Cai, 2010; Schnettler et al., 2008). Conversely, none of the study regions were willing to pay a premium for furniture produced outside Europe compared to products with undisclosed origins.

Additionally, respondents in Spain and the Czech Republic showed positive preferences for side tables produced outside Europe compared to products with undisclosed production location. This suggests that, for these two study regions, having any production location information is preferable to having none, indicating a general demand for greater transparency. However, this does not translate into higher WTP, as respondents in these countries were not willing to pay more than those in the other study regions for this attribute.

Respondents consistently favoured side-tables with low carbon footprint, with a particularly higher preference for the Spanish respondents. Conversely, respondents also showed a clear aversion towards side-tables with a high carbon footprint, with Norwegian respondents displaying significantly strongest aversion. Willingness to pay mirrored these patterns: Spanish and Norwegian respondents had higher WTP for low-carbon tables, while Norwegians applied the largest discounts to high-carbon options. This illustrates that although Spanish respondents value the low-carbon attribute, they do not strongly penalize high-carbon footprints. Overall, all regions favour low and disfavour high carbon footprints, but the intensity of preference or aversion varies, with Norwegian and Spanish respondents showing the greatest sensitivity.

The information treatment strengthened preferences for solid wood tables in all four study regions and increased preferences for non-solid wood side-tables in Czech Republic and Spain. Preferences for metal tables varied, decreasing in Norway but increased in Czech Republic and Spain. Despite these differences, the ranking of material attribute across countries remained the same as before the treatment. These findings are of significant relevance, as if the aim is to encourage the consumption of long-lived wood furniture over other materials, informing consumers about the potential for long-lived wood products to store carbon for a prolonged period of time appears to be a relevant tool, as documented by Høibø et al. (2015).

For the production location attribute, the information treatment had noticeable effects in Belgium and Spain: in both countries, preferences for side-tables produced in Europe increased, while in Belgium, aversion toward tables produced outside Europe also intensified. Regarding the carbon footprint attribute, the treatment effect was observed only in Spain, where preferences for low-carbon-footprint disclosure increased. Interestingly, the AN-A results show that carbon footprint was one of the most frequently ignored attributes, especially in the Czech Republic and Norway, where more than one-third of respondents did not consider it when making their choices. This may explain why the information treatment did not significantly influence carbon footprint preferences in those countries. Similarly, the production location was less ignored in Belgium and Spain, which are the samples where the treatment effect had an impact on preferences.

The information treatment primarily influenced preferences for material attributes across all study regions and generated significant effects for production location and carbon footprint only in Spain and Belgium. The treatment was brief and generic to reflect real market conditions, where product information is limited and consumer attention is short. These results suggest that, while concise messaging may not shift preferences for intangible attributes (production location and carbon footprint), it meaningfully increased preferences for wooden side-tables.

While focused on side-tables, our findings hold significant implications for the production-oriented policy frameworks, such as the EU Bioeconomy Strategy and the Circular Economy Act, that encourage greater substitution of fossil-based materials with renewable resources such as timber. Strong acceptance of solid-wood side-tables across regions indicates potential for scaling up long-lived wood furniture, particularly for climate-smart, forest-based pathways that rely on market uptake. Moreover, the clear consumer preference for locally or European-produced long-lived wood products reinforces ongoing initiatives to strengthen EU-based manufacturing. Lastly, even brief, low-intensity information treatments can enhance preferences for solid-wood products, suggesting that relatively simple communication efforts may be useful to help boost demand for long lived wood products. Nevertheless, since the focus of this research was specifically on side-tables, caution is needed when extrapolating the findings to other types of wooden furniture.

Conclusion

This deliverable had as objective to assess societal preferences and demand for forest-related goods and services in Belgium (Flanders), Czech Republic, Norway and Spain through two complementary discrete choice experiments (DCEs), focusing on 1) citizen preferences for forest ecosystem services (FES) and forest management strategies, and 2) consumer preferences for long-lived wood products and their characteristics. Together, the results from these DCEs provide a comprehensive perspective on the demand-side dynamics shaping Europe's forest sector and offer empirical insights into how forests can contribute to climate change mitigation, biodiversity conservation, and circular bioeconomy objectives.

Across both DCEs, a consistent finding is the strong societal demand for sustainable and multifunctional forest use. In the DCE on FES (Part A), citizens across all four study regions clearly prefer forests delivering a balanced mix of provisioning and regulating and maintaining FES, while preferences for cultural FES are more variable and context-dependent. Preference patterns suggest that multifunctional forest management offers an effective framework for accommodating diverse societal expectations. Similarly, the long-lived wood product DCE (Part B), revealed strong consumer acceptance of solid wood products, with higher willingness to pay (WTP) for wooden side-tables compared to non-wood alternatives. Preferences for locally and regionally produced products, alongside sensitivity to carbon footprint information, further indicate that consumers recognize and value the environmental characteristics of wood-based products. These findings point to a clear potential for scaling up the role of long-lived wood products within a circular bioeconomy, given that such an extension aligns with sustainable forest management practices.

Another common outcome across the two DCEs is the demonstrated effect of information in shaping preferences and moderating attitudes. In the FES study, information reduced the extreme positions and increased acceptance of active and multifunctional management strategies, while in the long-lived wood product study it enhanced preferences for solid wood products. Although the magnitude of these effects varied across regions and attributes, the results highlight that even minimal information can contribute to behavioural shifts. This underscores the importance of targeted communication strategies in supporting policy implementations and enhancing public acceptability of multiple policy frameworks.

The findings presented in this deliverable also demonstrate significant regional variation in both preferences and WTP, shaped by ecological conditions, legal frameworks, and socio-demographic characteristics. This context-dependence highlight the limitations of uniform, one-size-fits-all approaches to forest governance at an EU-level. While societal preferences strongly support the EU's Forest Strategy for 2030 and the Biodiversity Strategy emphasis on multifunctionality and resilience, they also expose a potential tension with production-oriented policy frameworks such as the Circular Economy Act. Taken together our findings suggest that multifunctional forest management should remain the backbone of EU forest governance as it aligns most closely with societal expectations and delivers high social value. However, where intensification is required to support circular bioeconomy objectives it should be strategically targeted and regionally adapted.

In conclusion, the combined evidence from both DCEs demonstrates that integrating societal preferences into forest governance may help design effective, coherent, and socially acceptable management frameworks. Multifunctionality emerges as a unifying strategy able to reconcile biodiversity conservation, climate change resilience, and sustainable production objectives. By embracing regionally differentiated strategies informed by citizen and consumer preferences, policymakers can better balance Europe's environmental objectives with the practical realities of market dynamics to strengthen the long-term sustainability of Europe's forestry sector.

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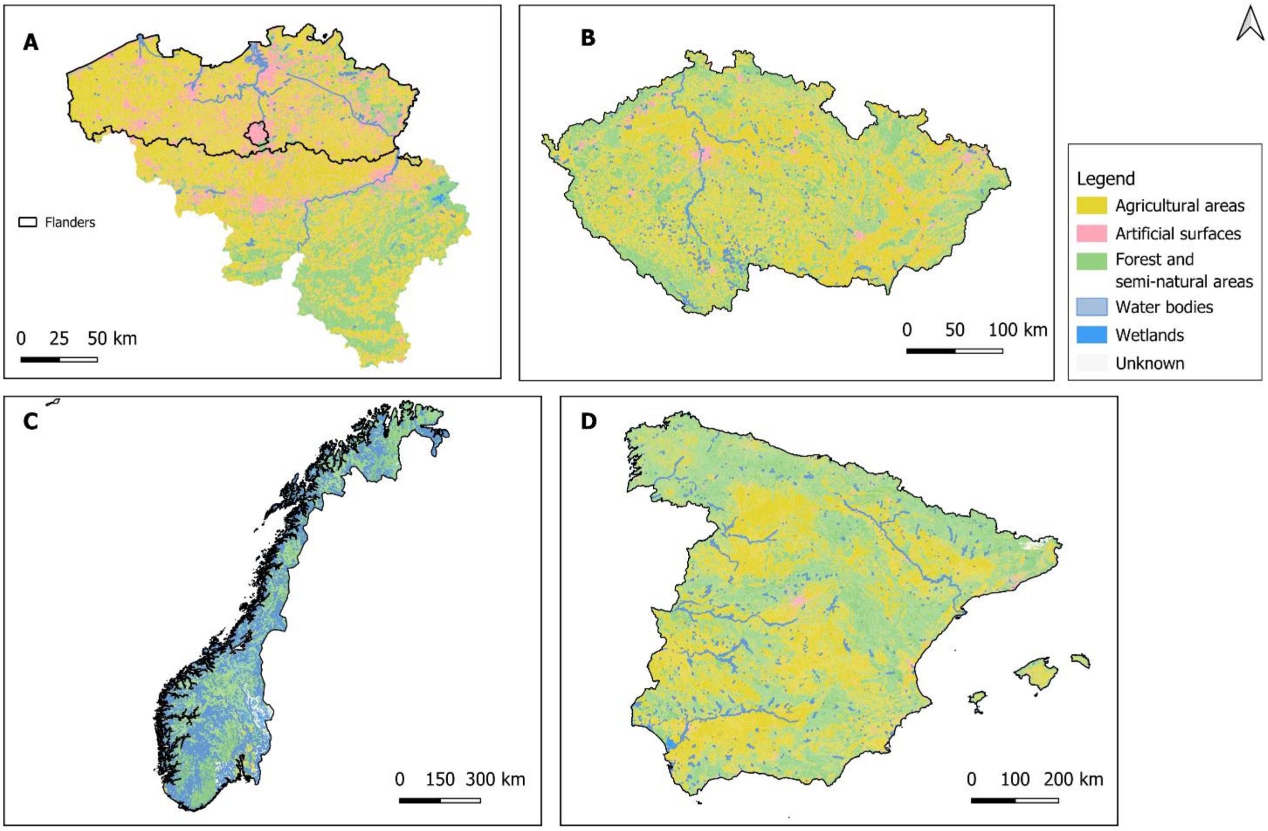
Appendix A: Study region description

This section provides a detailed description of the four study regions. Each sub-section describes the regions land-use and land-cover patterns (Figure 6), forest types and composition, forest ownership structures, hazard exposure, FES, the regions' socio-cultural contexts, legislative frameworks, population size and density, among other relevant features.



Source: Data from (European Environment Agency, 2019)

Figure 6: Overview of land uses in the study regions A) Belgium (Flanders), B) Czech Republic, C) Norway and D) Spain

Belgium (Flanders)

Located in northern Belgium, Flanders covers an area of 13 521 km^2 and has a population of about 6.86 million inhabitants, accounting for 58% of Belgium's population. Although Belgium has a population density of 385 inhabitants per km^2, the Flemish Region registers a 504 inhabitants/km^2 population density. This is almost five times higher of the average population density in the EU, which is 109 persons per km^2 in 2022 (Eurostat, 2024; Statbel, 2024).

Flanders experiences an oceanic climate with a mean annual air temperature of 10.28°C and mean annual precipitation of 790 mm for the period 1901 - 2024 (Moereels et al., 2024; WorldBank, n.d.). Data from the Royal Meteorological Institute reports that temperatures in Belgium have increased by more than 2°C over the last 150 years (Adapt2Climate, n.d.). Many temperature records have been broken in recent years in Flanders: 2014, 2018, 2020, 2022, 2023 and 2024 were the hottest on record (WorldBank, n.d.). With regard to precipitation, historical data suggests a slight upward trend in the quantity of precipitation, despite strong year-to-year variability. This increase is unevenly distributed, with wetter winters and drier summers, reflecting a more pronounced seasonal pattern (Adapt2Climate, n.d.). Notably heavy rainfall events are becoming more frequent (Adapt2Climate, n.d.), causing flood events such as the massive flood in July 2021 in Wallonia.

At the national level, agricultural land covers approximately 44% of the country's surface, 29.2% is classified as built-up land and 23% are forests (FBW, 2024; Statbel, 2025). With nearly 700,000 ha of forests, the distribution of forest cover is highly uneven: 79.64% is located in Wallonia, 20.05% in the Flemish Region, and 0.32% in the Brussels-Capital Region (FBW, 2024). According to the most recent forest inventory (2014–2023), the Flemish region contains 152 600 ha of forests, representing 11.2% of the region's total land surface. This is an increase of around 2 600 ha compared to the previous inventory (2009–2018) (Govaere and Leyman, 2024).

Flemish forests tend to be small and highly fragmented in terms of both space and ownership (Hermy et al., 2008; Verdonck et al., 2025). Over 70% of Flemish forest patches are smaller than 5 ha (Schneiders et al., 2020), and the majority is privately owned (54%) (Govaere and Leyman, 2024), and often comprises parcels smaller than 1 ha (De Borsgroepen, 2020). As a result, forest patches are interwoven throughout the landscape, with a significant proportion (28%) located within 20 meters of other land uses (Govaere and Leyman, 2024). Additionally, forest cover is unevenly distributed across Flanders (Hermy et al., 2008), with the largest shares found in Antwerp (31.92%) and Limburg (31.81%), followed by Flemish Brabant (18.33%), East Flanders (12.24%), and West Flanders (5.70%) (Govaere and Leyman, 2024).

