Uniwersytet Warszawski
Warszawski Ośrodek Ekonomii Ekologicznej

Institute of Transport Economics
Norwegian Centre for Transport Research

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Recommendations on transboundary NPAs management, based on study findings and political implications

Iratxe Landa Mata, Mikołaj Czajkowski, Askill Harkjerr Halse,
Marek Giergiczny, Sviataslau Valasiuk, Knut Veisten, Tomasz Żylicz

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1 Introduction

The project "Value of Transboundary Nature Protected Areas Situated near the EU Outer Borders" – TRANPAREA, deals with economic valuation of protecting nature, particularly the remaining pristine nature that is shared between more countries, so-called transboundary nature protected areas (NPA). Transboundary NPAs comprise ecosystems and biodiversity that are preserved in near intact state and provide various ecosystem services, contributing to the human welfare.

The economically optimal allocation and management of pristine nature is complicated, and even more so in the case of cross-border nature areas. Pristine nature may have a use value (whether for non-consumptive use like hiking and wildlife/bird watching, or for harvesting activities like berry/mushroom picking and wood collection/cutting) as well as a non-use value, when the existence of nature is valued, without any need of visiting the area. Such passive use is non-excludable and non-rival in consumption, thus pristine nature areas that people attach non-use value to are by definition pure public goods. If non-use (passive use) values represent the dominating economic value, the collection of entrance fees from visitors will underestimate the true economic valuation of preserved pristine nature. The cross-border character of transboundary NPAs adds some complexity to their valuation. Theoretically, the preservation of transboundary pristine nature qualifies as an "international public good". As transboundary NPAs are contiguous natural areas, any part of the border could be assumed of equal value to people, disregarding any particular feature located on (only) one side of the border. Yet, being artificially divided by state borders, the possibility exists that transboundary NPAs could be perceived as two national public goods.

The challenge lies, thus, in assessing the non-use value of transboundary NPAs while investigating whether they are considered international public goods. The application of economic valuation studies can be a useful tool to improve the knowledge base on which public decision-making and management of pristine nature and transboundary NPAs is funded. Such valuation is normally based on so-called stated-preference methods, a survey-based method for economic valuation of public goods. On one hand, valuation of ecosystems has been criticized for attempting to put a price on nature. However, economic values normally relate to changes of nature areas (preservation versus alternative use), not to the value of nature as such. On the other hand, ecosystem valuations can back-up decision-making on public lands, as well as incorporate peoples' preferences into the decision processes.

The overall goal of the TRANPAREA project has been to provide information that contributes to the assessment of economically efficient preservation of scarce nature habitats. More specifically, the TRANPAREA project has aimed to investigate empirically whether transboundary NPAs located at EU's outer borders qualify as international public goods, by investigating people's stated preferences for preservation on both sides of the border.

In order to fulfil this aim, the objective has been two-folded: i) conduct comparative valuation studies of two transboundary NPAs - the 'Eastern' (Białowieża / Bielavieskaja Pušča) and 'Scandinavian' (Fulufjäll / Fulufjell); and ii) work out appropriate

recommendations based on the studies' implications and communicate the studies' findings to a wider audience.

To achieve the first objective, stated-preference surveys including choice experiment have been run at the 'Eastern' and the 'Scandinavian' cases. In the survey, respondents could choose among alternatives that depicted extended preservation of areas on both or only one side of the border, with varying costs. Thereby, each respondent faced 16 choices altogether. The surveys were conducted among samples of Belarusn and Polish citizens for the Białoweża / Bielavieskaja Pušča case and among samples of Swedish and Norwegian citizens for the Fulufjäll / Fulufjell case. The questionnaires, including the nature preservation scenario and choices among alternatives, were first developed in consultation with experts from different disciplines. Field trips into the areas of study also provided valuable insights into the development of the scenario. Then the questionnaires were elaborated further for the adaptation to self-administered surveys for ordinary citizens and tested by in-depth interviews ('Eastern' case) or focus groups sessions ('Scandinavian' case). This contributed to improving the content and design of the survey. Finally, the computer-assisted questionnaire versions were first tried in pilot tests.

Econometric analyses and modelling applied to the survey datasets have provided insights into whether:

i. estimated willingness to pay (WTP) for extended conservation of the transboundary NPAs is relatively consistent across the borders when adjusting by factors of difference in purchasing power and/or income level;
ii. the cases selected are qualified as "perfect" international public goods, i.e. WTP for extending the part of the transboundary NPA in the neighbouring country equals WTP for the domestic part;
iii. an 'international' free-riding effect is indicated, either stating higher WTP for preservation in the neighbour country and/or indicating a free-rider motive in responses to probe questions after the choice experiment, by the share stating that they believe the neighbouring country will extend the preservation irrespective of the preservation extension project depicted in the survey.

The results of the analyses and the implications derived from the choice/valuation exercise have been discussed with stakeholders in order to achieve the second objective (i.e., work out appropriate recommendations based on the studies' implications and communicate the studies' findings to a wider audience). Within this objective rests an aim of providing to the decision-making a research that assesses the economics of preserving, or extending preservation, in the transboundary NPAs.

This report communicates main results and policy recommendations to both the professional community and the transboundary NPAs' 'stakeholders', including EU and national authorities, local communities, business circles and environmental NGOs. Further dissemination activities include the celebration of workshops during the lifetime of the project, the creation of a project's website, the publication of several articles in peer-reviewed journals, the presentation of the project at several conferences and the distribution of informational materials describing the project at the national park visitor centres of Bielavieskaja Pušča / Białowieża and the Fulufjället / Fulufjellet, through email newsletters, social media, project website and by other means. A summary of all dissemination activities is provided in the appendix.

By studying elements of the economically efficient preservation of transboundary NPAs, this study may contribute to economically improved use of natural resources; showing the economic fundament for preserving, or even increasing the preservation, of scarce nature habitats.

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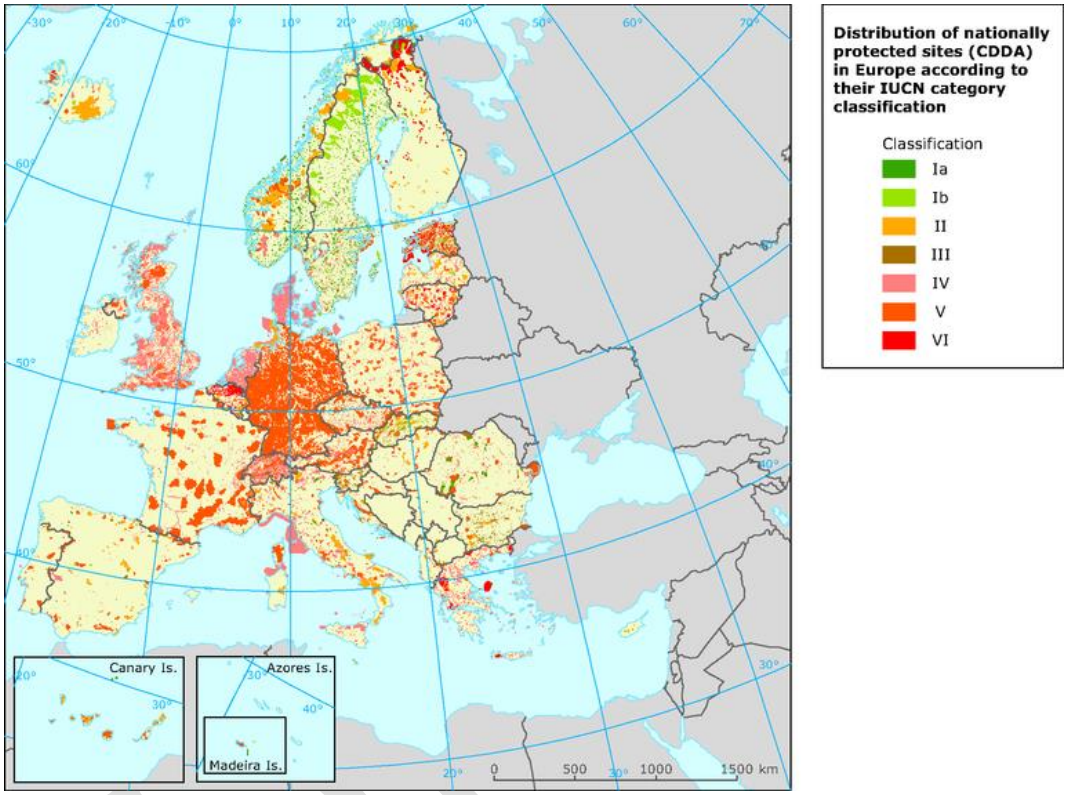
2 Transboundary nature protected areas

1.12 million km^2 of the EU 28 terrestrial land is protected in some way or another, either under national designations (Figure 1) or Natura 2000 (Figure 2), or some combination of the two (EEA 2016 a)[1].

Figure 1: Distribution of nationally protected sites (CDDA) in Europe according to their IUCN category classification (EEA, 2016b)



Source: EEA. (2016 b)

As shown in Figure 1, nature protected areas comprise various levels of protection, as defined by IUCN (1994). These include strict nature reserves (Ia), wilderness areas (Ib), national parks (II), national monuments or features (III), habitat/species management areas (IV), protected landscape/seascape (V), and protected areas with sustainable use of natural resources (VI) (IUCN, 2016). Features that have been taken into account to decide whether an area should be classified within one category or another include the scope of setting it under protection, its restoration capacity, the degree of human intervention (past and future), the level of disturbance that can be tolerated (e.g. human visitation), its regional representativeness, its uniqueness and intactness, the state of its biodiversity, ecological quality and integrity, diverse features (natural, cultural, geomorphological, etc.), its size and the type of management required to achieve objectives (ibid).