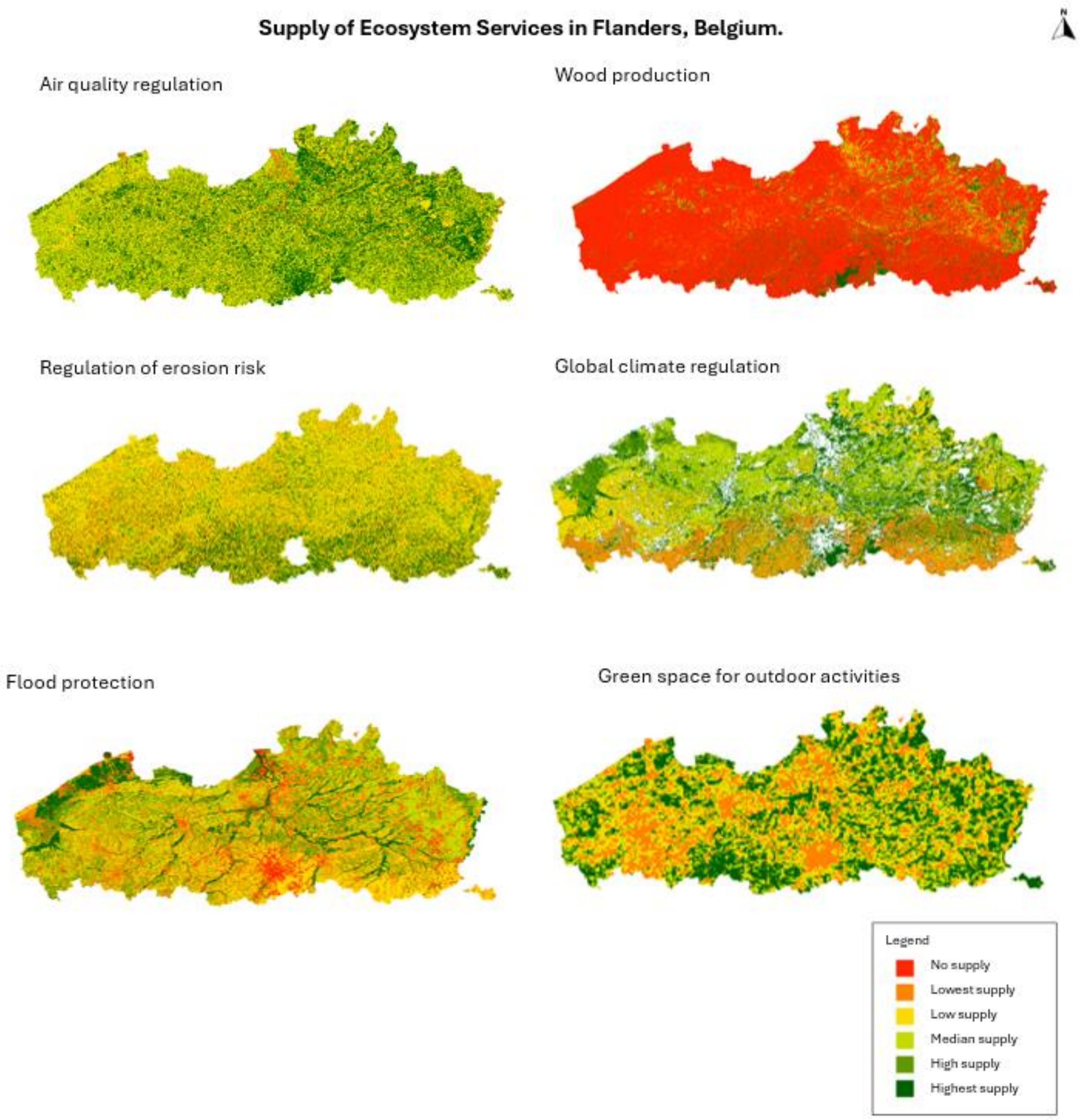
Regarding tree composition, the tree species that have the largest of the ground surface in Flanders are Scots pine (24.2%), followed by Native oak (17.3%), Poplar (9.7%), and Corsican pine (8.5%). Since the first inventory in the 1997-1999 period, the proportion of Scots pines and Poplar has decreased by 5.3 and 6.9 points respectively, and the proportion of Native oak has increased by 5.5 points (Govaere and Leyman, 2024). In addition, comparisons between the 1997-1999 and 2009-2018 inventory periods show a gradual transition from monoculture coniferous and non-native forest stands toward more mixed and species-rich deciduous stands (Verdonck et al., 2025).

Belgian forests have seen a steady increase in their regulating ecosystem services, particularly in carbon sequestration. The average carbon stock in living biomass (above and below ground) is currently estimated at 97 tons per ha of forest, representing an increased from the 73-76 tons per ha estimated in the 1997-1999 inventory. This rise reflects an overall increase in standing biomass, largely because annual forest growth has consistently exceeded timber harvests over the past decades (Govaere and Leyman, 2024).

Urbanisation pressures, especially pronounced in densely populated regions such as Flanders, pose a significant threat to the remaining natural and semi-natural habitats (Hermy et al., 2008) and, consequently, to the forest-related ecosystem services they provide. To assess ecosystem service supply under these conditions, the Research Institute for Nature and Forest (INBO) has developed synthesis maps for 16 ecosystem services. Figure 7 presents five services most relevant to this study: air quality regulation, wood production, erosion regulation, climate regulation, and green space for outdoor recreation. Overall, these maps highlight a very limited supply of wood production in Flanders, as well as a low provision of erosion regulation. Air quality regulation services levels from low to high seem stable across the region. Then, climate regulation services appear unevenly distributed, with the southern part of Flanders showing the lowest supply and the northern part displaying medium to high levels. Flood protection also appears to be unevenly distributed, with urban areas having the lowest levels. With regard to green spaces, the high degree of fragmentation becomes particularly apparent, with some areas showing very low supply and others exhibiting some of the highest levels. Compounding these limitations, Flanders has only 0.02 hectares of forest per inhabitant, underscoring the scarcity of accessible green spaces in the region.

Regarding wood production, the total roundwood that is removed from Belgian forests in 2020 is 5 351 thousand m^3, from which 76.9% is for industrial purposes, whereas 23.1% is for energy application. Industrial roundwood represents then the largest share, with 4 114 thousand m^3, of which 2 600 thousand m^3 consisted of sawlogs and veneer logs (Eurostat, 2025). When it comes to the demand for timber in construction, the national trend appears to be stagnating. In 2022, wooden housing accounted for 6.75% of new residential buildings, a share that has remained stable in recent years. This stagnation may be linked to factors such as the impact of the pandemic and rising energy prices during the 2011 - 2022 period (Hout Info Bois, 2023).

Finally, since Belgium accounts for less than 2% of total furniture production in the EU in 2023 (MINETUR, 2025), its furniture market is highly dependent on European suppliers. This reliance is reflected in the fact that 60% of Belgium's furniture consumption is imported from intra-EU countries, and the country ranked as the 9th largest furniture importer worldwide in 2012 (Renda et al., 2014)



Source: (Research Institute for Nature and Forest, 2014)

Figure 7: Forest-related Ecosystem Services in Flanders, Belgium.

Czech Republic

Located in central Europe and with a total coverage of 78 866 km^2 , the Czech Republic has a population of 10.91 million people. The most populated regions are the Central Bohemian Region, Prague, South Moravian Region and Moravian-Silesian Region. This distribution results in a population density of 138 inhabitants per km^2 , slightly above to the EU average (CZSO, 2025; Eurostat, 2024).

The average annual temperature in the Czech Republic is 8.5 °C in the 1991–2020 period and the annual precipitations for the same period averages 676 mm (WorldBank, n.d.). With 2023 being the warmest year since 1961, the annual temperature has been rising at a rate of 0.35 °C per decade, nearly twice the global average. This contributes to climate impacts such as droughts, fire hazards, torrential rainfall, and more extreme hydrometeorological events (Mertl et al., 2023). For example, Storm Boris in 2024 brought record rainfall to the region, with five times the average September rainfall falling in just four days. This caused over 200 rivers to overflow, resulting in severe damage and casualties (Copernicus, 2024; IFRC, 2024).

The landscape of the Czech Republic is dominated by agricultural land (53.2%), followed by forest land (34%), water surface (2.2%) and built-up area and courtyards (1.7%) (CZSO, 2024). Forests particularly cover approximately 2.6 million ha, and this share has slightly increased over the last years (2 000 ha per year) (MZE, 2019). About 14% of these forests are located in the South Bohemian region, followed by 11% in both the Prague & Central Bohemian Region and Plzeň (Pilsen) region. The remaining regions each contain between 5% and 7.8% of the country's total forest area (CZSO, 2024b).

Forest ownership in the Czech Republic is divided among several actors, with the state holding the largest share (54%). Among the state owned forests, 1 159 thousand ha are managed by S.P. Forests of the Czech Republic, 123 thousand ha managed by S.P. Military forests and estates of the Czech Republic and 95 thousand ha are managed by the National Park Administration. Municipalities and forest cooperatives collectively own 18% of forests, while private owners hold 29% (MZE, n.d.; Palátová et al., 2023).

Czech forests are largely composed of coniferous trees, which make up 71.5% of the total, predominantly Norway spruce (50.0%) and Scotch pine (16.2%), while broadleaved species account for 27.3%. In contrast, the reconstructed natural tree species composition is markedly different with 34.7% of conifers (11% of Norway spruce) and 65.3% of broadleaves, highlighting the public will to bring the tree species composition closer to a natural one (MZE, 2019).

When it comes to the provision of raw materials, the total roundwood that was removed from Czech forests in 2024 is 17 807 thousand m^3, from which 81.8% is for industrial purposes and 18.2% is for energy application. Industrial roundwood represents then the largest share, with 14 558 thousand m^3, of which 2 600 consisted of sawlogs and veneer logs, 4 948 consisted of pulpwood and 108 on other industrial roundwood (Eurostat, 2025). Furthermore, despite the slowdown of the construction industry in 2024 due to several reasons (high interest rates, expensive mortgages, inflation, and rising prices for materials and energy), 13.6% of new timber structures were timber buildings, compared to 14.6% in 2023, proving that timber buildings remain a popular building method (Czech Green Building Council, 2024).

Between 2017 and 2020, total salvage felling in the Czech Republic increased sharply, peaking in 2020 at approximately 64.8 million m^3, more than three times the 2017 level (CZSO, 2024c). This record-high sanitary logging was due to the drought-induced bark-beetle infestation in the period 2017-2019 (Cienciala and Melichar, 2024; Dudík et al., 2021; Palátová et al., 2023). After 2020, the trend shows a steady decline, with total salvage felling dropping to 14.3 million m^3 in 2024 (CZSO, 2024c). These developments have had widespread consequences for carbon sequestration in the forestry sector. Historically, Czech forests acted as a long-term carbon sink, offsetting roughly 6% of the country's greenhouse gas emissions since 1990. However, in recent years (2018–2021), the sector became a significant source of CO_2 emissions, contributing nearly 10% of the country's total GHG emissions in 2020 (Cienciala and Melichar, 2024; Czech Hydrometeorological Institute and MZE, 2023)

With 0.24 ha of forests per inhabitant, Czech forests offer a series of recreational ecosystem services. For instance, they are commonly used to collect forest products, particularly mushrooms and berries (Riedl et al., 2020; Sisak et al., 2016). According to the Czech Forest Act, the free collection of non-wood forest product is allowed on 92% of the forest areas. The most commonly harvested forest fruits in the Czech Republic are include mushrooms, bilberries, cowberries, raspberries and blackberries, and the popularity of their collection is considerable (Riedl et al., 2020; Šišák, 2006). Furthermore, Riedl et al. (2020) reports that collecting forest berries is not only an important recreational activity, but it has an important economic value as the average annual value is estimated to be worth more than EUR 86 million at 2018 prices. Moreover; the value of forests as recreation ecosystem services became especially evident during the COVID-19 pandemic in 2019–2020, as Jarský et al. (2022) reported a significant increase in the number of people visiting forests and collecting forest fruits amid strict restrictions.

Lastly, Czech Republic accounts for less than 2% of total furniture production in the EU in 2023 (MINETUR, 2025). Nevertheless, in 2012, domestic production supplied 59% of national consumption, while 35% of furniture was imported from other EU countries (Renda et al., 2014)

Norway

Located on the Scandinavian Peninsula in northern Europe, Norway has a mainland area of 323 808 km^2. With 5.5 million in-habitants and an average of 17 persons per km^2 (SSB, 2025), it is one of the most sparsely populated countries in Europe (Helseth et al., 2022). Notably, 83.35% of the population lives in urban settlements, with the five largest being Oslo, Bergen, Stavanger/Sandness, Trondheim and Drammen (SSB, 2025).

Norway's landscape changes sharply over short distances, creating strong topographical contrasts and various climate settings. Average annual temperatures vary from −2°C in northern regions and the high mountains, to 8°C in southern and western parts of the country. The average yearly temperature across all regions is 1.52°C in the period 1901-2024 with an all-time high in 2020 of 3.45°C. Mean annual precipitation for the same period is estimated to be 1038 mm, although annual precipitation also differs between regions, ranging from 300 to 3500 mm (Beylich, 2021; Hanssen-Bauer et al., 2017; Machado Nunes Romeiro et al., 2024; WorldBank, n.d.). With a temperature increase of 1.4 °C from 1901 to 2024 (Dyrrdal et al., 2025), Norway has recently suffered unexpected periods of drought and high temperatures (i.e. 2011, 2014, 2020 and 2024), causing an increase in the probability of wildfire occurrence (Rafaqat et al., 2025). Moreover, precipitation has increased by about 21% from 1901 to 2024 and on average, it is expected to rise by 11% by the end of the century if emissions continue to rise. Rain floods such as the Hans storm in 2023, which brought heavy rain and flooding in major river systems in Eastern Norway, are also expected to become more frequent (Dyrrdal et al., 2025).

Norwegian forests cover approximately 12.07 million ha (SSB, 2025b), accounting for about 38% of the country's land area (LMD, 2014). In the south, forests are mainly deciduous, while coniferous woodlands dominate farther north and inland. At higher elevations, where trees can no longer grow, the terrain is characterized by alpine vegetation (Machado Nunes Romeiro et al., 2024). Thus, the majority of forest biomass is located in the south-eastern part of the country (Helseth et al., 2022). Around 71% of this area is considered as productive forest[3], while the remaining 29% is considered economically unproductive (Helseth et al., 2022; SSB, 2025b). The regions with the largest share of Norway's total forest area were Innlandet (21.9%), Troms

[3] Defined as timber growth rate exceeding 1 m3/ha/year (Helseth et al., 2022)

and Finnmark (14.9%), Trøndelag (13.9%) and Rogaland, Vestland and Møre og Romsdal (13.11%), whereas the remaining regions each account for between 7 % and 11% (SSB, 2025b).

Norway has the highest share of privately owned productive forest land in Europe, accounting for about 84% of the total. The majority of this area (76%) is owned by individual landowners, while co-owners and private companies hold an additional 7.5%.The National Forestry Commission (*Statskog*) is the largest single forest owner, although its holdings represent only about 6% of the country's productive forest area. The remaining forests are owned by municipalities and by common property structures known as almenninger (Gundersen et al., 2022). In 2023, there were 125,449 forest holdings larger than 2.5 hectares of productive forest land: 11% of these covered less than 25 hectares, 41.5% between 25 ha and 200 ha, 26.9% between 200 ha and 2000 ha and 20.6% more than 2000 ha (SSB, 2024).

Since the mid-20th century, forest management has primarily focused on monospecific stands (Kuehne et al., 2025). The country's forests are largely dominated by coniferous species, particularly Norway spruce and Scots pine. Spruce is typically cultivated on the most productive sites, while pine is favoured on less productive areas (Gundersen et al., 2022; Kuehne et al., 2025). In terms of overall composition, Norwegian forests consist of approximately 29.6% Scots pine, 27.3% Norway spruce, and around 40% birch and other boreal deciduous species (Helseth et al., 2022).

Norwegian forests play a key role in regulating and maintenance ecosystem services, particularly carbon sequestration. In 2023, the Land Use, Land-Use Change and Forestry (LULUCF) sector removed 15.1 million tonnes of CO_2 equivalents, offsetting about 32% of the country's total emissions. However, the carbon sequestration capacity of Norwegian forests is declining due to forest maturation and rising natural mortality rates are. This decline that is expected to continue in the coming years (Norwegian Environment Agency et al., 2025).

Despite the decline in the relative importance of forestry over recent decades, as evidenced by a decrease in its contribution to the Norwegian GDP from 2.5% in 1950 to 0.2% in 2020, the rise of timber prices over the last decades has been accompanied by an increase of timber harvest (Helseth et al., 2022). In 2024, the total roundwood that is removed from Norwegian forests is 14 448 thousand m3, from which 83.3% is for industrial purposes and 16.7% for energy application. Industrial roundwood represents then the largest share, with 12 030 thousand m^3, of which 6 906 consisted of sawlogs and veneer logs, 5 079 consisted of pulpwood and 44 on other industrial roundwood (Eurostat, 2025). Thus, the sector includes primary wood processing, and the production of engineered wood materials, most of which are used in construction (Skatvedt et al., 2025). Furthermore, although forest is the largest source of bioenergy production in Norway (LMD, 2025), (Trømborg et al., 2007) find that despite its potential, bioenergy in Norway makes up a lower share of total energy production compared to Finland or Sweden mainly due to low energy prices.