[1] *"Natura 2000 overlaps with nationally designated areas on 7.7 % of the EU land territory"* according to http://www.eea.europa.eu/themes/biodiversity/protected-areas/facts-and-figures/complementarity-of-protected-areas

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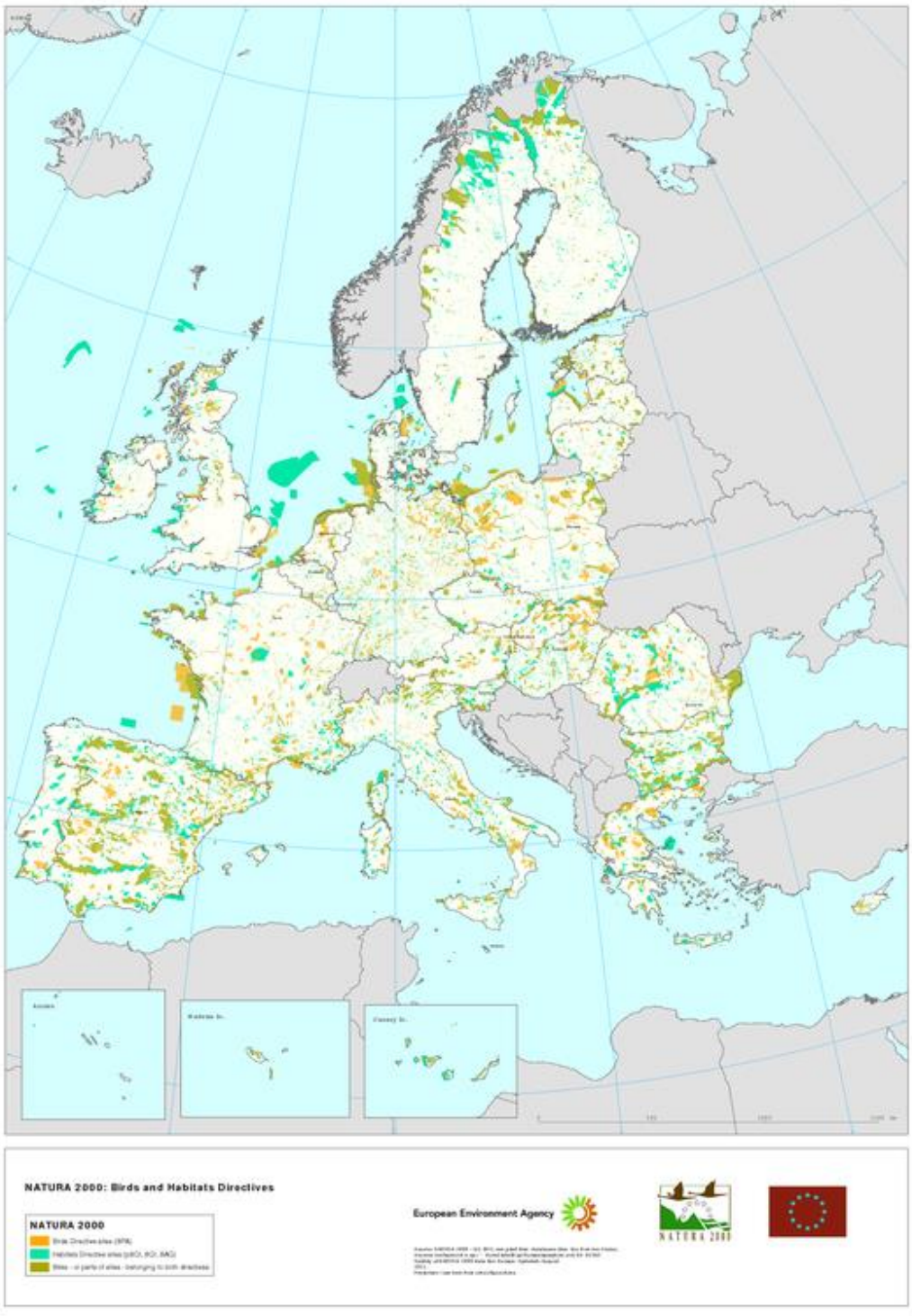
Figure 2: Distribution of the Natura 2000 network in the EU-27 (EEA, 2016b)



Source: EEA (2016 b)

Although the number of protected land areas is higher in Europe than any other continent (127.574), their average size is quite small (EEA 2016 a). To cope with this fragmentation, several European initiatives have been set up, with a strong focus on promoting

international cooperation across Europe. Natura 2000, which extends over 18% of the EU's land area and almost 6 % of its marine territory, is the largest coordinated network of protected areas in the world. Yet, one third of the network's sites is smaller than 100 ha and less than one third is greater than 1000 ha. A further initiative that pursues facilitating international co-operation in the management of protected areas is the EUROPARC Federation. EUROPARC gathers individual parks, national agencies, national and regional governments, some NGO's and individuals to share experiences and collaborate on projects (EUROPARC, 2016).

Moreover, there are several other regional initiatives aimed at improving international cooperation to manage transboundary nature areas, such as that at Wadden Sea (undertaken by the Netherlands, Denmark, and Germany) and the Danube River (undertaken by the riparian countries). There are also many cases of adjacent areas in two or more countries that are protected on both sides, especially in mountainous areas, such as the Pyrenees (Spain/France), the Alps (France/Italy/ Switzerland/Italy) and the Tatra (Poland/Slovakia). This contributes to improve spatial connectivity.

Transboundary protected areas comprise 4.6 million km^2 worldwide (UNEP-WCMC 2007), accounting for 14% of the 32 million km^2 protected terrestrial and maritime global surface area (Deguignet et al. 2014). In Europe, transboundary protected areas cover 188.153 km^2 (UNEP-WCMC 2007), which represents ca. 4% of the transboundary protected areas worldwide and approximately 17% of the total protected area in Europe. Levels of protections described above may vary between but also within nature protected areas. In the case of transboundary NPAs, levels of protection may be different at each side of the border. This, in turn, can affect functional connectivity, meaning that despite spatial connectivity, species cannot/are not spread at each side of the border.

A new discipline designated as "landscape ecology" has relatively recently surged to integrate fragmented ecosystems and facilitate connectivity. However, managing transboundary NPAs can result specifically challenging. According to the Global Transboundary Conservation Network[2] (2016) different barriers of physical, cultural, political, economic and infrastructural nature may exist. Further difficulties may include gaining the necessary support (especially from key agents with high impact and local communities), ensuring that national sovereignty is not threatened, making available the necessary resources to establish, manage and develop the transboundary NPA and ensuring a balanced investment between countries (WCPA, 2016). According to this network key factors to succeed are good communication, research and planning, as well as having clear targets against which the effectiveness of the initiative can be assessed (ibid).

Economic valuation studies can underpin decisions to whether or not protect nature areas, and if results show that people are willing to pay for protecting nature they may also contribute to creating the necessary support. Moreover, investigating whether transboundary NPAs are perceived as international public goods can help decision makers to develop appropriate policies regarding the allocation of resources, transboundary NPAs'

[2] This network was launched at the Vth IUCN World Parks Congress, gathers *"more than 1,000 organisations and 10,000 volunteer expert"* and *"offers expertise and guidance on all aspects of transboundary conservation planning, management and governance"* (WCPA, 2016).

management and/or the establishment/continuation/improvement of collaboration initiatives.

2.1 Use and non-use value of nature areas

Nature protected areas and transboundary NPAs can have both a "use" and "non-use" value. The "use value" implies its active use either for recreational purposes like hiking and bird/wildlife watching or, if allowed, for harvesting activities such as berry/mushroom picking, gathering of wood and extraction of timber. The "non-use" value or passive use of nature protected areas is linked to the ecosystem functions and services they provide, such as clean air, water balance, biodiversity and pristine nature. When people travel to visit nature areas, they indicate a willingness to pay for that nature area, inasmuch as they have travel-related costs (e.g. public transport tickets or fuel/car costs) and are willing to spend time and efforts to get to the nature area. However, people may be also willing-to-pay for (the preservation of) nature areas they do not intend to visit, because they value their mere existence.

In economic terms, if people attach non-use value to preserving an area, they are willing to pay for its preservation without using/visiting the area. The challenge is that non-use values of nature protected areas cannot be observed because the willingness to pay is not manifested in regular markets and (different from non-market use values) cannot be deducted from other behaviour (e.g., spending time to reach the area). In such cases, a survey-based approach known as the stated preference methodology can be employed to estimate economic valuation of the nature area that is not used, but still valued for its pristine state. In such surveys people are asked what they are willing to pay based on a hypothetical scenario, either directly (contingent valuation method) or indirectly (contingent choice method). Studies based on this method, can help to solve the problem of underestimating the true economic valuation of preserved pristine nature, if non-use values represent the dominating economic value.

2.2 International public goods

Public goods are goods that are non-exclusive and non-rival in consumption. The "use value" of pristine nature areas may not fulfil these requisites, i.e. entrance fees may apply and the number of visitors to a certain area may be limited. However, the passive use is non-excludable and non-rival in consumption. Thus, pristine nature areas to which people attach a "non-use value" are by definition pure public goods. Theoretically, transboundary NPAs qualify for being international public goods, i.e. any part of the border could be assumed of equal value to people, disregarding any particular feature located on (only) one side of the border. This would practically mean that individuals care for each part of the transboundary NPA equally, i.e. is stated willingness-to-pay (WTP) for extending the "foreign" part of the transnational park equals to stated WTP for extending the "domestic" part. However, such a theoretical hypothesis requires empirical verification by investigating people's real preferences.

Although transboundary NPAs are contiguous natural areas, contrary to other international public goods such as air, global climate or international seas (e.g. Baltic or Mediterranean),

they are divided by state borders. Such borders may affect pristine nature areas from different perspectives (natural, socio-economic, administrative). Protection regimes, for instance, seem to be tougher in Scandinavian national parks, as compared to many of the European mainland analogues. Yet, protected areas designation and the levels of protection these imply may also differ between Sweden and Norway. In Sweden a nature reserve (such as Lillådalen) implies less strict protection than national park designation, whereas in Norway the opposite is the case, with Fregn Nature Reserve having more strict preservation than the nearby Fulufjellet National Park.

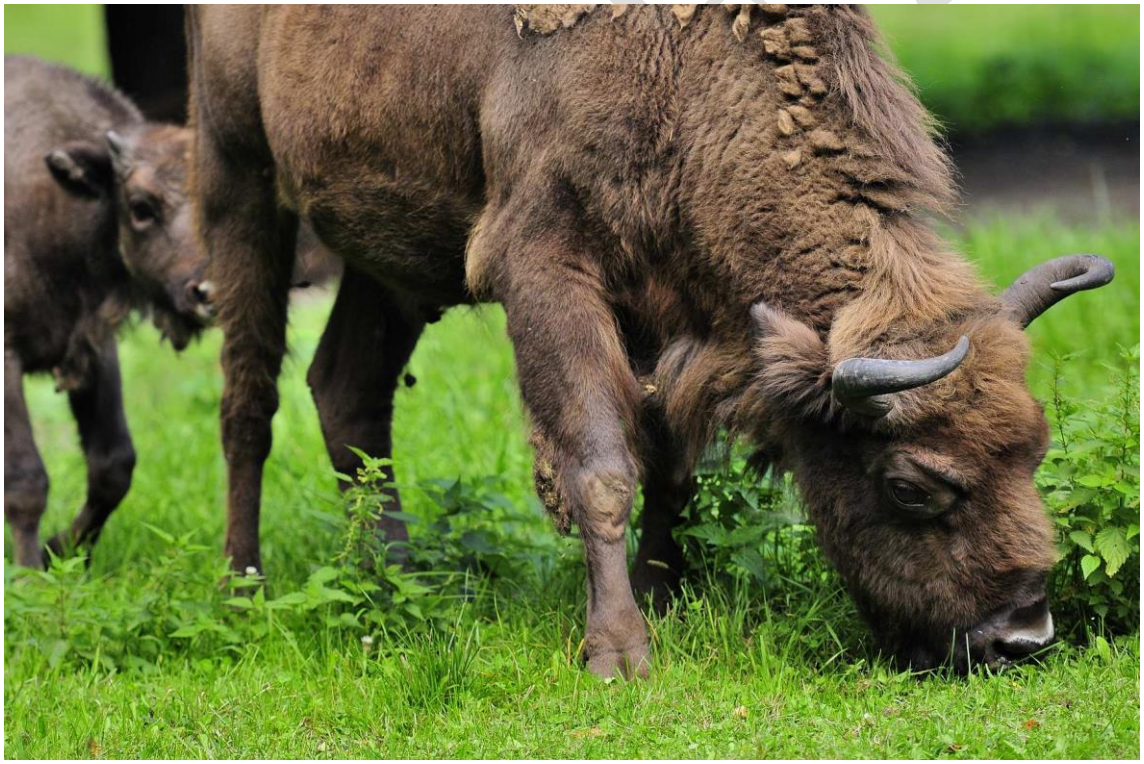
Since protection levels regulate the kind of human intervention and levels of disturbance that are allowed, these differences may affect the conditions in which species can develop and, thus, influence the natural value of the protected area at each side of the border. Moreover, people may perceive and value the protected nature area at each side of the border differently due to reasons not related to their natural value (e.g. patriotism). This means that the possibility exists that transboundary NPAs could be perceived as two national public goods.

3 Study area

3.1 Białowieża / Biełavieskaja Pušča

The Białowieża/Biełavieskaja Pušča Forest lying in between Poland and Belarus is considered one of the last intact lowland forests in Europe (Blavascunas, 2014) as well as one of the best known nature protected areas, which benefits from a high international reputation. For centuries it used to be hunting grounds for (subsequently) Ruthenian and Lithuanian nobility, Polish Kings, Russian Tsars, Polish and European high-life in the 1920s and 1930s, Nazi Reichsmarschall Herman Göring, and finally for the Polish and Soviet Communist Party officials. Approximately one third of the area has never been logged. Hence, the Białowieża Forest is one of the few forests in Europe governed by the natural rules to a large extent. Due to its relative intactness, the Białowieża Forest retains natural composition of forest ecosystems, functions and processes as well as typical forest flora and fauna (Wesołowski et al., 2016). Inter alia, the Białowieża Forest supports the unique semi-wild population of the European bison (*Bison bonasus*), the species once extinct and then restored following an international conservationists' effort.

Photo 1: European bisons in the Białowieża Forest. Paweł Kołodziejczyk ©

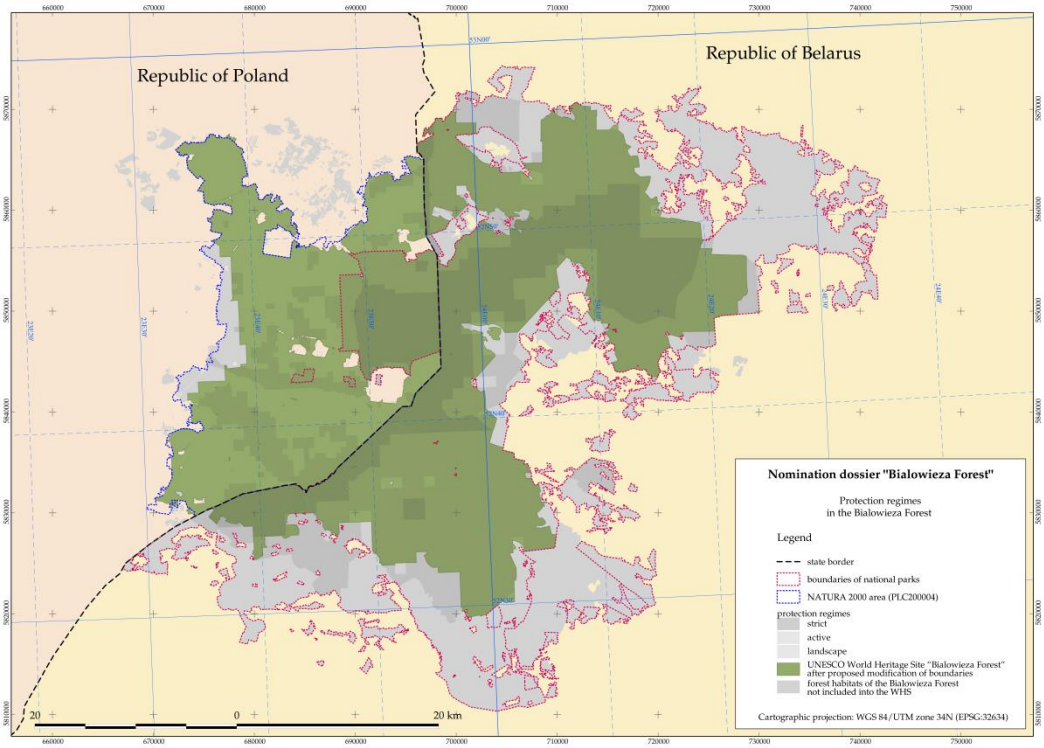


Some sort of protection regime has been applied to the Białowieża Forest since the Middle Ages, and the site has become one of the first nature protected areas of Central Europe in the modern sense. First, a nature protected area called Naturschutzpark has been established there by German military administration during World War I. A natural reserve (in 1921) and National Park (in 1932) have been established by the government of Poland. Since the ancient times and until the middle of the 20th century the Białowieża Forest was managed as a contiguous forest. However, since 1946 the Białowieża Forest has been

divided by the new state border into the Polish (about one third) and the Soviet Belarusian (the remaining two thirds) segments, which were governed in a different manner. Whilst the Belarusian part was always governed as a whole (subsequently as a strict reserve, state game reserve and, finally – the Biełavieskaja Pušča National Park); the Polish part of the Białowieża Forest has always been divided in terms of its management regime and such a division still persists (though the entire Polish part is currently covered with the Natura 2000 status). While a smaller part of the Polish segment of the Białowieża Forest is protected as the Białowieża National Park and a system of natural reserves, a bigger part of it is still managed as a production forest.

The idea of passive protection (which implies a total ban on human interference with the natural ecosystems and processes) has been implemented in both national parts of the Białowieża Forest, however to the different extent. In the Polish part passive protection applies to the Białowieża National Park and twenty-four nature reserves which amounts to 225 km^2 or approximately 35% of its total surface. At the same time, in the Belarusian part passive protection regime applies to the strict conservation zone of the Biełavieskaja Pušča National Park; the former corresponds with the IUCN category Ia (Dudley, 2008) and makes up a total of 570.5 km2 or about 37% of the Belarusian segment . Therefore, the forest fragments covered by the passive protection in the Polish and Belarusian segments of the Białowieża Forest constitute very similar proportions, though they differ more than twice in their absolute surface. Passively protected fragments of the transboundary Białowieża Forest which mostly overlap with its intact core are painted dark-green on the site map in Fig. 3.

Figure 3: The Białowieża/Biełavieskaja Pušča Forest



Source: UNESCO World Heritage Site Nomination Dossier for the Białowieża Forest

The remaining fragments of the Białowieża Forest are subject to active management including logging to a different extent – from partial protection to commercial forestry. A ministerial regulation was adopted in 2011 to limit logging in the part of the Białowieża Forest administered by the Polish State Forestry to 63.4 thousand m^3 for the next ten years. However the limit was exempted in the year 2016, thus proving the vulnerability of the site in the absence of a formal spatial protection regime.

Managed/industrial forest areas can be transformed to some semi-natural and, eventually, natural state too (Rey Benayas et al., 2008), but it takes time. The main idea of the survey scenario was a spatial expansion of the passive protection on adjacent areas, in order to re-naturalise forest ecosystems in a time-span of two hundred years, to improve the connectivity of intact ecosystems and wildlife, as well as to ensure survival of the natural "islands" in a longer perspective. In addition to such a protected area expansion, the survey also included a cost attribute for enabling monetary valuations. Obviously, there are financial costs involved in the national park designation/expansion process, a considerable part being administrative work and consultations, but also remuneration of land owners, and, in particular, monetary compensation to owners/operators of forests for the future loss of income from forest harvesting as a result of the protection regime establishment. The existence of such costs and compensations are assumed to be either known or being perceived as comprehensible/realistic for survey respondents, thus representing a credible cost attribute ("payment vehicle").

3.2 Fulufjäll/Fulufjell

In 2007, according to the last available list of transboundary protected areas (UNEP-WCMC 2007), Norway shared five nature protected areas with Sweden and three with Finland. However, new designations have taken place since them, among which we find our area of study.

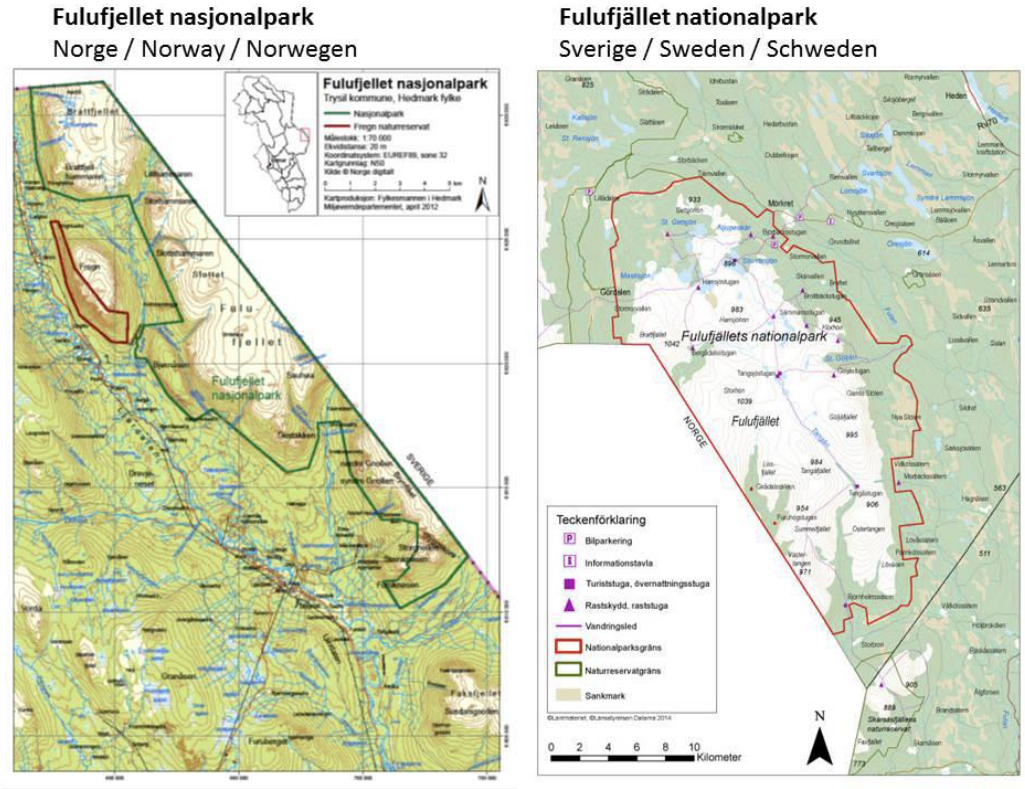
The Fulufjäll/Fulufjell area (Fig.4) is a mountain plateau with bare rock and forests situated on the border between the municipality of Älvdalen, in the County of Dalarna (Sweden), and the municipality of Trysil, in the county of Hedmark (Norway). The largest part of the Fulufjäll/Fulufjell area is situated on the Swedish side of the border, say about three fourths. The highest points are the mountain peaks Slottet – "the Palace" – (1047 m), on the Norwegian side, and there are also several peaks of about 1040 m on the Swedish side. Although the area consists primarily of a low alpine region, with large areas of thick lichen and some sparse forest cover, it still represents one of the relatively few remaining areas in Scandinavia with pristine old-growth (mixed/coniferous) forest. It hosts several rare and endangered plants, fungi, lichen, and bird species, and all the larger boreal predator mammals, including hibernating bears and lynx; and wolves and wolverines might also be observed (DN 2012a, DN212b, LS Dalarna 2011).