When it comes to societal demand for wood products, (Høibø et al., 2015) reports that, in Oslo, the best target for wood urban housing are younger people who have stronger environmental values as this group differs from the traditional preferences of the population. Furthermore, when assessing customers' preferences for wooden furniture in a Norwegian Ikea, (Veisten, 2007) finds that price and wood species mattered more for purchasing decisions than the environmental friendliness of the product. This research reports a significant preference for pine in wooden furniture.

With 2.27 ha of forest per inhabitant (FISE), 2015), Norwegian forests provide a wide range of cultural ecosystem services including outdoor recreation, tourism, foraging for berries, mushrooms and plants, and hunting ((Helseth et al., 2022; Norwegian Environment Agency, 2025). Although the rights for extracting raw materials belong to the owner, the Norwegian Outdoor Recreation Act (Act of 28 June 1957 No.16) safeguards the public right of access and passage through uncultivated land, as well as the time to spend time there. This principle of common access, also known as the "right to roam", also grants permission for picking wild berries, mushrooms, and plants in forests (Helseth et al., 2022; Ministry of Climate and Environment, 1957).

While improved accessibility has increased the potential for recreational use, certain activities are being negatively affected by deforestation near settlements and climate change (i.e. skiing) (Helseth et al., 2022). Furthermore, with roughly 90% of harvesting fully mechanized (Norwegian Environment Agency et al., 2025), the shift towards a service-based economy and mechanization has weakened local communities' direct reliance on forests, shifting people's relationship with forests from livelihood to recreation (Helseth et al., 2022).

Finally, Norway is the third country with highest per capita home furniture consumption (242 US$ in 2019) (Statista, 2020), far exceeding the Western European average (Tracogna, 2013). Norway produces 30% of the furniture that is sold in the country, making it a sector that heavily relies on foreign furniture manufacturers. In recent years, imports from low-wage countries such as China, Poland, and Lithuania have increased rapidly. Nevertheless, about half of Norway's imported furniture continues to originate from neighbouring countries, primarily Sweden and Denmark (Statista, 2020; Tracogna, 2013; Tronstad and Linder, 2024).

Spain

The Iberian Peninsula is a predominantly mountainous landmass, dominated by high plateaus and mountain ranges (Arellano et al., 2025). Due to its varied orography and geographical position between European subtropical and temperate zones, Spain's climate is diverse. Overall, the country has a temperate climate, with an average temperature of 14°C for the 1991-2020 period (Arellano et al., 2025; Worldbank, n.d.). The yearly average precipitation for the 1991-2020 period is 624 mm (Worldbank, n.d.) and follows a Mediterranean pattern marked by irregular distribution as in some months there are heavy and intense torrential episodes and in other months rainfall is scarce. Along with climate change trends worldwide, there have been a warming process in Spain in the last decades (1971-2022) with trends towards a reduction in annual rainfall and an increase in drought and torrential rainfall (Arellano et al., 2025).

With about 49 million inhabitants, Spain has a population density of 97 inhabitants per km^2 (INE, 2025). About 38.8% of Spain's geographical area is covered by forests (i.e. 19.4 million ha), 32.8% by farmland, 13.3% by pastureland and 3.7% by artificial surfaces (MAPA, 2023). The total forest cover has continuously increased over the last decade, increasing by 1.1 million ha since 2009, and nowadays there are 0.39 ha of forests per inhabitant. The regions with the largest proportion of forests is Castilla y León with 16.9%, followed 15.4% and 15.3% in Andalucía and Castilla la Mancha respectively. Moreover, 28% of all forests are public and 72% are private (MITECO, 2024a).

In terms of forest composition, 36.89% of Spain's forests are coniferous, 55.58% are broadleaved, and 7.52% are mixed. A considerable portion of Spanish forests are open woodlands called dehesas, which cover 14.6% of the forested area. The most widespread species is the Holm oak (14.5%) and Aleppo pine (11.3%). Mixed native broadleaved forests represent 6.4%, mixed native coniferous forests represent 3.5% and both broadleaf trees and mixtures of conifers together represent 6.2% (MITECO, 2025). Vadell et al. (2022) explains that since the 1940s, although practices have shifted towards promoting multifunctionality, forest management decision have focused on maximizing production, often at the expense of other ecosystem services such as the naturalness of tree species.

Forests in Spain are a main carbon sink, playing an important role in regulating and maintenance ecosystem services. In 2023, the LULUCF sector removed 47.6 million tons of CO2 equivalent, offsetting about 17.3% of the country's emissions. The forestry sector is the main responsible for this removal as 41.6 million tons come from forests and 2.7 million tons from harvested wood products (MITECO, 2024b). However, Enríquez-de-Salamanca (2024) signals that climate change will negatively influence the carbon sequestration capacity of Spanish forests, generating an increasingly smaller reduction in the LULUCF sector.

The total roundwood that was removed from Spanish forests in 2024 is 18 834 thousand m^3, from which 80.4% is for industrial purposes and 19.6% is for energy applications. Industrial roundwood represents then the largest share, with 15 139 thousand m^3, of which 5 939 thousand m^3 consisted of sawlogs and veneer logs, 8 400 thousand m^3 consisted of pulpwood and 799 thousand m^3 on other industrial roundwood (Eurostat, 2025). Particularly important is the construction sector in the demand for forest products as it is main driver of the market for sawn wood, fiberboard, particleboard, plywood, and veneer (MAPAMA, 2017). Other provisioning services is the cork production. Globally, Spain is the second-largest producer of cork, after Portugal, accounting for about one third of total world production (Sierra-Pérez et al., 2015).

The country's forests also provide non-wood products such as chestnuts, pine nuts, truffles, and other mushrooms (MITECO, 2025). Mushroom harvesting functions not only as a provisioning service but also as a recreational ecosystem service. In southern Spain, for example, De Frutos et al. (2016) found that the average willingness to pay for a mushroom-harvesting permit was approximately €22 per year.

Mixed evidence regarding stakeholders preferences over ecosystem services exists in Spain. Maroto Álvarez et al2013) found that stakeholders in Spain value regulating and maintenance services (water regulation, carbon sequestration, biodiversity conservation) more than social services (recreation and educational activities, employment creation and landscape) of the forests and provisioning services (wood production). Moreover, García-Nieto et al. (2013a) found that in south-east Spain the most demanded ecosystem service was nature for tourism, followed by timber, erosion control, recreational hunting, mushroom harvesting, and beekeeping.

Despite the fact that Mediterranean forests provide a wide range of ecosystem services, they are continuously confronted with several threats such as wildfires (Anaya-Romero et al., 2016). Particularly, the decrease in rainfall, coupled with the rise in temperature, favours fire conditions. This has resulted in an escalating risk of fire events, both in Spain in the rest of the world (Brotons et al., 2013). Recent extreme fire events have been documented in Spain, with 189,000 hectares affected in 2012, 130,000 hectares in 2017, 306,000 hectares in 2022, and 392,000 hectares in 2025, exhibiting an unparalleled magnitude (Copernicus, 2025). Forests are particularly at risk as they have been observed to experience the second-highest number of wildfires from 2008 to 2021, surpassed only by scrub and herbaceous vegetation (Hammed et al., 2024).

Lastly, Spain produces about 7% of total EU furniture production in 2023 (MINETUR, 2025), meeting 59% of its domestic demand in 2012. Additionally, 24% of its furniture consumption was imported from other EU countries, and 11% by non-EU countries (Renda et al., 2014).

Appendix B: Methodology

Sampling procedure

Both DCEs presented in this deliverable were carried across the four study regions, targeting the same population in each, namely citizens. For this, a single survey, incorporating multiple components to collect data for both DCEs as well as socio-demographic and attitudinal information, was designs and translated to each country's language. Figure 8 illustrates the survey flow, demonstrating how respondents entered the survey via the same weblink and were subsequently navigated through one of the two DCEs. Respondents sampled in each study region were randomly assigned to one of either DCE – FES or long-lived wood product.

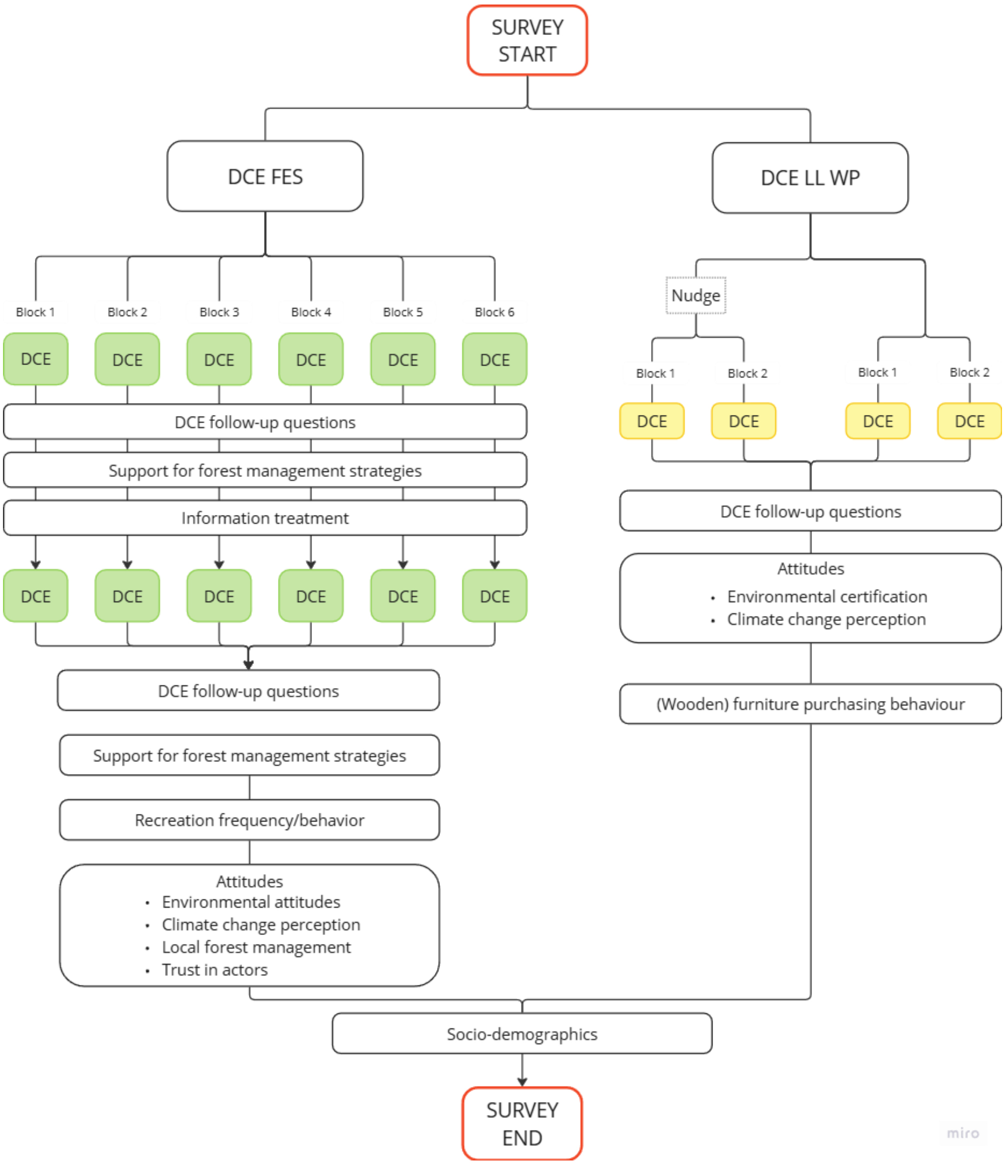


Figure 8. Survey flow used to sample for both discrete choice experiments

In each study region, respondents were recruited via a market research agency in early 2025. A balanced sample for gender, age and education was requested. Within all four countries, data collection was completed within seven days of the launch. Prior to analysis, the sample was cleaned for quality, protest responses and timing (explained in more detail in Part A and Part B). In total; 2084 respondents were sampled across the four study areas, 356 in Belgium (Flanders), 449 in the Czech Republic, 551 in Norway, and 728 in Spain. Table 9 illustrates the breakdown of the sample across study region and the DCEs.

Table 9. Cleaned sample sizes in FES and long-lived wood product DCE

	FES DCE		Long-lived wood products DCE	
Country	**Respondents**	**Observations**	**Respondents**	**Observations**
Belgium (Flanders)	170	6120	186	5952
Czech Republic	230	8280	219	7008
Norway	255	9180	296	9472
Spain	342	12312	386	123
Total	997	35892	1087	22555

DCE design

The attributes included in the **DCE on FES** (described in Part A above) represent different FES, while the attribute levels describe varying degrees of these FES being supplied as a result of forest management intensity. A long-list of potential attributes was defined based primarily on evidence from Başkent and Kašpar (2022), García-Nieto et al. (2013), and Müller et al. (2020). The selection process consisted of compiling a comprehensive list of 21 FES from academic literature and grey literature. A focus group was organised in June 2024 with 13 Flemish participants recruited through the market research agency Bilendi. During this focus group, participants were given the option to add any missing FES to the list, and were then asked to score each FES on a scale of 1 (not important at all) to 5 (very important). Scores were tallied and presented to the group for discussion. Through this processes, a final list of eight attributes was selected (Table 10). To ensure validity of the selected attributes in the remaining study regions, the final list, as well as the long-list of 21 attributes was presented to local forestry experts and evaluated for relevance. The eight selected attributes were found to be the most relevant in all four study regions, so the same design was used in each country.

Table 10. Attributes and levels used in the discrete choice experiment on FES

Attribute	Levels
Timber provisioning	1. Low [base level] 2. Medium 3. High
Carbon capture potential	1. Low [base level] 2. Medium 3. High
Local temperature regulation (°C)	1, 3, 5
Accessibility of the forest	1. Fully accessible all year 2. Partially accessible during certain weeks/months, fully accessible otherwise Partially accessible all year [base level]
Forest landscape diversity	1. Single colour and can see up to 50m through the trees [base level] 2. Single colour and can see up to 5m through the trees 3. Multiple colours and can see up to 50m through the trees 4. Multiple colours and can see up to 5m through the trees
Natural hazard protection capacity	1. Low [base level]: 4 out of 5 extreme events result in damage 2. Medium: 2 out of 5 extreme events result in damage 3. High: less than 1 out of 5 extreme events result in damage
Payment vehicle (% increase in annual tax EUR/household/year)	0.0005, 0.001, 0.002, 0.003

The first included attributes, **timber provisioning**, refers to the number of trees harvested from a forest per hectare (ha) per year to be used for timber and biomass production. This was simultaneously also presented as the percentage of trees harvested per ha annually. The attribute was treated as categorical consisting of three levels. Low provisioning, the base level, occur when 0 trees/ha/year are harvested, which is equivalent to harvesting 0% of trees/ha. Provisioning levels are medium when 2-5 trees/ha/year are harvested, or 1-3% of trees/ha. Provisioning levels are high when 8 trees/ha/year are harvested, or 4% of trees/ha. These levels were calculated based on average harvest rates in Flemish forests based on the bosinventaris (Agentschap Bos en Natuur, 2025) and EEA (2017) and adjusted to reflect realistic management intensities.