A considerable share of the Fulufjället/Fulufjellet area is protected. The transboundary Fulufjället/Fulufjellet National Park extends over 470 km^2, mostly covering the higher altitude bare rock area, but including old-growth coniferous forests in the mountain slopes and valleys (DN 2012a, DN212b, LS Dalarna 2011). If we limit the transboundary Fulufjäll area to the two rivers that run around most of the mountain plateau, Fuluälven-Fulan and

Göra/Ljøra, we obtain a considerably larger area than what is currently protected as national parks though. The national parks cover most of the mountainous area, except some minor part on the Norwegian side, in the southernmost corner, where there is a ski resort area with a ski slope. Moreover, some of the forested slopes and the lower areas close to the two rivers are not within the park borders.

There are several adjacent protected areas surrounding the Fulufjället/Fulufjellet transboundary NPA. On the Swedish side, Lillådalen (22 km^2) and Drevfjällen Nature Reserve (332 km^2) are located to the northwest of the Fulufjället/Fulufjellet National Park while Skarsåsfjället Nature Reserve (23 km^2) lies to its south and some Natura 2000 sites (the river Fulan) can be found on its eastern side. Besides, several other protected areas exist in the north-western corner of Dalarna county: Städjan-Nipfjällets Nature Reserve (225 km^2), Långfjället Nature Reserve (678 km^2), Vedungfjällen Nature Reserve (194 km^2) and Töfsingdalen National Park (17 km^2). On the Norwegian side of the border, protected areas comprise around 920 km^2. They include Femundsmarka National Park and Guttulia National Park (620 km^2) and several other areas (300 km^2) (LS Dalarna 2011).

Figure 4: Map of Fulufjället/Fulufjellet



Source: Fredman & Wikström (2015).

Fulufjället/Fulufjellet National Park is not presented as a transboundary NPA as such, although there is cross-border cooperation[3]. The Swedish national park is very clearly

[3] Cross-border projects and initiatives beyond the national park authorities that have attempted to increase cooperation between stakeholders at each side of the border are Hedmark-Dalarna samarbetet-

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established as a *national* park, governed by the state representative of the county, Länsstyrelsen, having its main Dalarna county office in Falun, and running the visitor centre, Naturum Fulufjället, at the entrance area to the park (http://www.sverigesnationalparker.se/en/choose-park---list/fulufjallet-national-park/visitor-information/visitor-centre/, last visited, 3 July, 2016). The entrance area is about 5 km to the west of Mörkret, which is about 25 km west of Särna. The Norwegian park is also established as a national park, but it is governed locally by a national park board, headed by a high political representative of the municipality of Trysil. The state representative of the county, Fylkesmannen, with main county office located in Hamar and a local national park office at Drevsjø (north of Fulufjell) has a secretary function in the national park board[4].

There are other evident differences between the national parks at each side of the border. 385 km^2 of the park area is located on the Swedish side, while only 82,5 km^2 on the Norwegian side (DN 2012a, LS Dalarna 2011). The national park was established in 2002 on the Swedish side and in 2012 on the Norwegian side, coinciding with the establishment of the Fregn Nature Reserve, northwest of Fulufjellet National Park (Miljøverndepartementet, 2012). The main visitor attractions are located at the Swedish side. Njupeskär is Sweden's highest waterfall (93 m), and can be reached, dry-shod, on a nicely established path close to the visitor centre (LS Dalarna 2011). Moreover, a Norway spruce tree with an estimated 9550 years old root system, the World's oldest living individual clonal tree, is situated within the park at the Swedish side[5]. Thus, the longer history, the larger size, as well as more clearly defined visitor attractions, may explain why there is more documentation and awareness about the existence of the Swedish part of the national park. Nevertheless, some measures have been recently taken at the Norwegian side to increase awareness about the site (Nasjonalparkstyret for Fulufjellet, 2015). These include upgrading of the main entrance at Storbekkåsen (in the southernmost part of the national park, close to the centre of Ljørdalen), also setting-up temporary information stands at various localities, and developing a common map brochure with the Dalarna County Administrative Board (ibid).

However, there are also similarities. The establishment of the national park did not take place without the emergence of conflicts, neither in Sweden nor in Norway. In Sweden, opponents showed mistrust and strong emotions about whether the establishment would bring clear benefits and reduce the impacts of traditional uses (Wallsten, 2009). Only when the perspective changed from restrictions within the national park to the socio-economic benefits in the outside boundary areas and the possibilities that would emerge from the creation of the national park, the idea gained local and regional support (Wallsten, 2003, 2012).

Gränskommitté (http://hedmarkdalarna.com/om-granskommitteen/) and https://www.fylkesmannen.no/Hedmark/Landbruk-og-mat/Bygdeutvikling/Landbruksbasert-reiseliv/Grenseoverskridende-samarbeid-i-Fulufjellets-nasjonalparker/. The cross-border cooperation seems even more developed in the protected areas to the north of Fulufjäll, in the so-called "border land" - Gränslandet: http://www.graenslandet.se/.

[4] http://www.trysil.kommune.no/nyheter/Sider/Nasjonalparkforvalteren-er-på-plass.aspx, last visited on 3 July 2016

[5] https://sverigesnationalparker.se/en/choose-park---list/fulufjallet-national-park/national-park-facts/plant-life/, last visited on 3 July 2016

In Norway, the reasons for establishing the national park was to protect a large, coherent and partly undisturbed mountainous and forested ecosystems of high biodiversity value, that contains distinctive and representative species of mountain vegetation, (some old-growth) coniferous forests, flora, fungi and wildlife. A further important reason was the possibility of attaching this area to a larger park area on the Swedish side of the border, that would provide a larger and more comprehensive ecological and landscape unit (DN 2012a, Nasjonalparkstyret for Fulufjellet, 2015). Opposition came mainly from the forestry industry and from the ski resort adjacent to the southern part of the park, at Ljørdalen (Miljøverndepartementet, 2012)[6].

The Swedish part of the national park is divided into zones with different levels of protection: i) undisturbed zone (60%); ii) low activity zone (15%); iii) high activity zone (25%); and iv) structure zone (Wallsten, 2003). The division into zones shall reflect the resources in each zone, serve as communication tool and balance the provision of national and local interests (Wallsten, 2009). Moreover, the zoning influences on-site management, visitor impact, social interaction level and the probability to experience solitude, silence and unspoilt nature (ibid). Recreational activities (e.g. hiking, making a fire, pitching a tent, fishing, elk hunting) are allowed in the high activity zone and – to some extent – in the low activity zone, although they may be limited to certain periods of the year[7], but hunting of small game is forbidden in the national park (Wallsten, 2012).

Zoning was also proposed on the Norwegian side but was abandoned because local land owners were unwilling to accept a ban on hunting in any zone of the park (Miljøverndepartementet, 2012). Some areas considered for inclusion into the national park at the Norwegian side were abandoned because they were "planned" for other purposes (e.g. as parking areas at the ski resort area or as forest areas for the forest industry) (ibid). Moreover, the wish from the Swedish side to extend the national park on the Norwegian side was seen by some as a kind of pressure (Miljøverndepartementet, 2012). As a result, the area protected as national park at the Norwegian side is not divided into zones but is a mix of "low" and "high activity zones". Restrictions are similar to those of the high activity zones on the Swedish park side, though no visitor centre exists. Many of the former local harvesting activities can still take place within the park, although locals need to apply to the board for felling/collection of elk (moose) within the park, as well as for entering with snowmobile (ibid). The existence of different regulations at each side of the border affects, for instance, the development of infrastructure for recreational activities such as appropriate trails that crosses the border. Most of the trails from the Norwegian side run into zone I at the Swedish side, which is the zone with the highest protection level of Fulufjället/Fulufjellet national park.

[6] The ski lift is on the western side of the small peak, Steinknøsen (817 m), situated just southwest of the larger Storgnollen (868 m), both of which are partly within the national park.

[7] https://sverigesnationalparker.se/en/choose-park---list/fulufjallet-national-park/visitor-information/safety-and-rules/, last visited on 5 July 2016

4 Method

4.1 Choice experiment and questionnaire design

In order to achieve the project's objectives, TRANPAREA has employed stated preferences methodology for the economic valuation of park extension and forest landscape renaturation. More specifically, discrete choice experiments were applied.

Stated preference methods represent an approach to performing economic valuation studies of "non-market" goods/services, e.g., the protection of nature areas (Bateman et al., 2002; Carson & Louviere, 2011). This is the only suitable methodological approach to economic valuation of goods/services that involve a considerable (or dominant) share of non-use values (Smith, 1987; Mitchell & Carson, 1989; Adamowicz et al., 1998; Bateman & Willis, 1999). Following Carson and Louviere (2011), the term "contingent valuation" encompasses different elicitation techniques, like the term "stated preference". One elicitation technique is to ask the respondent if he/she accepts payment for a specific change (Hanemann (1984), like a national park extension. In discrete choice experiments, individuals are asked to choose among options that may or may not involve a change. In the options, one of the attributes must be a cost tag, so that willingness to pay can be estimated (Adamowicz et al., 1998; Bateman et al., 2002).