Carbon capture potential, a regulating and maintaining FES, refers to the amount of carbon dioxide (CO2) that can be stored per ha of forest. This was expressed as the equivalent of the yearly CO2 emissions of an average car that can be sequestered by one ha of forest. On average, a car emits approximately 3 tons of CO2 per year, which corresponds to the annual sequestration capacity of one ha of forest. The attribute includes three ordinal levels: low (base level), equivalent of 0.5 cars of CO2 emissions; medium, equivalent to one car's emissions; and high, the equivalent of 1.5 cars. These levels represent increasing carbon storage capacity associated with lower management intensity and greater biomass accumulation.

The third attribute, **accessibility of the forest**, describes the degree to which the forest is fully or partially open to the general public throughout the year. Accessibility refers to whether certain areas of the forest are closed to protect the ecosystems, such as during breeding seasons or periods when young trees are vulnerable. The attribute has three nominal levels. First, partially accessible all year round (base level) means that certain areas of the forest are closed off to the general public throughout the year. Second, fully accessible all year round means that access is never restricted to the general public. Third, the forest is partially accessible during certain weeks/months (e.g., during breeding or hunting periods) but is fully accessible outside of these periods. Variations in accessibility reflect differences in management strategies that balance recreation with conservation objectives. As such, this attribute is interpreted as a cultural (recreation) FES.

The fourth attribute captures the extent to which the forest can **reduce local temperatures**, thereby providing a cooling effect during summer months. This attribute, considered a regulation and maintenance FES, was defined as a continuous attribute with levels 1°C, 3°C, and 5°C, where higher values indicate stronger cooling effects. Insights from Haesen et al. (2021) and Wang et al. (2023) were used to identify the relevant cooling potential levels in European temperate forests.

Forest landscape diversity represents the visual diversity of the forest landscape, defined by the range of visible colour shades and the field of depth when walking through the forest. This attribute captures a combination of stand density and species diversity. Mixed-species forests generally exhibit greater variation in colour than single-species forests, while denser stands limit visibility through the forest. Four nominal levels were defined. The base level represents a sparsely populated, single-species stand – a uniform colour and visibility up to 50m through the trees. The second level describes a densely populated, single-species forest with uniform colour and visibility up to 5m. The third level depicts a sparsely populated, mixed-species stand with multiple colours and visibility up to 50m, while the fourth level captures a densely populated, mixed-species stand with multiple colours and visibility up to 5m. The visual focus of the levels make it such that this attribute reflects how stand structure and composition influence aesthetic experience (a cultural FES).

The sixth and last attribute, **natural hazard protection**, refers to the ability of the forest to mitigate property damage in nearby communities caused by natural hazards (regulating and maintenance FES). While the description of the attribute and the levels remains the same, the specific hazard considered differs by study region. In Belgium and the Czech Republic we consider flooding, where the mitigation potential of the forest relates to the water absorption and infiltration capacity of the soil, as well as the presence of forest vegetation reducing runoff and erosion potential. In Spain, we consider fire, where proper management of the forest can help reduce the spread of wildfires. In Norway, we consider storms, where proper forest management can reduce the impacts of property damage resulting from fallen branches and heavy rainfall events similarly to Czech Republic and Belgium. For all types of natural hazards considered, three ordinal levels are used, defined by the degree to which property damage can be mitigated during the occurrence of an extreme event: low mitigation potential (base level), medium mitigation potential, and high mitigation potential.

The final attribute is a **payment vehicle**, representing the monetary contribution required to support forest management that enhances FES provisioning. In all four study regions, this was defined as an increase in annual tax (EUR/household/year). The absolute values differed across countries but corresponded to the same proportional increases: 0.0005%, 0.001%, 0.002%, and 0.003% of annual taxes. The tax levels were calculated using the average taxable income per person (2021), the average income tax rate (2023), and the resulting average tax amount per person per year. In Belgium, this equates to €20, €60, €100 and €140. In the Czech republic, this equates to 280 Kč, 550 Kč, 1100 Kč and 1700 Kč. In Norway, this equates to 280 NOK, 560 NOK, 1100 NOK, and 1700 NOK. And in Spain this equates to €15, €30, €60, €90.

Directional priors obtained from a pilot study with 30 Flemish citizens recruited through the market research agency Bilendi were used in a D-efficient ($D = 0.073$), multinomial logit design without interaction effects using Ngene (ChoiceMetrics, 2012). An mfederov algorithm using a candidate set, combined with a 0.3 balance correction, was used to generate 36 choice cards divided across six blocks of six choice cards each. A dominance check was conducted to avoid dominant or unplausible scenarios. Coloured pictograms were used to visualise the attribute and levels on the choice cards (Figure 2).

Attributes presented in the **DCE on long-lived wood products** (described in Part B above) were selected through a three-step process. First, an extensive literature search was performed to identify a long list of 17 potential attributes (characteristics) influencing purchasing behaviour of small- to medium-sized wooden furniture. Second, a group of 26 academic and industry experts in the field of forestry were consulted and asked to identify the five most and five least important attributes from the long-list. Based on the results from this exercise, the list of potential attributes was narrowed down to seven. Third and finally, these seven attributes were presented to a group of 13 consumers during a focus group discussion organized in Flanders, Belgium. Based on these inputs, the final list of four attributes was selected, presented in Table 11.

Table 11. Attributes and levels used in the DCE on long-lived wood products

Attribute	Levels
Material	1. Solid wood 2. Non-solid wood 3. Metal
Production location	1. Information not disclosed 2. Local (case study-specific): Belgium/Norway, Spain/Czech Republic 3. Europe (outside of local region) 4. Outside of Europe
Carbon footprint	1. Information not disclosed 2. High (>50 kg CO_2 eq) 3. Medium (20-50 kg CO_2 eq) 4. Low (<20 kg CO_2 eq)
Price (local currency)	Belgium (EUR): 20, 50, 80, 110 Czeck Republics (CZK): 500, 1300, 2000, 2800 Norway (NOK): 240, 560, 950, 1300 Spain (EUR): 20, 50, 80, 110

The first attribute, **material**, refers to the primary material used to construct the main body of the side table, excluding its legs. This attribute served as the label used to define the alternatives presented in the DCE. Three labelled options (materials) were presented: solid wood, non-solid wood, and metal. Side tables made from solid wood are typically crafted from one or multiple solid pieces of natural timber. Those made from non-solid wood are constructed from engineered wood products such as plywood, particle board, or medium-density fibreboard (MDF). Metal side tables are composed of materials such as iron, stainless steel, or aluminium. Considering its use as the labelled alternative, an alternative-specific constant (ASC) was estimated for each label.

The **production location** attribute refers to the country or region where the side table was primarily produced, encompassing both the manufacturing and assembly processes. Important to note is that this attribute does not refer to the origin of the materials used in the table. This categorical attribute consisted of four levels. When information is not disclosed, the production location remains unknown to the respondent. This level was used as the base-level in modelling and interpretation. Local production refers to manufacturing within the case study's specific region, Belgium, Norway, Spain, or Czech Republic. European production means that the table is made within Europe, but in a region other than the local study region. Production outside of Europe refers to an undisclosed region outside of the European continental boundaries.

The **carbon footprint** attribute represents the total greenhouse gas emissions generated throughout the side table's life cycle (from cradle-to-gate), expressed in kilograms of carbon dioxide equivalents (kg CO2 eq). Also categorical, this attribute consistent of four levels. The base level, information not disclosed, once again means that information on the carbon footprint of the table is unknown to the respondent. The remaining three levels represent increasing emission levels: low (<20 kg CO2 eq), medium (20-50 kg CO2 eq) and high (>50 kg CO2 eq). Thresholds used to define the levels were identified through reports and grey literature (Valente et al., 2011). To account for inherent differences in emission levels associated with the material types considered in this study, a constraint was embedded into the design where the two wood labels (solid and non-solid) were only presented with a low or medium carbon footprint, while the metal label was only presented with a medium or high carbon footprint.

The **price attribute** represents the retail cost of the side table expressed in the local currency. Levels were identified by consulting online websites of furniture stores across the various study regions. As prices were relatively similar across the study areas, levels were established in euros (€) and the exchange rate was then used to translate them to local currencies.

A D-efficient multinomial logit design without interaction effects, using directional priors based on literature and hypothesized results, was generated in Ngene. A total of 16 choice cards divided across two blocks of eight choice cards each were created. Choice cards were visualized in a matrix format incorporating a textual specification combined with a coloured visual representation using a pictogram. Choice cards were presented in the local language.

Survey design

As described in Figure 9Figure 8, data was collected via a single survey for both DCEs. The survey was programmed such that respondents were randomly assigned to one of the two DCEs (either FES or long-lived wood products). Respondents completing the **DCE on FES** were first shown a warm-up choice card where they were prompted to provide an explanation for their choice. This was done to prompt critically thought amongst respondents and to familiarize them with the choice task exercise. After this, they were directed through to the DCE. In Spain, Norway, and the Czech Republic, respondents were presented with a first, randomly assigned block of six choice cards where the payment vehicle was expressed as a tax increase. These questions were followed-up by a set of questions aimed to test the validity of the DCE, including questions regarding attribute non-attendance, choice certainty and payment consequentiality. Next, respondents' attitudes towards five forest management strategies, each of which represented a different level of management intensity, was measured.

Based on academic (Duncker et al., 2012; Jactel et al., 2012; Sing et al., 2018) a set of five management strategies were identified, ranging from least to most intensive (Figure 9): unmanaged, close-to-nature forestry, multifunctional forestry, management for timber production, and management for bioenergy production.

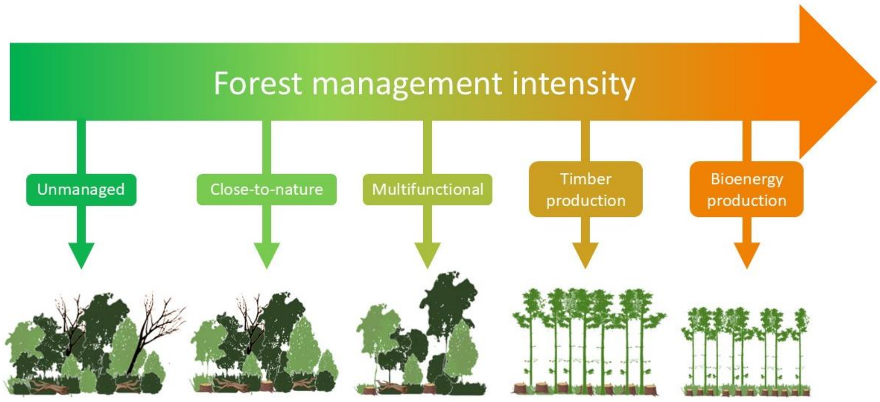


Figure 9. Forest management intensity spectrum.

Unmanaged forest are defined as forests with no or minimal active management, where all natural processes are left to develop without interventions (with the exception of paths constructed for recreation and the protection of leaves and small saplings from heavy browsing from animals). In this forest, no timber is actively harvested. Close-to-nature forestry is typified by a forest in which human interventions take place, but this is done through management practices that are designed to mimic natural forest processes such as regeneration and felling. Multifunctional forestry are defined as forests which are simultaneously managed for multiple objectives, including the production of timber, biodiversity protection and recreation. On the intensive side of the spectrum, we define forests managed for timber production as those with a focus on producing and harvesting high volumes of timber for the production of long-lived wood products. Forests managed for bioenergy production, on the other hand, have an objective of producing and harvesting high volumes of fuelwood for the production of bioenergy, typified by shorter rotation periods.

Following the measurement of attitudes towards management strategies, respondents were shown an informative video explaining the implications of actively managing a forest for various FES, including pest control, natural hazard regulation, recreation and hunting, and biodiversity. Though the themes addressed in the video remains constant across study areas, reference to context-specific natural hazards was adapted, e.g., wildfires in the Spanish study area. The English script used in each study region can be found in Appendix C: Script FES information . After the video, respondents were shown a second, randomly assigned block of six choice cards, followed by the same question aimed to test the DCE validity, and finally the same questions regarding attitudes towards management strategies. As a within-sample treatment design, the DCE responses recorded prior to the video served as the control for the responses after the information video. The following component of the survey consisted of a set of questions regarding respondents' forest recreation activities, attitudes towards climate change (Van Valkengoed et al., 2021), environmental concern measured using the New Environmental Paradigm as specified by Dunlap et al. (2000), local forest management activities, and trust towards actors. Finally, a set of socio-demographic questions to characterize respondents was included.

A quality control question was incorporated in the Likert-scale questions included in the survey, where respondents were prompted to select the option "fully disagree". Those who did not correctly identify this option were removed from the survey. Protest respondents, those who demonstrated systematic non-demanding behavior (selecting the opt-out for each presented choice card) in the DCE both before and after the information video were also removed. Lastly, respondents who spent less than 52 seconds watching the information video, which equates to watching the video at a 1.25 speed, were also removed prior to analysis. In the Belgian sample, this resulted in a total of 123 respondents removed from the sample prior to analysis; 56 who did not pass the quality control, 5 protest responses, and 62 who did not watch the information video fully. In the Czech sample, 287 respondents were removed; 263 who did not pass the quality test, 3 protest responses, and 82 who did not watch the full information video. In the Spanish sample 101 respondents were removed; 113 who did not pass the quality test, 5 protest responses, and 83 who did not fully watch the information video. In the Norwegian sample, 255 respondents were removed prior to analysis; 81 who did not pass the quality test, 2 protest responses, and 52 who did not fully watch the information video.

Respondents who were directed to the **DCE on long-lived wood products** were randomly assigned to a treatment and control group. The treatment group was shown a figure informing them about the potential for long-lived wood products to store carbon for a prolonged period of time (Figure 10) after which they were directed to a randomly assigned block of eight choice cards. Respondents in the control group were directly shown a randomly assigned block of six choice cards. Both treatment and control group were then shown a set of questions aimed to test the validity of the DCE, including attribute non-attendance, choice certainty and payment consequentiality, followed by attitude questions aimed to measure environmental attitude (Dunlap et al., 2000) and climate change perception (Van Valkengoed et al., 2021). Their familiarity with environmentally-friendly labels, including PEFC and FSC, was measured, and information regarding their consumption of timber products was collected. Finally, the same socio-demographic information was collected as for the DCE on FES to contextualize responses.