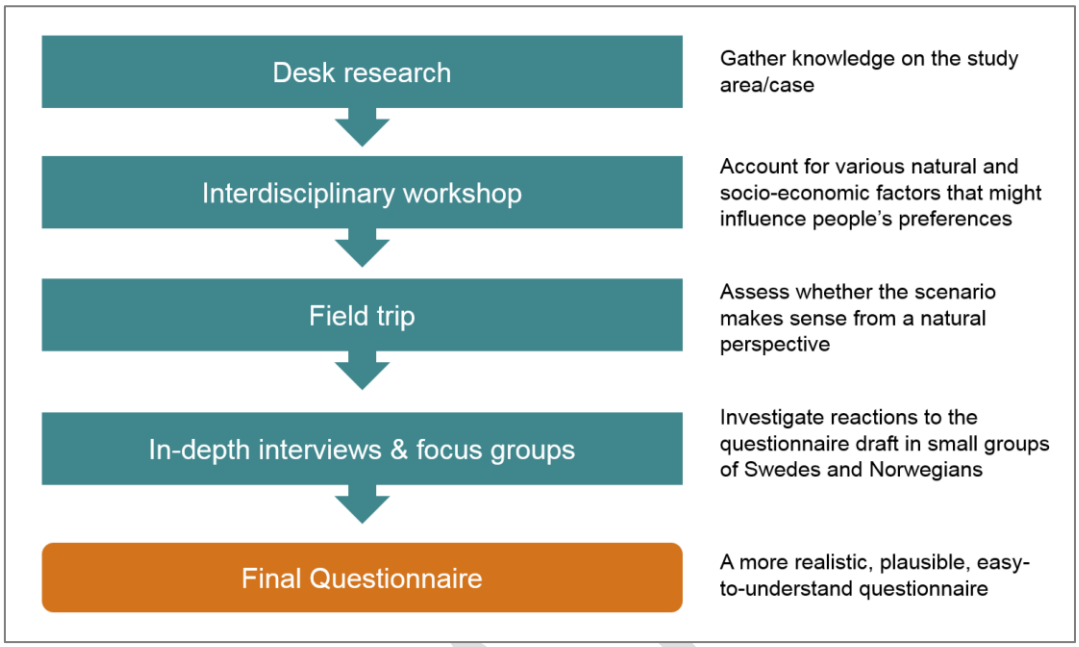
Stated preference (or "contingent valuation") methods are survey-based and involve the description of a (more or less) hypothetical scenario. Therefore, it is fundamental that survey respondents understand the scenario and the choice/valuation task, as well as that they find the scenario and payment mechanism realistic. Policy consequentiality of the survey exists when the respondent believes that the results of the survey can influence actual policy, whereas payment consequentiality exists when respondents believe that there is some non-zero probability that they will have to pay something close to what they state or indicate by their responses (Herriges et al., 2010; Carson & Groves, 2007).

In order to ensure a realistic, plausible and easy to understand survey, the development of the final questionnaire comprised several steps. These are illustrated in Figure 5 and included the celebration of an interdisciplinary workshop, a field trip, and in-depth interviews ('Eastern' case) or focus groups ('Scandinavian' case). The questionnaires were, first, prepared in English, and then translated into Swedish, Norwegian Bokmål, Polish, and Russian. Finally, computer-assisted pilot surveys were conducted.

4.1.1 Interdisciplinary workshops

The main aim of the interdisciplinary workshop was accounting for the various natural and socio-economic factors that might influence people's preferences and adjust the preliminary methodological settings within the choice experiment framework to make the scenario more realistic/plausible.

Figure 5: Steps followed to develop the final questionnaire used in the computer assisted survey



Based on the insights gained from the interdisciplinary workshop, plus field trips carried out by project core members to Białowieża in the autumn of 2013 and to Fulufjäll in the spring of 2014, a new questionnaire version was developed. While the scenario would involve the extension of a stricter protection regime in the Białowieża forest area, it would involve the extension of the national park borders in Fulufjäll, an inclusion of forest areas that to a large extent had been managed for wood production. The questionnaires were developed in English, to ensure consistency between the questionnaire employed in the "Eastern" case (Białowieża) and the one employed in the "Scandinavian" (Fulufjäll), and then, in the final phase, translated into Swedish, Norwegian, Polish, and Russian.

In the following we describe the main topics and conclusions of each of the workshops celebrated for the 'Eastern' (Białowieża / Bielavieskaja Pušča) and 'Scandinavian' (Fulufjäll / Fulufjell) cases.

The Eastern Interdisciplinary Workshop was held at the Faculty of Economic Sciences of the University of Warsaw on 3rd-5th December 2013, while the Scandinavian Interdisciplinary Workshop was held at Oslo Airport Gardermoen on the 25th of November 2013.

The essence of the both events was to confront the initial research ideas prevailing within the TRANPAREA Project Core Team against the interdisciplinary expertise of the external experts and/or sites' stakeholders, invited to participate at the workshops and thus frame the forthcoming valuation study into interdisciplinary context.

Six invited experts/stakeholders from Poland, Belarus, Sweden, Hungary, and Spain participated in the Eastern workshop, while three external stakeholders attended the Scandinavian workshop, together with the researchers working within the project.

Participants brought expertise from various disciplines of conservation biology, nature management, landscape analysis, economics, tourism, journalism and social animation.

Photo 2: Discussion of the TRANPAREA Core Team with the Białowieski NP officials, September 2013

The workshops mainly focused on presenting and discussing the draft scenario, making scenario adjustments, and considering the inclusion of possibly other relevant issues (natural, social, other). Participants also discussed the main differences and similarities between the two case-studies (Bielavieskaja Pušča / Białowieża and Fulufjället / Fulufjellet). This was important in order to keep scenario settings and questionnaires as similar as possible across cases.

The original draft scenario presented consisted in "extending the strictly preserved area within the park". Here, it was suggested that the scenario should explain the practical implications of establishing or extending so-called undisturbed zones in terms of benefits (e.g. regeneration of habitat and ecosystems; increased environmental function; preservation for scientific purposes and future generations) and costs (e.g. limitations on the existing business activities and of its recreational function and reduction of business and local income). The original draft scenario presented also included an annual compulsory tax for adult citizens of Sweden and Norway. Such a tax could be collected by a bilateral funds (e.g. Swedish-Norwegian Fund for Conservation of Fulufjället/Fulufjellet, possibly under the auspices of an international organisation like UNESCO or IUCN) and would be exclusively spent on the provision of undisturbed zones of Bielavieskaja Pušča / Białowieża and Fulufjället/Fulufjellet in accordance with the adopted conservation programme, to cover conservation costs and the lost profits of local populations due to the stricter protection regime.

Alternative scenarios discussed included i) the extension of the national park (instead of undisturbed zones), ii) the creation of habitat corridors to connect the national park with nature protection outside current park areas (e.g. between Fulufjellet and Fregn) and thus improve connectivity; iii) and "packages" of protection/management improvements.

One of the Scandinavian workshop participants' reaction to the draft scenario was that it would make little sense to integrate zones III and II into (the strict preservation) zone I (on the Swedish side, as zoning does not exist on the Norwegian side), because it would provide no particular added ecological value. Instead, it was indicated that it would make more sense to enlarge the national parks on both sides (the Norwegian area to the west and the Swedish area to the east).

A topic which gained special attention during the discussions at the both workshops was the need for improving connectivity because despite of protecting more and more areas, the fragmentation of nature areas is increasing. Improving the functional connectivity was, thus, suggested as a reasonable scenario alternative to increase the quality of the protected area from an environmental perspective. However, it was indicated that creating scenarios that involved improving functional connectivity increase the probability of human use value (making it more difficult to isolate non-use values in the economic valuation).

Moreover, participants indicated that TRANPAREA should consider the inclusion of other protected areas in the Norwegian/Swedish case study, and that this could possibly be linked to the issue of "lack of connectivity" between protected nature areas. The drawback would be that this would require a labelled choice experiment, which could make the questionnaire too complicated.

A further important conclusion was that the background from the scenario development should be comprehensively described, because knowledge plays an important role on how nature and protection of natural habitats is perceived. As an example, a participant indicated that previous studies show how an initial negative perception of dead wood may turn positive under the explanation of the ecological functions provided by dead wood.

It was also indicated that questions (and especially those at the beginning of the questionnaire) should be carefully selected in order not to motivate participants to hiding the truth and, thus, disproportionally increasing the share of participants who "apparently" care about the environment. This is, of course, a fundamental challenge of survey recruiting when the desire is to collect a sample fairly representative of the (adult) population, not a self-selected sample of survey-topic enthusiasts.

Further items that were proposed to be included in the questionnaire were questions to determine prior knowledge of the park as well as the place of residence. The reason for this was a study conducted and presented by one of the participants in Poland and Belarus, which shows that opinions about whether or not to enlarge the protected area depend on the distance to the park. More specifically, it was reported that locals associate enlarging the park with lowering income (and thus, react negatively), while many non-locals see park enlargement as something positive. Results from the same study also show that those having their income primarily from tourism would probably see park extension neither as negatively as locals nor as positive as non-locals.

Participants of the Białowieża workshop underlined that difference in preferences towards additional protection of the domestic and foreign segments of the transboundary natural

site may be underpinned with various factors, of which only a part could be of conservation reasons, while other might express lack of trust, strategic behaviour, patriotic considerations and other attitudes and cognitive processes; or those differences might reflect overall difference in the country-specific governance and internal regulations.

Photo 3: TRANPAREA Core Team's Fieldtrip into the Białowieski NP Strict Reserve, September 2013

During the workshops it also became clear that there are important differences between both cases (Białowieża and Fulufjäll) and the four countries (PL, BY, SE, NO) concerning the public awareness of the national parks, the role of national and local authorities and the relationship between public bodies and forestry industry. Therefore, it was concluded that the two case studies could require development of somewhat different scenarios, however subordinated to the joint research idea.

Fieldtrip of the core project team to Fulufjellet / Fulufjället has initially been scheduled to be organised within the WP2 duration period. However, because of the unfavourable natural (weather and trails) conditions it has been postponed for the spring 2014 and arranged on 11-13th April 2014 where three Core Team members have visited the site. During the visit they have:

- met with the staff of the Fulufjället NP, delivered presentation of TRANPAREA project and discussed details of prospective survey scenario with them.
- made a short reconnaissance in the Fulufjället NP by the trail from Naturum to Njupeskär waterfalls.

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- watched an educational film about Fulufjället NP, addressing the main local values and problems.
- observed the natural (i.e. forest) conditions in the close surroundings of the Fulufjä/ellet NP including in the Lillådalens Natural Reserve (SE) and Fregn NR (NO).

As a result of the fieldtrip, valuable inputs have been made into the survey scenario and questionnaire. After it, the ultimate conclusion about principle consistence of the Białowieża/Bielavieskaja Pušča and Fulufjellet/Fulufjället cases has been made as well as particular solutions have been suggested in order to maintain it in the study. Thus, the same idea of expanded passive protection has been employed as a central one for the two cases despite the context specific details.

At the end of 2014, the draft questionnaire was prepared in English and it was translated into the local languages by the professional interpreters: Fulufjäll questionnaire version was translated into Norwegian Bokmål and Swedish, while Białowieża questionnaire version was translated into Polish and Russian. The scenario (protection programme) in the questionnaire envisaged the addition of adjacent forest areas to the national parks and setting them up under "passive protection regimes". The larger part of these additional forest areas is not currently in a "natural forest" condition. Having been exploited for wood production in recent times a considerable proportion of them can be considered as "wood production forest", although some of the forest areas have a semi-natural character. Yet, left to the "forces of nature" under so-called "passive protection", over time (say, 200 years), these areas will gradually be transformed back into some near-natural state. The introduction of such a scenario implies a new perspective in nature protection management, since selection of forest areas for protection has targeted already established old-growth forest in a near-natural state.