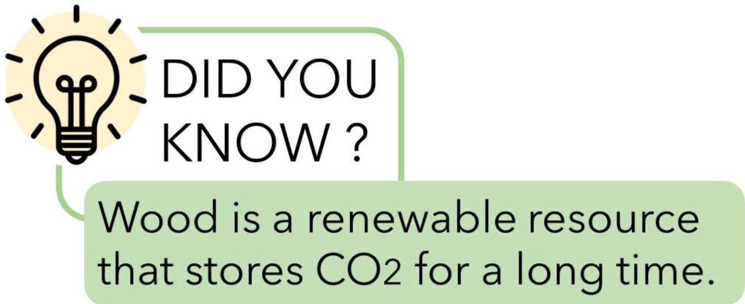


Figure 10. Treatment presented to respondents in the long-lived wood product DCE

Each sample in this study was cleaned using the same three checks. The first check was a quality control measure embedded within an attitude questions. One statement required respondents to select “Totally disagree”. Those who failed to do so were removed. In the second check, protest responses based on the DCE exercise were identified and removed. Protest responses were identified as those who systematically selected the opt-out across all eight choice cards (i.e., systematic non-demanding behaviour). Based on a follow-up questions, those who explained their systematic non-demanding behaviour based on one of the following reasons were removed: "I am not interested in buying side-tables", "I am not interested in buying furniture," or "I did not understand what was being asked". Finally, respondents who completed the survey in under 5 minutes were excluded. Given the length of the DCE, this filter helps remove respondents who likely clicked through the questions too quickly and did not engage with the task seriously.

Econometric analysis

DCEs are conceptually based on (Lancaster, 1966) theory of value and (Mcfadden, 1974) random utility theory. (Lancaster, 1966) posits that consumers derive utility from the different attributes of a good or service rather than from the good/service itself. (Mcfadden, 1974) random utility theory is centered around the assumption that when faced with multiple alternatives, a respondents' choice is driven by utility maximization. Integrating these two theories allows to express the utility derived by individual i from choosing an alternative j of a good out of a set of J alternatives in choice card t as follows:

$$U_{ijt} = V_{ijt} + \varepsilon_{ijt} = ASC + \sum_{k=1}^{K} \beta_{ik} x_{ijkt} + \varepsilon_{ijt} \tag{1}$$

where the utility consists of two components, a deterministic (observed) component ($Vijt$) including a vector of K observed alternative-specific variables ($xijkt$), which are attributes of the considered good as well as a vector of parameters (βik) expressing individual preferences for said attributes, and a random (unobserved) error term (εijt) that is assumed to be independently and identically (i.i.d.) extreme value distributed (Train and Weeks, 2005). The ASC is an alternative specific constant which represents preferences for the opt-out option presented along with the two alternatives within each choice task.

Several models building on the model described in equation 1, each differing in the assumptions made concerning preference and scale heterogeneity, can be used to estimate preferences for the attributes that make up an alternative. In this deliverable, we use the mixed logit (MXL) model estimated in preference space (Hole, 2007) to assess overall **FES preferences** for the split-samples (i.e., separated by country), the generalized multinomial logit (G-MNL) model for the pooled sample (i.e., combining country datasets), and the MXL model estimated in willingness-to-pay (WTP) space to assess demand for FES.

The MXL model relaxes the assumption of homogeneous preferences made in the conditional logit model, instead allowing for heterogeneous preferences, i.e., for differences in preferences between individuals which are assumed to follow a normal distribution (Hess and Train, 2017). Here, the probability of individual i choosing alternative j out of a set of J alternatives is expressed as:

$$P_{ij}(\beta_i) = \int \frac{e^{(\lambda_i \beta_i x_{ij})}}{\sum_{h=1}^{J} e^{(\lambda_i \beta_i x_{ih})}} f(\beta|\theta) d\beta \tag{2}$$

with the density for β, $f\beta\theta$, representing the normal distribution across individuals, and λi capturing the individual-specific scale parameter which is set to unity.

Two distinct specifications of the MXL model in preference space were estimated, each for the country split-samples. First, we estimate a MXL model for each study region separately in which the samples before and after the information video are pooled. All parameters are identified as random with an assumed normal distribution. Second, we assess the impact of the information video on preferences by estimating a MXL model for each study region incorporating a dummy-coded interaction effect for the information treatment. The dummy takes the value 1 for observations after the information treatment, and 0 otherwise. The main parameters are identified as random with an assumed normal distribution, while interaction parameters between the main effects and the dummy are kept fixed.

To test for significant differences in preferences between countries we estimate a G-MNL model in which we pool the samples before and after the information video for all four countries. The G-MNL model is a generalization of the MXL model which can account for both preference and scale heterogeneity (Fiebig et al., 2010). Scale heterogeneity, popularly defined as the consistency with which respondents answer choice cards, is particularly relevant to control for when combining datasets from distinct samples. We estimate the G-MNL model with three dummy-coded interaction effects identifying the Czech, Spanish and Norwegian samples. The dummies take the value 1 for observations from the respective study region, and 0 otherwise. All main parameters are identified as random with an assumed normal distribution, while interaction parameters between the main effects and the dummies are kept fixed. The G-MNL model extends equation 1 by defining the vector of parameters (βik) as follows:

$$\beta_i = \sigma_i\beta + \gamma\eta_i + (1-\gamma)\sigma_i\eta_i \quad (3)$$

where

$$\theta_i = \sigma_i\theta + \gamma\xi_i + (1-\gamma)\sigma_i\xi_i \quad (4)$$

The specification of $\boldsymbol{\beta_i}$ depends on i) β, a vector of mean attribute utility weights, ii) the individual-specific scale of the idiosyncratic error ($\boldsymbol{\sigma_i}$) with $\boldsymbol{\sigma_i} \sim LN(1,\tau)$, and iii) $\boldsymbol{\eta_i}$, the vector of individual n-specific deviations from the mean assumed to be multivariate normal. The individual-specific scale parameter is specified as:

$$\sigma_i = \exp\left(\bar{\sigma} + \delta Z_i + \tau\eta_i\right) \quad (5)$$

where we assume $\bar{\sigma} = {}^{-\tau^2}/_2$, and τ is the standard deviation of the scale. The vector $\boldsymbol{Z_i}$ contains the observed individual characteristics that explain between-individual differences in scale, with δ the corresponding vector of coefficients (Eppink et al., 2019). In our estimation, we do not define $\boldsymbol{Z_i}$. The parameter that governs the variance of residual taste heterogeneity with scale, γ∈0,1, is assumed to be 0 (Fiebig et al., 2010; Hess and Train, 2017).

Lastly, we estimate the MXL model in WTP-space to calculate marginal WTP (MWTP) for particular attribute levels while overcoming the restriction of an assumed fixed price parameter as specified in the post-estimation delta method (Train and Weeks, 2005). Prior to analysis, the payment levels as described in the DCE design were adjusted using Purchasing Power Parities (PPP) to EU27 2024 € to ensure commensurability in WTP estimates between countries. We estimate split-sample MXL models in WTP-space for each study region separately. After reformulating equation 2 to specify utility (in preference space) with separate price (p) and non-price (x) attributes, utility in WTP-space can then be written as:

$$U_{ijt} = \alpha_i ASC - \lambda_i p_{ijt} + (\lambda_i w_i)' x_{ijt} + \varepsilon_{ijt} \quad (6)$$

Here, $\lambda_i = ({}^{\theta_i}/_{\sigma_i})$ is the ratio of the price coefficient to the scale parameter and $w_i = {}^{c_i}/_{\lambda_i}$. $c_i' = ({}^{\beta_i}/_{\sigma_i})$ is a vector of the ratios of the non-price attributes to the scale parameter. MWTP values were obtained through a split-sample estimation (by study region) in which the payment vehicle followed a log-normal distribution, while all remaining parameters were assumed to follow a normal distribution.

As the attributes included in this DCE have been selected such that their levels reflect the level of FES provisioning, and the level of FES can be coupled to different forest management intensities illustrated in Figure 9, the MWTP estimates can be compiled to calculate the social demand for a specific management scenario defined by a bundle of attribute levels (i.e., FES provisioning levels). For this, we use the MWTP estimates obtained through equation 6 to calculate the compensating surplus (CS) as follows (Varela et al., 2017):

$$CS = -{}^{(V_s - V_0)}/_{\beta_{price}} \quad (7)$$

where V_s and V_0 represent the utility of the scenario s under consideration and the utility of the scenario composed of the base levels of each attribute, respectively. As such, the CS represents the WTP to move away from a management scenario resulting in the delivery of all the lowest levels of FES (the base levels) towards one of the alternative scenarios delivering increasing levels of FES. CS, initially expressed as PPP € per household per year, is transformed to PPP € per hectare of forest by considering the average household size within the sample, the total population, and the total forested area in the study region.

The forest management scenarios considered in this assessment are based on the management strategies included in the main survey. Specifically, we identify the level of FES provisioning for unmanaged, close-to-nature, multifunctional, timber production, and bioenergy production as described in Table 12.

Table 12. Forest management intensity scenarios and associated ecosystem service provisioning

FES	Unmanaged	Close-to-nature	Multifunctional	Timber production	Bioenergy production
Timber volume	Low	Low	Moderate	High	High
Carbon sequestration potential	High	High	Moderate	Moderate	Low
Cooling capacity	High	High	Moderate	Low	Low
Accessibility for recreation	Low	High	High	Moderate	Low
Landscape diversity	Multiple + 5m	Multiple + 5m	Multiple + 50m	Single + 50m	Single + 50m
Hazard protection	Moderate	High	moderate	Moderate	Low

The analysis conducted in the **DCE on long-lived wood products** follows the same theoretical foundation as described above. As a labelled DCE was employed, the specification of equation 1 is slightly altered:

$$U_{ijt} = ASC_l + \sum_{k=1}^{K} \beta_{ik} x_{ijkt} + \varepsilon_{ijt} \qquad (\mathbf{8})$$

Here, the ASC is a vector defined as a dummy-variable which takes the value 1 for each labelled alternative (l), and 0 otherwise. In this sense, the ASC captures the preference for the label relative to the opt-out, which is defined as the option of not buying one of the presented side-tables.

Departing from equation 8, we estimate two specifications of the mixed logit (MXL) model (Hole, 2007) in preference space. First, we estimated a MXL model for each study region separately for the full samples (pooling the treatment and control group), as well as split-sample models for the treatment and control groups. All parameters are identified as random with an assumed normal distribution. Second, to assess the impact of the information treatment on preferences, we estimated a MXL model for each country incorporating a dummy-coded interaction effect for the information treatment. The dummy takes the value 1 for observations that received the information treatment, and 0 otherwise. In this model both main and interaction parameters are identified as random with an assumed normal distribution.

To test for significant differences in preferences between countries while accounting for scale heterogeneity (Fiebig et al., 2010), we estimate a generalised multinomial logit (G-MNL) model on the sample pooling responses across all countries. The model incorporates three dummy-coded interaction effects identifying the Czech, Spanish and Norwegian samples. The dummies take the value 1 for observations from the respective study regions, and 0 otherwise. All main parameters are identified as random with an assumed normal distribution, while interaction parameters between the main effects and the dummies are kept fixed. Gamma is constrained to 0 ($\gamma = 0$), and the ASC parameters as left unscaled. A more detailed description of the model is provided in equations (3, (4 and (5 in Part A.

Lastly, we estimate a MXL model in WTP-space to derive WTP estimates for specific attribute levels (Train and Weeks, 2005). Full-sample MXL models in WTP-space, as specified in equation (6), are estimated separately for each country. To evaluate whether WTP estimates for individual attributes differ significantly across countries, we apply the Poe-test (Poe et al., 2005). This involves estimating country-specific MXL models in preference space, followed by post-estimation WTP calculations using the delta method. We then tested cross-country differences in WTP for each attribute using two one-sided hypotheses: $H_1: WTP_{countryA} > WTP_{countryB}$ and $H_2: WTP_{countryA} < WTP_{countryB}$.

Appendix C: Script FES information treatment

Belgium:

Excessive recreation in a forest can result in visitors straying off designated paths, picking flowers and/or herbs, and littering, all of which disturb the forest ecosystem and have negative impacts on biodiversity. For this reason, access to a forest can sometimes be restricted during periods where the forest biodiversity is vulnerable, such as breeding and nesting seasons. Access can also be restricted during hunting seasons to ensure the safety of the forest visitors.

Czech Republic:

Managing forests through tree felling and thinning, planting new trees, and controlling diseases can have many benefits. By removing unwanted (invasive) tree species, the number of plant and animal species in the forest will increase. Felling diseased trees and mixing tree species slows the spread of insect pests. Thinning trees makes it safer and more pleasant to walk. This also allows young trees to grow faster and absorb more CO2. As a result, more wood can be harvested, and this CO2 is stored for a long time in wood products (such as furniture, building materials). Forest management ensures that recreation does not negatively impact biodiversity. Recreational paths and infrastructure ensure that visitors stay more on the paths, do not pick flowers and plants, and leave less waste behind. Access to a forest can sometimes be restricted, for example, during sensitive periods such as the breeding and nesting season. Access may also be limited during the hunting season to ensure visitor safety.

Norway:

Forest management through logging and thinning, planting new trees, and combating pests and diseases can have many benefits. By removing trees there will be more plant and animal species in the forest. Felling diseased trees and mixing tree species prevents the spread of diseases and pests. Thinning trees makes hiking safer and more enjoyable. Better timber can then be harvested, and this CO2 is subsequently stored for a long time in wood products like furniture and building materials. Forest management ensures that recreation does not negatively impact biodiversity. Recreation trails and infrastructure ensure that visitors stay more on the paths, do not pick flowers and plants, and leave less litter. Access to a forest may sometimes be restricted, for example, during vulnerable periods like nesting and breeding seasons.

Spain:

Managing forests through tree felling and thinning, planting new trees, and controlling diseases can have many benefits. By removing unwanted (invasive) tree species, the number of plant and animal species in the forest will increase. Felling diseased trees and mixing tree species slows the spread of insect pests. Thinning trees makes it safer and more pleasant to walk and limits the spread of wildfires. This also allows young trees to grow faster and absorb more CO2. As a result, more wood can be harvested, and this CO2 is stored for a long time in wood products (such as furniture, building materials). Forest management ensures that recreation does not negatively impact biodiversity. Recreational paths and infrastructure ensure that visitors stay more on the paths, do not pick flowers and plants, and leave less waste behind. Access to a forest can sometimes be restricted, for example, during sensitive periods such as the breeding and nesting season. Access may also be limited during the hunting season to ensure visitor safety.