4.1.2 In depth interviews (Eastern case)

With the purpose of the questionnaire testing for further adjustment and improvement, a series of in depth interviews has been taken in Belarus and Poland in the beginning of 2015 with the help of the professional market survey agency staff. In total, nineteen in depth interviews have been administered face-to-face in Minsk, the capital of Belarus while five more interviews have been administered later in Warsaw. In the first part of the interview, the respondent was asked to fill in the questionnaire, while in the second, debriefing part a semi-structured discussion was conducted between the respondent and the two interviewers (member of the project Core Team and professional interviewer). Besides, the organisers kept control over the timing of filling in different chapters of the questionnaire and provided a audio recording of the entire conversation. The average time of filling in the entire questionnaire equalled 37 minutes, which exceeded the average time of the interview targeted for the survey.

The following observations have been made as a result of conducting in depth interviews and their analyses:

Before the choice experiment exercise, some illustrative example would be useful to explain the respondents what they should do, what means what in the choice-card; it should be clearly explained that every choice situation is independent an not connected with the

previous or subsequent ones. In the pilot questionnaire the respondents tend to make comparison across the choice-tasks, they always want to return to the previous choice-task; it seems to them the choice-tasks double. Already on the second choice-task the questions occur on what is the difference as compared to the previous one; what is alike and what differs in between the situations.

Block 5. The Białowieża Forest protection programme:

The through description of the international control should be supplied, including what the funds will be spent on. The essence of the programme of protection should be given, since the questions on the protection programme follow this block, however the respondents can hardly remember its main idea.

The paragraph about UNESCO should not split the choice experiment instruction.

The question on important/less important elements of the protection programme should be more straightforward, since many respondents misunderstood it; the question should preferably follow the choice experimental part in order not to be out of the context.

The question 13 in fact comprised many questions; their number should be shortened. Many of the questions are structured pairwise with the mutual contradiction, so many of the respondents perceived them wrongly and answer with logical mistakes (e.g. many were giving positive answer to a pair of mutually contradictory questions). It would be better to exclude such contradictions.

Block 2. The description of the term 'passive protection' should be extended. The block comprising information on production vs natural forests could be shortened.

Infographics is required, because the amount of plain text is excessive; instructional infographics (possibly, animated) could be before the choice experiment.

When making choices, the respondents pay attention to both area and proportion (percentage). An accent should be made on either one or another; possibly absolute extension in hectares should be emphasised, as per cent are less straightforward.

The wording of the questionnaire should be simplified in general: official/scientific terms and expressions like 'protection programme', 'recreation' should be used less often (or their meaning should be given explicitly).

4.1.3 Focus groups (Scandinavian case)

The aim of the focus groups was to investigate Swedish and Norwegian reactions to the questionnaire draft intended for the Fulufjäll/Fulufjell case study, in order to improve the questionnaire design, its structure and its wording, and, thus, increase the response rate and the data quality of the subsequent internet-based surveys in the two Scandinavian countries. There is a long tradition of using FG and other qualitative analysis in the preparation of survey material for stated preference studies (Mitchell & Carson, 1989).

Two focus groups were celebrated in February 2015, one in Stockholm and one in Oslo. The recruiting and moderation of the Focus Groups was commissioned to NORSTAT, while TØI briefed the moderators, acted as an observer of the FG and committed itself to the reporting of results. The FG were meticulously planned – following recommendations

described in Krueger & Casey (2009) –, and included the design of a questioning route, which was further enhanced with moderators' comments, received during two briefings. In both the briefings and the applied questioning route for the FG, a distinction was made between issues that were of primary importance (needed to be known) and those that were of secondary importance (would be interesting to know). This allowed the moderators at both sites to follow a similar structure and keep the discussion focused around key issues.

The "questioning route" included questions about the best/worst elements of the questionnaire; the easiest/most difficult parts/questions to understand; the most frustrating elements; the point at which participants could find it difficult to continue; the understanding of key concepts (forest protection, production forest, natural forest, semi-natural character of forests, decaying trees, dead wood, protection programme, national park, human intervention) the Fulufjäll/Fulufjell area and the National Park; the protection programme's reliability, clarity and the inclusion of an international organization; and the choice set (its understanding of it, the presentation of the attributes, the capacity to compare each of its attributes).

FGs at each site counted with seven participants and there was a relative good distribution of age, gender and civil status. Participants also lived in different household structures and practiced different occupations. Both FG were quite active and constructive.

The questionnaire was handed out with single-sided print. It did not include the logos of the institutions conducting and funding the study, while the additional two sheets (also with single-sided print) with four questions from the questioning route, did have such logos. The questionnaire draft applied in the focus groups comprised 14 pages and several parts which can be summarized as follows:

- Introduction (aim of the study)
- Questions concerning respondents' recreation activities in the forest
- Description of production forests and natural forests with focus on the functions of natural forests, including picture illustrating their differences
- Description of the alpine area Fulufjäll/Fulufjell that extends the border between Sweden (Älvdalen municipality in Dalarne county) and Norway (Trysil municipality in Hedmark county), followed by questions concerning respondents' level of knowledge about the location and visits to the area
- Description of the forest within and outside Fulufjäll/Fulufjell National Park, which was established in 2002 on the Swedish side and in 2012 on the Norwegian side, followed by questions regarding respondents' opinions about the extension of the protection at each side of the border[8]
- Presentation of a protection programme by which a larger part of the forest in the Fulufjäll/Fulufjell area can be part of the national park(s), including the description of

[8] The term "passive protection" was not applied in the Swedish questionnaire draft for the focus groups (draft of 16 Feb 2015), based on the language correction of the Swedish version that we received few days before the focus group sessions. It was also (partly) removed from the Norwegian questionnaire, but the term remained (due to a lapse of error) at two places in the Norwegian questionnaire draft of 16 Feb.

an obligatory tax payments, charged nationally, and then transferred to bilateral target fund under the auspices of an independent international organisation (UNESCO)

- Tabular presentation of a choice set (including status quo) implying different levels of increased forest protection on each side of the border at different extra costs for the households[9]
- A series of statements upon which respondents are asked to express their level of agreement[10]
- Questions about socio-demographic characteristics

Questions asking respondents their opinions about various parts of the questionnaire were removed in the questionnaire's version used for the FG because it was preferred to select some of them for the FG discussion, thus including them in the questioning route.

In the following we summarize the insights gained from the analysis of the comments made by participants during the FG sessions.

The aspects of the questionnaire regarded as most positive by FG participants were the topic of the study, (it was considered important and engaging); the introductory part; and, especially, the pictures and tables used to describe the differences between production forests and natural forests. Contrarily, the aspects mentioned as least positive were the length of the questionnaire (too much text and a far too many statements at the end of the questionnaire on which respondents were asked to indicate their level of agreement); structural weaknesses (the "lack of flow" between questionnaire parts, particularly from the scenario to the choices); and some unclear and even provocative questions and statements (particularly the many adversative comparisons of Sweden and Norway, as well as the perceived lack of information to agreeing or disagreeing on certain statements).

Stated difficulties were related to the above-mentioned weaker parts of the questionnaire as well as to the lack of structure, clearness and motivation for introducing certain elements. Elements contained in certain parts, especially the description of the programme and the scenario setting, the choice set and the statements on which respondents were asked to indicated their level of agreement, were perceived as especially difficult. For instance, the choice set was perceived as difficult due to the lack of explanation of the attributes in the preceding text ("protection programme"), as well as some difficulty in understanding measurements (hectare). Negative and difficult to respond elements would also provoke frustration among FG participants. All this contributes to raising the cost of the survey response and indicates a risk of increasing the rate of incomplete responses in the subsequent internet-based survey.

[9] We applied just one choice set example (instead of 16, as planned for the subsequent survey), based on a former draft version with three alternatives plus a "no change" option, as this was a part of the questionnaire that was still in development in the period just preceding the focus group sessions. However, we considered that the assessment of the graphical design and wording in the choice set example was more important in a qualitative assessment (while the assessment of attribute levels is more appropriate for the quantitative pilot test on the internet). We applied similar design and figures for the Swedish and Norwegian focus groups, based on proposed attribute levels, but selecting combinations from the proposed set avoiding dominant alternatives (given an assumption that the valuation of increased protection was greater than or equal to zero).

[10] The Likert-type scale was from left to right: I definitely do not agree; I rather do not agree; I neither agree nor disagree / It is hard to say; I rather agree; I definitely agree.

FG sessions also showed that the Fulufjäll/Fulufjell area it is not among the most iconic national parks (at least not in Norway). The map was proven indeed necessary as it helped to locate the area, although some reacted to the unclear state border and French language. FG participants expressed the need for more information about the forest areas considered for protection rather than specifications on the exact location of roads and rivers. Participants suggested that information provided in the questionnaire could include examples of endangered and rare species that potentially will regain these areas after some decades of passive protection, although this was not spelled out in detail. The attempt of exactly locating the area "by words" seemingly had the undesired effect of posing local knowledge as a prerequisite for being able to continuing the survey.

What the protection programme and the choices concerns, FG participants reacted towards a perceived over-simplification, in which protection was reduced to a matter of area size and costs, while not mentioning the aspects concerning its ecological value (what made, or can make, this place so special). To some extent, this can be taken as a reaction to weaknesses in the questionnaire structure, the too long text and the space between the presentation of the natural forest and the potential natural forest development in the Fulufjäll/Fulufjell area, on the one hand, and the presentation of the protection programme on the other.

After the FG sessions it was clear that the questionnaire needed to be shortened by removing/restructuring far too long texts, substituting texts with illustrations whenever possible, and deleting unnecessary details and certain statements. It was also indicated that the questionnaire needed to be restructured and have a more natural flow, i.e. questions and texts should be reorganized such that questions would be immediately preceded by the relevant text. A key element that required review was the scenario presentation (the protection programme) because participants perceived that attributes were not properly introduced. Participants also demanded that the potential ecological value would be better portrayed (e.g. with illustrations of some of the rare and endangered species). Some also mentioned that the juxtaposition of Sweden and Norway should be removed and/or better explained. A more specific suggestion included the use of "square kilometres" instead of "hectares" in the choices. Most worryingly, FG participants expressed that the credibility that had been established in the first half of the questionnaire had been crushed in the second part.

Some elements proposed in the FG seem difficult to be followed-up, such as more detailed information about the choice attributes, the ecological value or potential ecological value of additional areas and the costs of buying the land, management/administration, etc. This partly was due to the fact that it became tedious to obtain precise information from the relevant bodies and partly because there was not possible to describe the motivation for the study (the international public good test) too much in detailed, as this might have possibly affected the choice behaviour and undermine the study results. The juxtaposition of Sweden and Norway could neither be completely removed, as it is a fundamental part of the study testing. Neither could be introduced a "state budget (re)distribution", instead of "personal/household WTP", because this is beyond the scope of the TRANPAREA project.

However, although not all the suggestions could be implemented without compromising the research objectives, the focus groups' analysis contributed to the development of a

clearer, fluent and simple questionnaire. Based on the FG in Stockholm and Oslo, major changes made in the questionnaire included:

i) removing unnecessary (duplicated text about "production forest" and "natural forest";
ii) simplifying and shortening the presentation of the Fulufjäll/Fulufjell area, clarifying that forests in the area around the park are (mostly) not protected (i.e. "production forest" or "semi-natural forest");
iii) a clearer and fluent introduction of the choice attributes in the presentation of the protection programme, stressing the issue of re-transforming (mostly) "production forest" back to "natural forest" by extending the national park; explaining better that size does matter; and specifying that it is a matter of how to share the protection and the cost between the countries that share the transboundary NPA;
iv) removing UNESCO as main body to handle the taxes of the protection programme, as this was perceived as surprising in the Scandinavia context
v) reducing the number of statements upon which respondents were asked to indicated their level of agreement, and re-structuring them in blocks that are properly introduced.

Findings of the focus groups (FG) have been summarized in an own report, which can be downloaded from the project's website.

4.2 Survey and sample

4.2.1 Final questionnaire

The final questionnaire included the following items (1) introductory questions, (2) scenario, (3) discrete choice experiment, (4) debriefing block of attitudinal questions, and (5) a block of questions on respondent's socioeconomic characteristics.

In part (1) respondents were asked some questions in order to establish whether they were national park / forest visitors and to introduce the topic of the questionnaire, i.e. differences and similarities between "natural" and "production" forests were presented and the study area was described.

Part (2) depicts a scenario in which the national park is enlarged by including adjacent areas to the national park containing "production" and "semi-natural forests" are setting them up under "protection based on natural development" under which after some time span, they would also eventually resemble "natural forests". Examples of possible areas to be included into the park by setting them under "passive protection" are given. They comprise the Bergåa river valley, on the Norwegian side, that would link the small Fregn Nature Reserve (4 km^2) to Fulufjellet National Park, as well as the Fulan river valley, which is managed for forestry, and Lillådalen, which is already designated a nature reserve, on the Swedish side. Further, the scenario describe that this extension would impose costs for by each tax-payer. Such costs would be in the form of a compulsory tax administered bilaterally between the two countries.

Based on this scenario, respondents were, then, asked to choose among 16 comparisons of different options, which involve different extensions of the national park, on one side or both sides of the border, at different costs and a status quo option (part 3).

Part (4) included a block of attitudinal questions of identical closed type, upon which respondents were requested to indicate their level of agreement on an ordered Likert scale[11]. Some questions in this part assessed the plausibility of the scenario, a key element to validate results obtained by applying stated preferences methodologies. Other questions might explain individual perceptions and beliefs (e.g. conservationism, patriotism, free-riding, plans to visit the site, etc.), which may underpin specific aspects of the choice decisions made by the respondents. Some of the attitudinal questions were country-specific, but most were identical for both countries. A list of the attitudinal questions in each country specific versions is available in the appendix (B).

Part (5) was limited to some few questions on the respondent's household structure, income and wealth, as socioeconomic characteristics (age, gender, place of residence, postal code, and education) of respondents were available because they served as recruitment criteria.

Along the questionnaire questions were included to assess whether the questionnaire, the topic, the scenario and the attributes of the choice experiment were understood. As comprehensiveness of the survey is fundamental in stated preference methodologies, the inclusion of these questions are key to validate results.

An English copy of the final questionnaires can be found in the appendix (B).

4.2.2 Survey Administration and Sample

A specialised internet panel agency (IQS Sp.zo.o)[12] was employed to administer the survey at Scandinavian case, while two other agencies were contracted to administer CAPI surveys in Poland (MillwardBrown Poland)[13] and in Belarus (Entrepreneur Dzmitry Kavalou).

After having been adapted to an internet format, the questionnaires were pilot-tested for a sample of 458 Swedes and 282 Norwegians, during September and October 2015 for the "Scandinavian case", and for a sample of 100 Belarusians (in July 2015) and 100 Poles (in January 2016) for the "Eastern case". As the questionnaire was found to work very well in the pilot, it was carried over to the main survey without major changes. Only the design of the choice attribute levels was adjusted, using the pilot survey MNL parameter estimates as priors in producing *d*-efficient designs. Therefore, pilot survey results are included in the results of the main survey.

The main online survey was administered to samples of Polish, Belarusian, Norwegian and Swedish citizens, which characterise the countries' population in terms of education, income, age, gender and location and are assumed representative with this respect. The response rate among respondents in Norway and Sweden was, respectively, 28 and 39 per cent. About one third of those starting the questionnaire, also completed it (33% in Norway and 35% in Sweden). Table A2 in the appendix gives an overview of the response

[11] The Likert-type scale was from left to right: I definitely do not agree; I quite don't agree; I neither agree nor disagree; I quite agree; I definitely agree; It is hard to say

[12] IQS Sp.zo.o (http://www.grupaiqs.pl/en/) is a Polish survey research agency affiliated with ESOMAR (https://directory.esomar.org/country140_Poland/r2238_IQS-Sp.zo.o.php).

[13] MillwardBrown S.A. http://www.millwardbrown.com/subsites/poland/home

and filling-in indicators of the survey. In the Białowieża CAPI study, the rejection rate appeared to be much lower than in the Scandinavian CAWI study, namely about 20% in Poland and about 7% in Belarus respectively.

In the "Scandinavian case" the main survey was carried out in November and December 2015 and comprised 885 Swedes and 902 Norwegians. Together with the pilot test, the sample applied for analysis comprises 1343 Swedes and 1184 Norwegians.[14] Table in the appendix provides an overview over the socio-economic characteristics of the respondents in Sweden (n=1343) and Norway (n=1184).

The status quo alternative, no extension of the transboundary NPA, was the respondent's best choice in about 46% of the choice-tasks in the Swedish sample and in about 45% in the Norwegian sample. Moreover, 28% of the Norwegians and 24% of the Swedes consistently chose status quo in all the sixteen choice tasks. With the purpose of identification of protesters, i.e. respondents who for some reasons understate their true WTP and therefore bias the modelling results (Fonta et al. 2010), additional questions were asked about the motivation of systematically choosing status quo. After removal of protesters (those indicating that it is the government who must finance conservation programs, not them) the dataset (main surveys plus pilots) was reduced to 1000 Norwegian respondents and 1166 Swedish respondents.

In the "Eastern case" the main face-to-face CAPI survey was administered at respondents' homes in Belarus during October-December 2015 (n=900), and in Poland in February 2016 (n=901); therefore, together with the pilot survey results the total sample, applied for the subsequent analyses makes a total of 1000 Belarusians and 1001 Poles. In about 60% of particular choice tasks observations the status quo option was picked as the respondents' best choice, whilst the majority of them have picked some of the suggested program alternatives rather than status quo option at least in one choice task out of sixteen (Valasiuk et.al, forthcoming).

Both the Polish and the Belarusian samples comprise substantial number of respondents who consequently picked status quo option in all the sixteen choice tasks they faced. The appropriate rate appears to be respectively 40% of the Polish respondents and 34% of the Belarusian respondents (to compare, in a study about public attitudes towards rewilding, conducted in Switzerland, Bauer et al. (2009) estimated an approximately 50-50 division of wilderness proponents and wilderness opponents). Both in the Polish and Belarusian cases, the most popular explanation of such behaviour picked from the list of suggested answers was "this is the government who must finance conservation programmes, not me" – the appropriate variant of explanation was chosen by 59% of the Polish respondents and by 64% of the Belarusian respondents who consequently picked status quo option in all the choice tasks. Such a tendency seems to imply the substantial share of protesters amongst the both national samples of respondents. After protestors' removal, the "cleared" sample comprises data of choices made by 755 Polish respondents and 763 Belarusian ones. However, the protesting votes have been included into the Białowieża study samples for the certain parts of the subsequent econometric modelling.

[14] In the Scandinavian case, IQS applied a quota sampling based on households' geographical distribution within each country (Sweden and Norway), as well as the educational level.

4.3 Econometric analysis and modelling

In a choice experiment exercise, individuals are asked to identify their preferred choice *i* among a given set of *J* alternatives. The **Multinomial Logit Model** (MNL) is employed first and the data analysis follows the Random Utility Model (RUM) (McFadden 1974). Under RUM, it is assumed that the observed choice from an individual *n* is the one she expects to provide her with the highest utility. Her utility function, U_{ni}, can be decomposed into a systematic part, V_{ni}, and a stochastic part, ε_{ni}. The probability P_{ni} that the decision maker *n* chooses alternative *i* instead of another alternative *j* of the choice set is

$$P_{ni} = \Pr(V_{ni} + \varepsilon_{ni} > V_{nj} + \varepsilon_{nj} \forall j \neq i).$$

If ε_{nj} is assumed to be an independently and identically distributed extreme value type I (Train 2003), this probability has a closed form expression,

$$P_{ik} = \frac{e^{\beta' x_{ni}}}{\sum_j e^{\beta' x_{nj}}}. \qquad (1)$$

where *x* is a vector of variables and β a vector of parameters. Expression (1) is often referred to as a logit choice probability function.

The standard multinomial logit model (MNL) has some limitations, as listed by Train (2003):

(i) It assumes a property of independence from irrelevant alternatives (IIA). IIA implies that the relative odds of choosing alternative *i* over *k* are the same no matter what other alternatives are available or what the attributes of other alternatives are (Train, 2003).

(ii) MNL can represent only the systematic taste variation but not random taste variations. Systematic taste variation means that respondents' preferences vary systematically with some observable characteristics (i.e. socio-demographics, attitudinal answers etc.). For example older people may have on average other preferences than younger users of a given site may be more interested in preserving it than non-users etc. In addition to systematic taste variation respondents are likely to vary in a random way, this random taste variation cannot be controlled in MNL model.

(iii) It cannot handle situations where the unobserved part of the utility function is correlated over time. If the same person handles more than one choice situation then the unobserved part of the utility is going to be correlated. Not controlling for this can lead to biased estimates and wrong policy conclusions.

To deal with these limitations, more advanced and complex econometric approaches such as the **Mixed Logit** and **Latent Class** models can be applied, which both allow the researcher different options to tackle model heterogeneity in preferences within the sample. Besides a standard MNL (which assumes that there is no preference heterogeneity in the studies sample), in this paper we made use of the more complicated Latent Class Model (LCM) and several modifications of the Mixed Logit Model including the Hybrid Mixed Logit Model.

The LCM allows for the identification of a number of latent classes of respondents with distinct preferences for the programme attributes. LCM assumes that preferences are uniform within groupings of individuals, but vary between these groupings. Probabilistic membership of these latent classes (LC) can depend either on observed or on unobserved variables. Number of latent classes is decided based on a model fit (on the basis of McFadden's R^2 or AIC statistic).

We hypothesised that estimating a latent class model (LCM) can provide important insights into the structure of this heterogeneity i.e. that preferences towards spatial extension of the passive protection regime on either side of the border instead of having a continuous distribution are rather clustered into a relatively small number of classes (i.e. respondents having positive, negative and neutral preferences to one programme attribute or another).