Appendix D: Sample description FES DCE

Table 13. Sample description in FES DCE: socio-demographics

	Sample				Test-statistics (p-values)					
Characteristic	Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	1-2	1-3	1-4	2-3	2-4	3-4
Size (n)	170	230	255	342	NA	NA	NA	NA	NA	NA
Gender (%)										
Female	51.76	51.30	52.16	51.46	NS	NS	NS	NS	NS	NS
Other	0.00	0.87	0.39	0.00	NS	NS	NS	NS	NS	NS
Age (mean, min, max)	55.19 (19, 83)	44.40 (18, 81)	50.82 (18, 90)	51.25 (19, 92)	0.000	0.023	0.036	0.000	0.000	NS
18-34 years (%)	13.53	28.26	15.69	13.45	0.001	NS	NS	0.001	0.000	NS
35-54 years (%)	30.59	43.48	44.31	41.23	0.057	0.029	NS	NS	NS	NS
≥55 years (%)	55.88	28.26	40.00	45.32	0.000	0.006	NS	0.048	0.000	NS
Education (%)										
Low (secondary degree or lower)	35.88	47.83	40.00	11.70	0.045	NS	0.000	NS	0.000	0.000
Medium (bachelor degree)	45.82	33.04	45.88	84.80	0.003	NS	0.000	0.010	0.000	0.000
High (master's degree or higher)	15.29	19.13	14.12	3.51	NS	NS	0.000	NS	0.000	0.000
Net household income (%)										
Flanders (€/month)										
1001-3000	30.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
3001-5000	28.82	NA	NA	NA	NA	NA	NA	NA	NA	NA
5001-7000	15.29	NA	NA	NA	NA	NA	NA	NA	NA	NA
More than 7000	2.35	NA	NA	NA	NA	NA	NA	NA	NA	NA
Don't know/no answer	23.53	NA	NA	NA	NA	NA	NA	NA	NA	NA
Czech Republic (CZK/month)										
Less than 20000	NA	3.91	NA	NA	NA	NA	NA	NA	NA	NA
20001-30000	NA	14.79	NA	NA	NA	NA	NA	NA	NA	NA
30001-40000	NA	20.00	NA	NA	NA	NA	NA	NA	NA	NA
40001-50000	NA	16.53	NA	NA	NA	NA	NA	NA	NA	NA
50001-60000	NA	16.96	NA	NA	NA	NA	NA	NA	NA	NA
More than 60000	NA	23.48	NA	NA	NA	NA	NA	NA	NA	NA
Don't know/no answer	NA	4.35	NA	NA	NA	NA	NA	NA	NA	NA

	Sample				Test-statistics (p-values)					
Characteristic	Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	1-2	1-3	1-4	2-3	2-4	3-4
Norway (NOK/month)										
Less than 23000	NA	NA	6.27	NA	NA	NA	NA	NA	NA	NA
23001-45000	NA	NA	22.35	NA	NA	NA	NA	NA	NA	NA
45001-67000	NA	NA	22.75	NA	NA	NA	NA	NA	NA	NA
67001-89000	NA	NA	16.86	NA	NA	NA	NA	NA	NA	NA
89001-100000	NA	NA	5.88	NA	NA	NA	NA	NA	NA	NA
More than 100000	NA	NA	10.59	NA	NA	NA	NA	NA	NA	NA
Don't know/no answer	NA	NA	15.29	NA	NA	NA	NA	NA	NA	NA
Spain (€/month)										
Less than 1000	NA	NA	NA	7.60	NA	NA	NA	NA	NA	NA
1001-3000	NA	NA	NA	59.36	NA	NA	NA	NA	NA	NA
3001-5000	NA	NA	NA	18.13	NA	NA	NA	NA	NA	NA
5001-6000	NA	NA	NA	3.51	NA	NA	NA	NA	NA	NA
More than 6000	NA	NA	NA	1.16	NA	NA	NA	NA	NA	NA
Don't know/no answer	NA	NA	NA	10.23	NA	NA	NA	NA	NA	NA
Occupation type (%)										
Full time (>30 hr/week)	38.82	56.52	48.24	52.34	0.003	NS	0.023	NS	NS	NS
Part-time (<30 hr/week)	7.06	6.52	9.41	9.06	NS	NS	NS	NS	NS	NS
Self-employed	4.12	8.40	3.14	4.68	NS	NS	NS	0.033	NS	NS
Not working – student	4.12	7.83	2.75	3.22	NS	NS	NS	0.036	0.046	NS
Not working - not able to work	3.53	0.43	9.02	2.05	NS	0.018	NS	0.000	NS	0.000
Not working – retired	40.59	14.35	22.35	16.08	0.000	0.000	0.000	NS	NS	NS
Not working – seeking employment	0.59	5.22	2.35	7.31	NS	NS	0.003	NS	NS	0.021
Not working – not seeking employment	0.59	0.43	1.57	5.26	NS	NS	0.007	NS	0.001	0.020
Don't know/no answer	0.59	0.00	1.18	0.00						
Household size (mean, min, max)	2.36 (1, 6)	2.86 (1, 21)	2.35 (1, 11)	2.79 (1, 15)	0.004	NS	0.009	0.000	NS	0.001

	Sample				Test-statistics (p-values)					
Characteristic	Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	1-2	1-3	1-4	2-3	2-4	3-4
Household members w/ taxable income (mean, min, max)	1.79 (1, 4)	1.66 (1, 4)	1.78 (1, 5)	1.74 (1, 5)	NS	NS	NS	NS	NS	NS
Residential area (%)										
Rural	54.12	18.26	33.33	20.18	0.000	0.000	0.000	0.001	NS	0.002
Small/medium-sized city	35.29	43.48	38.04	44.15	NS	NS	NS	NS	NS	NS
Large city	10.59	37.39	28.24	35.67	0.000	0.000	0.000	NS	NS	NS
Don’t know/no answer	0.00	0.87	0.39	0.00						
Province (%)										
Belgium (Flanders)										
Flemish Brabant	12.94	NA	NA	NA	NA	NA	NA	NA	NA	NA
Limburg	7.06	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antwerp	32.35	NA	NA	NA	NA	NA	NA	NA	NA	NA
East-Flanders	27.65	NA	NA	NA	NA	NA	NA	NA	NA	NA
West-Flanders	19.41	NA	NA	NA	NA	NA	NA	NA	NA	NA
Czech Republic										
Jihovýchod	NA	13.48	NA	NA	NA	NA	NA	NA	NA	NA
Jihozápad	NA	7.83	NA	NA	NA	NA	NA	NA	NA	NA
Moravskoslezsko	NA	14.35	NA	NA	NA	NA	NA	NA	NA	NA
Prague	NA	18.26	NA	NA	NA	NA	NA	NA	NA	NA
Severovýchod	NA	8.70	NA	NA	NA	NA	NA	NA	NA	NA
Severozápad	NA	12.61	NA	NA	NA	NA	NA	NA	NA	NA
Střední Morava	NA	17.17	NA	NA	NA	NA	NA	NA	NA	NA
Střední Čechy	NA	7.83	NA	NA	NA	NA	NA	NA	NA	NA
Norway										
Agder og Rogaland	NA	NA	10.20	NA	NA	NA	NA	NA	NA	NA
Hedmark og Oppland	NA	NA	7.84	NA	NA	NA	NA	NA	NA	NA
Nord-Norge	NA	NA	10.98	NA	NA	NA	NA	NA	NA	NA
Oslo og Akershus	NA	NA	30.20	NA	NA	NA	NA	NA	NA	NA
Sør-Østlandet	NA	NA	15.29	NA	NA	NA	NA	NA	NA	NA
Trøndelag	NA	NA	7.84	NA	NA	NA	NA	NA	NA	NA
Vestlandet	NA	NA	17.65	NA	NA	NA	NA	NA	NA	NA
Spain										

Characteristic	Sample: Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	Test-statistics (p-values): 1-2	1-3	1-4	2-3	2-4	3-4
Andalucía	NA	NA	NA	15.79	NA	NA	NA	NA	NA	NA
Aragón	NA	NA	NA	4.09	NA	NA	NA	NA	NA	NA
Canarias	NA	NA	NA	3.22	NA	NA	NA	NA	NA	NA
Cantabria	NA	NA	NA	2.92	NA	NA	NA	NA	NA	NA
Castilla y León	NA	NA	NA	4.39	NA	NA	NA	NA	NA	NA
Castilla-La-Mancha	NA	NA	NA	4.09	NA	NA	NA	NA	NA	NA
Cataluña	NA	NA	NA	14.62	NA	NA	NA	NA	NA	NA
Comunidad Floral de Navarra	NA	NA	NA	2.92	NA	NA	NA	NA	NA	NA
Comunidad de Madrid	NA	NA	NA	11.40	NA	NA	NA	NA	NA	NA
Comunidad de Valencia	NA	NA	NA	8.19	NA	NA	NA	NA	NA	NA
Extremadura	NA	NA	NA	3.80	NA	NA	NA	NA	NA	NA
Galicia	NA	NA	NA	9.06	NA	NA	NA	NA	NA	NA
Islas Baleares	NA	NA	NA	2.92	NA	NA	NA	NA	NA	NA
La Rioja	NA	NA	NA	2.34	NA	NA	NA	NA	NA	NA
País Vasco	NA	NA	NA	4.09	NA	NA	NA	NA	NA	NA
Principado de Asturias	NA	NA	NA	4.09	NA	NA	NA	NA	NA	NA
Región de Murcia	NA	NA	NA	1.75	NA	NA	NA	NA	NA	NA
Member of an environmental organization (%)	15.29	3.48	5.10	6.73	0.000	0.000	0.001	NS	NS	NS

Table 14. Sample description in FES DCE: forest recreation behaviour

Characteristic	Sample: Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	Test-statistics (p-values): 1-2	1-3	1-4	2-3	2-4	3-4
Visit frequency forest last 12 months (%)										
≥20 times	23.53	41.30	40.78	12.87	0.000	0.000	0.053	NS	0.000	0.000
11-19 times	9.41	12.17	14.90	6.43	NS	NS	NS	NS	NS	0.005
2-10 times	44.12	36.96	30.20	46.78	NS	0.023	NS	NS	NS	0.000
Once	13.53	6.52	7.06	16.96	NS	NS	NS	NS	0.001	0.001

	Sample				Test-statistics (p-values)					
Characteristic	Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	1-2	1-3	1-4	2-3	2-4	3-4
Never	7.06	1.74	5.10	15.20	NS	NS	0.008	NS	0.000	0.000
No answer	2.35	1.30	1.96	1.75	NS	NS	NS	NS	NS	NS
Recreation activities (%)										
Hiking/walking	85.88	69.57	77.25	61.11	0.002	NS	0.000	NS	NS	0.000
Enjoying nature	54.12	69.13	64.71	50.88	0.014	NS	NS	NS	0.000	0.004
(Mountain)biking	20.59	22.61	11.37	7.60	NS	0.042	0.000	0.002	0.000	NS
Seeking relief from heat	18.24	36.52	26.27	34.50	0.000	NS	0.001	0.080	NS	NS
(Self)guided walk	14.12	25.22	17.25	11.99	0.019	NS	NS	NS	0.000	NS
Jogging	13.53	19.13	23.14	11.99	NS	0.055	NS	NS	NS	0.002
Photography	13.53	29.13	26.67	31.87	0.003	0.015	0.00	NS	NS	NS
Bird spotting	5.88	16.96	9.80	12.87	0.004	NS	NS	0.088	NS	NS
Harvesting non-timber forest products	4.71	72.17	37.25	11.99	0.000	0.000	NS	0.000	0.000	0.000
Harvesting timber	2.94	3.04	18.04	1.75	NS	0.000	NS	0.000	NS	0.000
Skiing	0.59	6.09	20.39	2.34						
Camping	1.18	10.00	9.80	7.60	0.006	0.006	0.058	NS	NS	NS
Hunting/fishing	0.00	2.61	15.69	2.34	NS	0.000	NS	0.000	NS	0.000
None	3.53	1.30	1.18	10.23	NS	NS	0.004	NS	0.000	0.000
How do you travel to the nearest forest? (%)										
By car/tram/bus	39.41	29.57	23.92	48.54	NS	0.006	NS	NS	0.000	0.000
By foot	37.06	53.91	67.06	40.94	0.004	0.000	NS	0.019	0.011	0.000
By bike	19.41	10.87	5.49	4.39	0.014	0.000	0.000	NS	0.038	NS
By Train	1.18	5.22	0.39	2.63	0.054	NS	NS	0.003	NS	NS
No answer	2.94	0.43	3.14	3.51	NS	NS	NS	NS	NS	NS
Travel time (minutes) from nearest forest	19.56	27.35	12.22	34.23	0.046	0.065	0.000	0.000	0.031	0.000
By foot	15.27	21.69	9.94	26.01	NS	NS	0.052	0.001	NS	0.000
By bike	16.33	28.13	16.07	32.27	NS	NS	NS	NS	NS	NS
By car/tram/bus	23.45	29.26	17.93	40.00	NS	NS	0.000	0.067	0.020	0.000

Characteristic	Sample: Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	Test-statistics (p-values): 1-2	1-3	1-4	2-3	2-4	3-4
By Train	60.10	45.83	NA	45.83	NS	NA	NS	NA	NS	NA
Forest owner (in family)										
Yes	6.47	17.39	27.06	7.31	0.010	0.000	NS	0.012	0.004	0.000
No answer	6.74	1.30	1.57	1.17						

Table 15. Sample description in FES DCE: Attitudes

Characteristic	Sample: Belgium (1)	Czech Republic (2)	Norway (3)	Spain (4)	Test-statistics (p-values): 1-2	1-3	1-4	2-3	2-4	3-4
New Environmental Paradigm (mean, sd)	3.84 (0.53)	3.88 (0.38)	3.78 (0.55)	4.04 (0.51)	NS	NS	0.000	NS	0.001	0.000
Climate Change (mean, sd)	3.79 (0.64)	3.69 (0.48)	3.68 (0.76)	3.92 (0.57)	NS	NS	NS	NS	0.000	0.000
Flemish forest management										
Trust (mean, sd)	5.59 (1.76)	4.64 (1.75)	5.68 (1.82)	4.79 (1.76)	0.000	NS	0.000	0.000	NS	0.000
People in general	5.44 (2.10)	4.29 (2.67)	5.51 (2.05)	4.75 (2.16)	0.000	NS	0.004	0.000	0.077	0.000
People I know	7.43 (1.92)	6.85 (2.20)	7.30 (2.10)	6.56 (2.20)	0.049	NS	0.000	NS	NS	0.000
Local authorities	4.91 (2.51)	3.70 (2.59)	4.44 (2.61)	3.53 (2.70)	0.000	NS	0.000	0.014	NS	0.000
Federal authorities	4.14 (2.38)	2.78 (2.60)	4.51 (2.81)	3.52 (2.97)	0.000	NS	0.097	0.000	0.012	0.000
Police	6.08 (2.41)	5.60 (2.60)	6.53 (2.48)	5.50 (2.79)	NS	NS	NS	0.001	NS	0.000
Trust in forest managers (mean)										
Forest managers	6.07 (2.00)	5.27 (2.38)	5.48 (2.27)	4.74 (2.62)	0.007	NS	0.000	NS	0.066	0.004

NGO's	4.83 (2.58)	4.24 (2.59)	4.21 (2.64)	4.43 (2.93)	NS	NS	NS	NS	NS	NS
Timber industry	4.40 (2.14)	4.70 (2.39)	4.61 (2.32)	3.49 (2.62)	NS	NS	0.001	NS	0.000	0.000
Local authorities	4.88 (2.35)	4.29 (2.50)	4.16 (2.40)	3.47 (2.71)	NS	0.038	0.000	NS	0.001	0.010
Federal authorities	4.17 (2.34)	2.82 (2.54)	4.54 (2.88)	3.52 (2.94)	0.000	NS	0.080	0.000	0.018	0.000

Appendix E: Additional econometric estimations

Table 16. G-MNL estimation with interaction effects for Belgium, Czech Republic, and Norway. Spain as main effects.

	β_{MAIN}	SD	β_{BEL}	β_{CZK}	β_{NOR}
ASC (dummy-coded)	2.612***	2.715***	-0.572**	1.052***	0.765***
ASC (effects-coded)	3.640***	2.811***	0.124	1.134***	0.513***
Timber [Low]					
Medium	0.283***	0.072	0.118	-0.014	-0.016
High	0.206***	0.224***	0.417***	-0.039	0.319***
Carbon sequestration [low]					
Medium	-0.030	0.119*	0.538***	0.239**	0.004
High	-0.088	0.629***	1.096***	0.496***	0.123
Temperature	0.028***	0.001	0.050***	0.007	-0.022*
Accessibility [partially accessible]					
Both	0.089	0.058	0.139	0.155	0.093
Full	0.345***	0.207***	-0.181	0.129	-0.035
Landscape diversity [single + 50m]					
Single + 5m	0.074	0.217***	0.039	-0.042	0.161
Multiple + 50m	0.213**	0.308***	0.197	0.140	0.029
Multiple + 5m	0.248***	0.104	0.156	-0.064	-0.175
Hazard protection [low]					
Medium	0.959***	0.059	0.321**	-0.435***	-0.551***
High	1.355***	0.533***	0.284*	-0.529***	-0.851***
Payment (€)	-0.014***	0.009***	0.010***	0.004***	0.002
τ	0.758***				
Observations (N)	35,856				
LL	-8944.41				
BIC	18633.42				

Note: *p<0.1, **p<0.05, ***p<0.01

Table 17. MXL model estimates with interaction effect for information treatment in individual case studies

	Belgium			Czech Republic			Norway			Spain		
	β	SD	β_{info}	β	SD	β_{info}	β	SD	β_{info}	β	SD	β_{info}
ASC (dummy-coded)	2.406***	2.352***	-0.718*	4.923***	3.640***	-0.134	4.584***	3.359***	-0.239	2.822***	3.014***	-0.143
ASC (effects-coded)	4.457***	2.521***	-0.616**	7.017***	4.229***	-0.028	5.405***	3.560***	-0.300	4.544***	3.451***	-0.095
Timber [Low]												
Medium	0.204	0.145	0.269	0.099	0.140	0.391***	0.388***	0.244**	-0.122	0.110	0.103	0.285**
High	0.438***	0.788***	0.238	0.103	0.568***	0.269*	0.469***	0.470***	0.105	0.033	0.649***	0.325**
Carbon sequestration [low]												
Medium	0.336**	0.374***	0.308*	0.086	0.083	0.152	0.049	0.202	-0.120	0.172**	0.068	-0.221**
High	0.842***	1.142***	0.000	0.160	0.653***	0.275*	0.045	0.702***	-0.104	-0.048	0.856***	0.069
Temperature	0.086***	0.073***	-0.031	0.021*	0.022	0.019	0.004	0.049***	0.006	0.017	0.051***	0.021
Accessibility [partially accessible]												
Both	-0.010	0.201	0.361*	0.230**	0.103	-0.148	0.295***	0.075	-0.082	0.267***	0.009	-0.32***0
Full	-0.043	0.255	0.092	0.470***	0.387***	-0.293*	0.422***	0.279**	-0.093	0.387***	0.303***	-0.205*
Landscape diversity [single + 50m]												
Single + 5m	0.285*	0.359*	-0.245	0.162	0.315**	-0.102	0.111	0.259	0.373**	-0.070	0.349***	0.233
Multiple + 50m	0.518***	0.538***	-0.419*	0.471***	0.224	-0.217	0.145	0.282**	0.347*	0.147	0.482***	-0.010
Multiple + 5m	0.419**	0.165	-0.231	0.250**	0.185	0.053	0.092	0.505***	0.094	0.193*	0.291**	0.115
Hazard protection [low]												
Medium	1.006***	0.279*	0.023	0.445***	0.038	0.000	0.474***	0.238**	-0.141	0.881***	0.062	-0.045
High	1.530***	1.398***	-0.347*	0.570***	0.640***	0.206	0.592***	0.524***	-0.155	1.257***	0.693***	0.010
Payment (€)	-0.004***	0.004***	0.000	-0.008***	0.008***	-0.001	-0.010***	0.013***	0.000	-0.013***	0.010***	0.002
Observations (N)	6,084			8,280			9,180			12,312		
LL	-1387.8			-1925.4			-2146.78			-3032.45		
BIC	3141.559			4229.707			4676.804			6460.474		

Note: *p<0.1, **p<0.05, ***p<0.01

Table 18. Mean attitude for alternative management strategies before (BI) and after information (AI) treatment in each country, and associated test statistic (p-value)

	Belgium			Czech Republic			Norway			Spain		
	$\bar{x}_{BI}$ (st.dev)	$\bar{x}_{AI}$ (st.dev)	p	$\bar{x}_{BI}$ (st.dev)	$\bar{x}_{AI}$ (st.dev)	p	$\bar{x}_{BI}$ (st.dev)	$\bar{x}_{AI}$ (st.dev)	p	$\bar{x}_{BI}$ (st.dev)	$\bar{x}_{AI}$ (st.dev)	p
Unmanaged	3.547 (1.061)	3.312 (1.067)	***	3.374 (1.121)	3.178 (1.229)	***	3.180 (1.136)	3.062 (1.446)	***	3.070 (1.286)	2.883 (1.341)	***
Close-to-nature	3.965 (0.737)	3.812 (0.769)	***	4.1 (0.806)	4.013 (0.859)	*	3.8 (0.760)	4.421 (1.194)	***	3.936 (0.917)	3.866 (0.866)	
Multifunctional	3.841 (0.852)	3.853 (0.826)		3.691 (0.849)	3.730 (0.900)		3.686 (0.830)	4.410 (1.202)	**	3.845 (0.888)	3.915 (0.836)	
Intensive for timber	2.671 (0.902)	2.953 (0.928)	***	2.517 (1.052)	2.696 (1.055)	***	2.718 (1.042)	2.456 (1.084)		2.667 (1.156)	2.874 (1.143)	***
Intensive for bioenergy	2.8 (0.958)	2.988 (0.997)	***	2.591 (1.104)	2.739 (1.050)	***	2.761 (0.973)	2.429 (1.060)		2.947 (1.255)	3.088 (1.213)	***

Note: *p<0.1, **p<0.05, ***p<0.01

Attitudes were measured on a five-point Likert scale, where 1 was expressed as 'totally oppose' and 5 as 'totally support'. A mean larger than three ($\bar{x}>3$) thus indicates a positive attitude towards a strategy, while a mean smaller than three indicates a negative attitude ($\bar{x}<3$). Means were calculated before (BI) and after (AI) the information treatment and a paired t-test was used to test for significant differences.

Table 19. MWTP estimates expressed as PPP-corrected euros (€) for each study area

	Belgium		Czech		Norway		Spain	
	β	**SD**	***β***	**SD**	***β***	**SD**	***β***	**SD**
ASC (dummy-coded)	514.566***	493.287***	489.966***	426.122***	806.357***	604.256***	361.255***	380.705***
Timber [Low]								
Medium	32.706***	14.067***	17.578***	13.699	16.670***	7.548	34.196***	9.909
High	21.323*	70.724*	15.106**	42.877***	34.521***	34.463***	21.670***	59.009***
Carbon sequestration [low]								
Medium	9.866	35.316	11.042**	5.791	-5.948	5.963	9.174	11.968
High	29.398***	55.604***	22.233***	48.403***	-2.613	53.516***	0.098	95.739***
Temperature	4.292***	4.647***	2.292***	0.912	1.543**	3.064***	3.127***	4.943***
Accessibility [partially accessible]								
Both	12.432	9.711	11.782**	2.954	19.025***	1.309	15.333**	10.912
Full	8.887	37.920***	26.757***	39.071***	20.012***	27.895***	35.998***	44.415***
Landscape diversity [single + 50m]								
Single + 5m	4.320	1.313	6.056	10.534	9.436	21.042***	3.848	33.222**
Multiple + 50m	17.053	1.414	25.533***	28.978**	14.805*	23.031***	20.586**	44.738***
Multiple + 5m	11.245	40.144***	16.715**	10.130	-3.133	5.931	27.108***	3.356
Hazard protection [low]								
Medium	72.421***	46.573***	33.432***	8.641	25.235***	9.522	96.100***	43.827***
High	108.090***	38.063***	60.351***	49.282***	42.863***	35.276***	134.191***	82.024***
Payment (€)	-4.778***	0.638***	-4.442***	0.338**	-4.597***	1.011***	-4.735***	0.232**
Observations (N)	6,120		8,280		9,180		12,312	
LL	-1530.67		-1959.69		-2243.35		-3050.9	
BIC	3305.482		4171.98		4742.189		6365.521	

Note: *p<0.1, **p<0.05, ***p<0.01

Table 20. Test statistics (p-values) for one-way ANOVA testing for significant differences in attitudes towards management strategies between Belgium (1), Czech Republic (2), Norway (3) and Spain (4) before and after information treatment.

	1-2	1-3	1-4	2-3	2-4	3-4
Before information						
Unmanaged	0.872	0.010	0.000	0.422	0.015	1.000
Close-to-nature	0.628	0.262	1.000	0.000	0.117	0.281
Multifunctional	0.507	0.412	1.000	1.000	0.216	0.154
Intensive for timber	0.928	1.000	1.000	0.232	0.600	1.000
Intensive for bioenergy	0.373	1.000	0.933	0.552	0.001	0.249
After information						
Unmanaged	1.000	1.000	0.002	1.000	0.038	1.000
Close-to-nature	0.137	0.000	1.000	0.010	0.286	0.000
Multifunctional	1.000	0.000	1.000	0.000	0.087	0.000
Intensive for timber	0.107	0.004	1.000	0.517	0.305	0.011
Intensive for bioenergy	0.163	0.007	1.000	0.369	0.002	0.000

Table 21. Marginal Willingness-to-Pay (MWTP) estimates for tax and donation payment vehicle treatments

	Tax		Donation	
	β	St.dev.	β	St.dev.
ASC(dummy-coded)	514.559***	493.284***	981.921***	1028.533***
Wood [Low]				
Medium	32.706***	14.068	125.583***	43.905
High	21.323*	70.725***	168.675***	157.565***
Carbon sequestration [low]				
Medium	9.866	35.316***	173.789***	68.981
High	29.398***	55.604***	251.564***	333.324***
Temperature	4.292***	4.647***	20.796***	18.264***
Accessibility [partially accessible]				
Both	12.432	9.712	47.649	107.981*
Full	8.887	37.920***	19.316	9.230
Landscape diversity [single + 50m]				
Single + 5m	4.321	1.313	55.173	148.165***
Multiple + 50m	17.053	1.416	106.264**	95.126**
Multiple + 5m	11.245	40.143***	87.322**	49.534
Hazard protection [low]				
Medium	72.422***	46.573***	303.377***	74.638
High	108.090***	38.064***	428.129***	426.607***
N observations	6,084		6,120	
Log-likelihood	-1402.216		-1530.671	
BIC	3048.407		3305.482	

Sample: Sample before and after information treatment pooled in both models

Note: * p<0.1, ** p<0.05, *** p<0.01

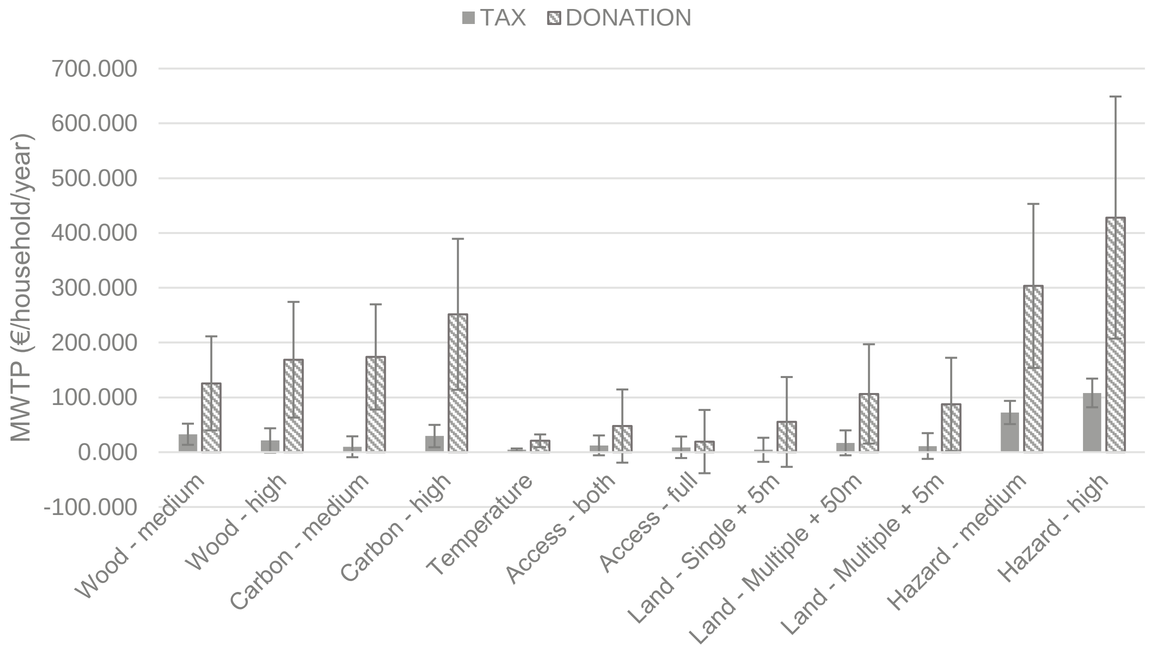


Figure 11. Marginal willingness-to-pay (MWTP) for tax and donation payment vehicle presentation format (Belgian sample only).

Table 22. Compensating surplus (CS) calculated per forest management strategy intensity to move away from the most intensive system for tax and donation payment vehicle treatments.

	Tax		Donation	
	€/household/year	€/ha	€/household/year	€/ha
Unmanaged	128	2459	557	11009
Close-to-nature	179	3451	701	13858
Multifunctional	154	2964	601	11889
Timber production	120	2319	477	9435
Biomass production	26	494	189	9435

Appendix F: Sample Description long-lived wood products

Table 23: Belgian sample description LLWP DCE : socio demographics

Characteristics	Full Sample	No information treatment	Information treatment	Test statistic (p-value)[1]
Sample Size	186	90	96	0.466
Information treatment (%)	51.61			
Gender (% male)	50.54	50.00	51.04	0.887
Age (mean)	55.61[2]	56.39	54.89	0.544
18-34 years (%)	14.52	14.44	14.58	0.979
34-54 years (%)	28.49	27.78	29.17	0.834
54 years or older (%)	56.99	57.78	56.25	0.833
Education				
Low (%)	41.94	38.89	44.79	0.415
No diploma	0.54			
Primary Education	3.23			
Secondary Education	38.17			
Medium (%)	32.80	33.33	32.29	0.880
Additional vocational training (A2, seventh year)	6.99			
Higher professional education (HBO5)	10.22			
Bachelor's degree	25.81			
High (%)	13.98	16.67	11.46	0.306
Master's degree	13.98			
Job (%)				
Employed (full time and part time)	44.62	45.56	43.75	0.804
Self Employed	2.69	3.33	2.08	0.598
Not able to work	4.30	4.44	4.17	0.926
Retired	40.32	38.89	41.67	0.700
Student	5.91	5.56	6.25	0.841
Unemployed (looking and not looking for a job)	2.15	2.22	2.08	0.948
Household Size	2.54	2.48	2.59	0.229
Monthly household net income (€/month)				
Below €1000 (%)	0.68	1.47	0.00	0.283
Between €1001 - €3000 (%)	33.56	33.82	33.33	0.950
Between €3001 - €5000 (%)	43.84	45.59	42.31	0.690
Above €5001 (%)	21.92	19.12	24.36	0.445
Living environment (%)				
Urban	46.24	50	42.71	0.319
Rural	52.69	48.89	56.25	0.315
Coast	1.08	1.11	1.04	0.963
Province of residence (%)				
Antwerp	31.18	31.11	31.25	0.984

Brussels	0.54	1.11	0	0.300
East-Flanders	29.57	28.89	30.21	0.844
Flemish Brabant	11.83	8.89	14.58	0.229
Limburg	8.06	6.67	9.38	0.498
West Flanders	18.82	23.33	14.58	0.127

[1] Significance level: *p<0.100, **p<0.050, ***p<0.010

[2] Average age in Flanders in 43 years in 2021 (Statbel, 2021).

The test statistics and p-values are derived from a Pearson's chi-squared test except for household size, which was derived from a Mann–Whitney U test and for Age which was derived from a T test.

Table 24: Czech Republic sample description LLWP DCE : socio demographics

Characteristics	**Full Sample**	**No information treatment**	**Information treatment**	**Test statistic (p-value)[1]**
Sample Size	219	105	114	0.468
Information treatment (%)	52.05			
Gender (% male)	45.21	43.81	46.49	0.690
Age (mean)	43.52[2]	44.41	42.71	0.378
18-34 years (%)	30.59	27.32	33.33	0.359
34-54 years (%)	44.29	43.81	44.74	0.890
54 years or older (%)	25.11	28.57	21.93	0.258
Education (%)				
I do not want to specify	0.91			
Low (%)	48.40	48.57	48.25	0.962
Elementary school	4.57			
High school diploma	43.84			
Medium (%)	33.33	31.43	35.09	0.566
Higher vocational school	5.94			
Apprenticeship certificate	19.63			
Bachelor's degree (Bc)	8.22			
High (%)	16.89	19.05	14.91	0.415
Master's degree (Ing., Mgr.,…)	15.98			
Doctorate (PhD)	0.91			
Job (%)				
Employed (full time and part time)	66.67	60.00	72.81	0.045**
Self Employed	8.22	9.52	7.02	0.500
Not able to work	1.83	3.81	0.00	0.035**
Retired	8.22	11.43	5.26	0.097*
Student	3.20	3.81	2.63	0.621
Unemployed (looking and not looking for a job)	6.85	7.62	6.14	0.665
Other or not specified	5.02	3.81	6.14	0.430
Household Size	3.05	2.85	3.22	0.541
Monthly household net income (€/month)				
Below CZK 20 000 (%)	7.69	3.00	12.04	0.015**

Between CZK 20 001 - CZK 35 000 (%)	22.12	21.00	23.15	0.709
Between CZK 35 001 - CZK 50 000 (%)	26.03	29.52	22.81	0.258
More than CZK 50 001 (%)	40.64	29.52	22.81	0.521
Living environment (%)				
Urban	73.97	68.57	78.95	0.080*
Rural	25.57	31.43	20.18	0.057*
Province of residence (%)				
Jihovýchod	13.7			
Jihozápad	5.94			
Jiné (prosím specifikujte)	4.11			
Moravskoslezsko	12.33			
Prague	16.44			
Severovýchod	12.33			
Severozápad	10.96			
Střední Morava	8.22			
Střední Čechy	15.98			

[1] Significance level: *p<0.100, **p<0.050, ***p<0.010

[2] Average age in Czech Republic in 43 years in 2021 (CZSO, 2022).

The test statistics and p-values are derived from a Pearson's chi-squared test except for household size, which was derived from a Mann–Whitney U test and for Age which was derived from a T test.

Table 25: Norway sample description LLWP DCE : socio demographics

Characteristics	Full Sample	No information treatment	Information treatment	Test statistic (p-value)[1]
Sample Size	296	150	146	0.473
Information treatment (%)	49.32			
Gender (% male)	51.53	50.34	52.74	0.680
Age (mean)	51.31[2]	50.93	51.70	0.669
18-34 years (%)	18.24	20.00	16.44	0.428
34-54 years (%)	40.54	38.00	43.15	0.367
54 years or older (%)	41.22	42.00	40.41	0.781
Education				
Low (%)	36.82	36.67	36.99	0.955
No education	0.34			
Elementary school	5.07			
Secondary school	31.42			
Medium (%)	42.91	42.67	43.15	0.933
Vocational school	12.84			
Bachelor's degree	30.75			
High (%)	15.54	16.00	15.07	0.825
Master's degree	13.18			
PhD	2.03			
Job (%)				
Employed (full time and part time)	55.74	56.00	55.48	0.928
Self Employed	1.35	1.33	1.37	0.978

Not able to work	11.82	14.00	9.59	0.240
Retired	23.31	22.67	23.97	0.790
Student	2.36	2.00	2.74	0.675
Unemployed (looking and not looking)	4.05	3.33	4.79	0.524
Household Size	2.28	2.19	2.38	0.770
Monthly household net income (€/month)				
Below NOK 23 000 (%)	7.43	8.00	6.85	0.710
Between NOK 23 001 - 56 000 (%)	27.70	30.00	25.34	0.371
Between NOK 56 001 - 89 000 (%)	21.62	23.33	19.86	0.468
Above NOK 89 001 (%)	11.15	12.67	9.59	0.400
Living environment (%)				
Urban	61.57	60	63.39	0.588
Rural	38.43	40	36.61	0.588
Province of Residence (%)				
Agder og Rogaland	10.47			
Hedmark og Oppland	9.46			
Nord-Norge	7.77			
Oslo og Akershus	33.11			
Sør-Østlandet	14.53			
Trøndelag	6.42			
Vestlandet	18.24			

[1] Significance level: *p<0.100, **p<0.050, ***p<0.010

[2] Average age in Norway is 41 years in 2024 (SSB, 2025c).

The test statistics and p-values are derived from a Pearson's chi-squared test except for household size, which was derived from a Mann–Whitney U test and for Age which was derived from a T test.

Table 26: Spain sample description LLWP DCE : socio demographics

Characteristics	Full Sample	No information treatment	Information treatment	Test statistic (p-value)[1]
Sample Size	386	189	197	0.476
Information treatment (%)	51.04			
Gender (% male)	45.05	46.81	43.37	0.498
Age (mean)	51.49[2]	51.09	51.88	0.575
18-34 years (%)	15.80	17.46	14.21	0.382
34-54 years (%)	35.49	33.33	37.56	0.385
54 years or older (%)	48.70	49.21	48.22	0.847
Education				
Low (%)	14.25	12.70	15.74	0.393
No diploma	0.52			
Primary education	2.86			
Secondary education	10.91			
Medium (%)	83.16	84.13	82.23	0.619
Higher professional education	36.62			
Higher Vocational Education and Training	0.78			
Bachelor's degree	45.97			
High (%)	2.33	2.65	2.03	0.689

Household Size	3.25	3.48	3.03	0.316
Job (%)				
Employed (full time and part time)	61.14	62.96	59.39	0.472
Self Employed	3.89	2.65	5.08	0.217
Not able to work	0.00			
Retired	15.54	14.81	16.24	0.699
Student	3.11	4.76	1.52	0.067**
Unemployed (looking and not looking for a job)	13.99	12.17	15.74	0.313
Monthly household net income (€/month)				
Below €1000 (%)	8.03	5.82	10.15	0.117
Between €1001 - €3000 (%)	56.74	61.90	51.78	0.045**
Between €3001 - €5000 (%)	24.61	22.22	26.90	0.286
Above €5001 (%)	4.15	4.23	4.06	0.933
Living environment (%)				
Urban	77.01	78.09	75.96	0.630
Rural	22.99	21.91	24.04	0.630
Province of residence (%)				
Andalucía	13.99			
Aragón	3.89			
Canarias	4.66			
Cantabria	3.63			
Castilla y León	5.96			
Castilla-La-Mancha	5.44			
Cataluña	16.84			
Comunidad Floral de Navarra	1.81			
Comunidad de Madrid	11.4			
Comunidad de Valencia	13.47			
Extremadura	2.07			
Galicia	5.44			
Islas Baleares	1.04			
La Rioja	1.04			
País Vasco	3.63			
Principado de Asturias	3.37			
Región de Murcia	2.33			

[1] Significance level: *p<0.100, **p<0.050, ***p<0.010

[2] Average age in Spain is 44 years in 2024 (INE, 2024).

The test statistics and p-values are derived from a Pearson’s chi-squared test except for household size, which was derived from a Mann–Whitney U test and for Age which was derived from a t-test.

Appendix G: Additional econometric estimation

Table 27: MWTP estimates for LLWP expressed as PPP-corrected euros (€) for each study area

	Belgium		Czech Republic		Norway		Spain	
	β	**SD**	**β**	**SD**	**β**	**SD**	**β**	**SD**
Material								
Solid wood	92.135***	-58.269***	154.911***	59.638***	121.350***	73.394***	103.693***	59.499***
Non-solid wood	67.811***	-56.91***	94.460***	-88.208***	60.913***	-49.111***	77.505***	51.522***
Metal	20.665**	-112.822***	55.296***	100.648***	21.546**	100.868***	51.230***	-32.599***
Location [not disclosed]								
Made Local	33.120***	3.442	46.104***	-35.659***	48.105***	28.145***	38.713***	-29.596***
Made Europe	19.401***	-4.486	20.336***	-8.284	11.024**	26.991***	12.956***	2.561
Made outside Europe	-0.866	-3.523	4.614	-10.037*	-3.508	1.082	2.581261	-12.738***
Carbon [not disclosed]								
Low carbon	17.627***	-4.303	13.540**	-39.990***	27.497***	-4.833	38.321***	-24.043***
Medium carbon	-3.411	16.815***	-13.849**	4.676	-8.514**	-0.909	9.792**	-6.960136
High carbon	-15.232**	2.761	-27.362	5.2	-75.816***	53.874***	-6.18601	10.464**
Price (neg)	-3.151***	0.663***	-3.596	0.665***	-3.411***	0.753***	-3.280***	0.856***
Observations (N)	5952		7008		9472		12352	
Log-likelihood	-1209.705		-1504.86		-2005.44		-2768.05	

Note: *p<0.1, **p<0.05, ***p<0.01

Table 28. Mean attitudes and test statistics towards certifications, climate change perception and purchasing behaviours, and respective components, in Belgium (BEL; 1), Czech Republic (CZK; 2), Norway (NOR; 3) and Spain (ESP; 4)

	Mean attitudes				**Country comparison test statistic (p-value)**					
	BEL (1)	CZK (2)	NOR (3)	ESP (4)	1-2	1-3	1-4	2-4	2-3	3-4
Certification	3.71	3.11	3.24	3.52	0.000***	0.000***	0.107	0.000***	0.411	0.001***
Importance of certification	3.95	3.39	3.62	3.86	0.000***	0.010**	0.773	0.000***	0.087*	0.037**
Certification involvement	3.49	2.90	2.98	3.26	0.000***	0.000***	0.026**	0.000***	0.791	0.001***
Climate Change Perception	4.03	3.64	3.61	4.11	0.002***	0.000***	0.800	0.000***	0.992	0.000***
Reality	4.27	3.83	3.93	4.35	0.002***	0.013**	0.872	0.000**	0.789	0.000***
Causes	4.17	3.77	4.05	3.62	0.028**	0.000***	0.781	0.140	0.644	0.002***
Valence of consequences	4.28	3.79	3.72	4.16	0.001***	0.000***	0.763	0.008***	0.940	0.000***
Spatial distance	4.01	3.60	3.49	4.04	0.009***	0.000***	0.995	0.001***	0.769	0.000***
Temporal distance	3.18	3.03	3.23	3.84	0.624	0.975	0.000***	0.000***	0.245	0.000***
Eco-friendly and ethical purchasing behaviour	2.91	2.82	2.77	3.08	0.861	0.536	0.257	0.024**	0.957	0.001***

Note: *p<0.1, **p<0.05, ***p<0.01

Attitude was measured using a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly Agree) for certification statements and climate change statements and from 1 (Never True) to 5 (Always True) for purchasing behaviour.

The p-values are derived from a an ANOVA test followed by a Tukey post-hoc test

Table 29: Hypothesis test (Poe-test) for WTP across study regions

	1-2		1-3		1-4		2-4		2-3		3-4	
	$H1: WTP_{BEL} < WTP_{CZK}$	$H2: WTP_{BEL} > WTP_{CZK}$	$H1: WTP_{BEL} < WTP_{NOR}$	$H2: WTP_{BEL} > WTP_{NOR}$	$H1: WTP_{BEL} < WTP_{ESP}$	$H2: WTP_{BEL} > WTP_{ESP}$	$H1: WTP_{CZK} < WTP_{ESP}$	$H2: WTP_{CZK} > WTP_{ESP}$	$H1: WTP_{CZK} < WTP_{NOR}$	$H2: WTP_{CZK} > WTP_{NOR}$	$H1: WTP_{ESP} < WTP_{NOR}$	$H2: WTP_{ESP} > WTP_{NOR}$
Material												
Solid wood	0.000	0.999	0.001	0.998	0.225	0.774	0.999	0.000	0.933	0.066	0.007	0.992
Non-solid wood	0.000	1.000	0.087	0.912	0.007	0.992	0.999	0.000	0.999	0.000	0.804	0.195
Metal	0.000	0.999	0.162	0.837	0.000	0.999	0.957	0.042	0.999	0.000	0.976	0.023
Production Location												
Made Local	0.465	0.534	0.259	0.740	0.139	0.860	0.215	0.784	0.323	0.676	0.620	0.379
Made Europe	0.746	0.253	0.985	0.014	0.480	0.519	0.236	0.763	0.918	0.081	0.991	0.008
Made outside Europe	0.184	0.815	0.714	0.285	0.092	0.907	0.442	0.557	0.930	0.069	0.974	0.025
Carbon footprint												
Low	0.864	0.135	0.023	0.976	0.000	0.999	0.000	0.999	0.004	0.995	0.864	0.135
Medium	0.982	0.017	0.974	0.025	0.300	0.699	0.002	0.997	0.395	0.604	0.996	0.003
High	0.772	0.227	0.999	0.000	0.779	0.220	0.451	0.548	0.998	0.001	0.999	0.000

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