In the case of LCM each respondents' class membership probability (and utility function parameters within each class) are calculated in a way that maximizes likelihood of observed choices. This means respondents are not deterministically classified to a given latent class. Therefore, we cannot provide socio-demographic characteristics of members of each class, since we do not deterministically know to which class each respondent will be categorized. What we can say, is that the class membership variables are the respondents' observable characteristics which we found to increase or decrease probability of being in one of the classes in statistically significant way.

Mixed logit model can also be considered in order to account for heterogeneity of preferences. Mixed logit probabilities can be expressed as the integrals of standard logit probabilities over a density of parameters. Thus, a mixed logit model (MIXL) is any model whose choice probabilities take the form

$$P_{ni} = \int \frac{e^{\beta_n' x_{ni}}}{\sum_j e^{\beta_n' x_{nj}}} \phi(\beta | b, \Omega) d\beta, \qquad (2)$$

where: $\frac{e^{\beta_n' x_{ni}}}{\sum_j e^{\beta_n' x_{nj}}}$ is a standard logit formula, $\phi(\beta|b,\Omega)$ is the density of the random coefficients with mean b and covariance Ω. Thus, the logit expression in (1) can be treated as a special mixed logit case with β being fixed.

Limitation (ii) of the standard MNL is relaxed by assuming a mixing distribution that is not degenerated at fixed parameters.

In a standard MNL the unobserved factors that affect respondents are assumed to be independent over the repeated choices (limitation iii), which may be considered unrealistic in the CE exercises where respondents usually make more than one choice. There might be some unobserved factors that are constant over the choices made by the same individual facing several choice sets, and consequently unobserved parts of the utilities over the choices may be correlated.

Mixed logit models (MXL) can account for dependence across repeated choices from the same respondent by specifying a panel version of the model. Conditional on β the probability that the decision maker *n* makes a sequence of *T* choices is the product of logit formulas:

$$P_{ni} = \prod_{t=1}^{T} \left[\frac{e^{\beta_n' x_{nit}}}{\sum_j e^{\beta_n' x_{njt}}} \right], \qquad (3)$$

where *t* denotes the sequence of choices made by the same respondent.

Since β_n is not known, the unconditional probability is given by the integral over all possible values of β_n, i.e.

$$P_{ni} = \int \prod_{t=1}^{T} \left[\frac{e^{\beta_n' x_{nit}}}{\sum_j e^{\beta_n' x_{njt}}} \right] \phi(\beta|b,\Omega) d\beta, \qquad (4)$$

with $\phi(\beta|b,\Omega)$ being the density of a random parameter with mean *b* and covariance matrix Ω.

The utility function specified in this study included six dummy-coded variables associated with the levels of spatial extension of the passive protection domestically and abroad, the continuous monetary cost variable, and an alternative-specific constant for the status quo. In the model we accounted for the panel-structure of data, assuming uncorrelated

parameters, a normal distribution for the non-monetary random parameters, and log-normally distributed cost coefficient. The model was estimated using maximum simulated likelihood techniques, using 10,000 shuffled Sobol draws. The models were estimated in Matlab. The software used here (estimation package for DCE data) is available at github.com/czaj/DCE under CC BY 4.0 license. The dataset, additional results and estimation codes are available from the authors upon request.

The Hybrid Mixed Logit model. Hybrid choice models allow analysts to incorporate perceptions and cognitive processes into a Random Utility Model (RUM) framework. In this study we develop a Hybrid Mixed Logit (HMXL) model which combines the framework widely adopted for analyzing DCE data, the Mixed Logit (Revelt and Train, 1998), with the Multiple Indicators and Multiple Causes (MIMIC) model (Jöreskog and Goldberger, 1975). Connecting discrete choice models with a MIMIC model is an emerging approach for incorporating psychological factors in the RUM framework. Most of the applications to date appear in the transportation literature (e.g., Vredin Johansson, Heldt and Johansson, 2006; Daly et al., 2012; Daziano and Bolduc, 2013). Applications in the environmental literature include Hess and Beharry-Borg (2012), Dekker et al. (2012), Czajkowski et al. (forthcoming), and Czajkowski, Hanley and Nyborg (forthcoming).

In the context of our application, we consider psychological factors – respondents' attitudes and beliefs towards different transboundary aspects of spatial conservation of natural forest ecosystems – as latent variables which influence stated preferences. Our hybrid choice model consists of two parts: a discrete choice component and measurement equations component. Below we describe each part in turn.

Discrete choice component. The theoretical foundation for the discrete choice model is random utility theory, which assumes that the utility a person derives depends on observed characteristics and unobserved idiosyncrasies, represented by a stochastic component (McFadden, 1974). As a result, individual i's utility resulting from choosing alternative j in choice set t can be expressed as:

$$V_{ijt} = a_i c_{ijt} + \boldsymbol{b}_i' \boldsymbol{X}_{ijt} + e_{ijt}, \qquad (5)$$

where the utility expression is assumed additively separable in the cost of the alternative, c_{ijt}, and other attributes, $\boldsymbol{X}_{ijt}$; a_i and $\boldsymbol{b}_i$ denote estimable parameters; and e_{ijt} is a stochastic component allowing for factors not observed by the econometrician to affect individuals' utility and choices. It should be emphasized that a_i and $\boldsymbol{b}_i$ are *individual*-specific, thus allowing for heterogeneous preferences amongst respondents and leading to a mixed logit model (MXL).[15] Assuming instead that parameters are the same for all respondents implies homogenous preferences and leads to the multinomial logit model (MNL) as a special case. We have estimated both ordinary MNL and MXL models within our study prior, and in addition to, HMXL model. Normalisation of the variance of the stochastic component of the utility function (e_{ijt}) leads to the following specification:

[15] It is typically assumed that individual parameters follow a particular distribution (possibly a multivariate distribution allowing for non-zero correlation of model parameters), rather than being separately estimated for each individual.

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$$U_{ijt} = \sigma_i a_i c_{ijt} + \sigma_i \boldsymbol{b}_i{}' \boldsymbol{X}_{ijt} + \varepsilon_{ijt}. \quad (6)$$

Note that due to the ordinal nature of utility, this specification still represents the same preferences as (1) does. The estimates $\sigma_i a_i$ and $\sigma_i \boldsymbol{b}_i$ do not have direct interpretation, but if interpreted in relation to each other, the scale coefficient ($\sigma_i = \pi / \left(\sqrt{6} s_i\right)$) cancels out.

Given the interest in establishing estimates of WTP for the non-monetary attributes $\boldsymbol{X}_{ijt}$, it is convenient to introduce the following modification which is equivalent to using a money-metric utility function (also known as estimating the parameters in the WTP space; Train and Weeks, 2005):

$$U_{ijt} = \sigma_i a_i \left(c_{ijt} + \frac{\boldsymbol{b}_i{}'}{a_i} \boldsymbol{X}_{ijt} \right) + \varepsilon_{ijt} = \lambda_i \left(c_{ijt} + \boldsymbol{\beta}_i{}' \boldsymbol{X}_{ijt} \right) + \varepsilon_{ijt}. \quad (7)$$

Note that under this specification the vector of parameters $\boldsymbol{\beta}_i$ is now scale-free and can be directly interpreted as a vector of implicit values for the attributes, $\boldsymbol{X}_{ijt}$. All our discrete choice models have been estimated in the WTP space in tens of 2015 Euros adjusted by relevant PPP factors. In our HMXL model we also assume that the random parameters $\boldsymbol{\beta}_i$ and λ_i depend on individual-specific latent variables, denoted by $\mathbf{LV}_i$. The functional form of this dependence may vary due to distributional assumptions. In the analysis we use two distributions, normal (for all non-monetary attributes) and log-normal (for the cost attribute). For a normally distributed $\boldsymbol{\beta}_i$, this dependence is of the form:

$$\boldsymbol{\beta}_i = \boldsymbol{\Lambda}' \mathbf{LV}_i + \boldsymbol{\beta}_i^*, \quad (8)$$

where $\boldsymbol{\Lambda}$ is a matrix of estimable coefficients and $\boldsymbol{\beta}_i^*$ has a multivariate normal distribution with a vector of means and a covariance matrix to be estimated.[16] Similarly, we assume that the cost coefficient follows a log-normal distribution:

$$\lambda_i = \exp\left(\boldsymbol{\tau}' \mathbf{LV}_i + \lambda_i^* \right), \quad (9)$$

where $\boldsymbol{\tau}$ is a vector of estimable coefficients and λ_i^* follows a normal distribution with the parameters describing its mean and standard deviation to be estimated.[17] As a result, the conditional probability of individual i's choices in choice set t is given by:

$$P(y_i \mid X_i, \boldsymbol{\beta}_i^*, \lambda_i^*, LV_i, \Lambda, \boldsymbol{\tau}, \boldsymbol{\theta}) = \prod_{t=1}^{T_i} \frac{\exp\left(\lambda_i \left(c_{ijt} + \boldsymbol{\beta}_i' \boldsymbol{X}_{ijt} \right) \right)}{\sum_{k=1}^{C} \exp\left(\lambda_i \left(c_{ikt} + \boldsymbol{\beta}_i' \boldsymbol{X}_{ikt} \right) \right)}, \quad (10)$$

[16] The number of columns in Λ is equal to the number of latent variables and the number of rows is equal to the number of non-monetary attributes.

[17] λ_i^* can also be correlated with $\boldsymbol{\beta}_i^*$.

where $\boldsymbol{\theta}$ is a vector of parameters on which λ_i^* and $\boldsymbol{\beta}_i^*$ depend.

Measurement equations. The main purpose of including latent variables in the models is that they are describing some psychological factors. These factors usually cannot be measured in a direct way, unlike other individual characteristics such as age and gender. Instead a researcher must use various indicator questions in a survey, responses to which could be expected to be determined by the latent variables.

The model choice for the indicator equations depends on a particular application.[18] In this study we include one indicator of the latent belief over policy consequentiality of a survey, which was measured on a five-point Likert scale. The measurement equation is therefore modelled using ordered probit (OP). In the general case with more latent variables and more (ordered) indicator variables $\mathbf{I}_i$, the measurement component of the hybrid choice model can be specified as follows:

$$\mathbf{I}_i^* = \boldsymbol{\Gamma}'\mathbf{LV}_i + \boldsymbol{\eta}_i, \tag{11}$$

where $\boldsymbol{\Gamma}$ is a matrix of coefficients and $\boldsymbol{\eta}_i$ denotes a vector of error terms assumed to come from a multivariate normal distribution with zero means and an identity covariance matrix.[19] Under this specification, the relationship between I_{il} and I_{il}^* (for the l-th indicator variable which takes J possible, ordered values) becomes:

$$\begin{array}{lll} I_{il} = 1, & \text{if} & I_{il}^* < \alpha_{1l} \\ \vdots & \vdots & \vdots \\ I_{il} = k, & \text{if} & \alpha_{k-1l} \le I_{il}^* < \alpha_{kl}, \\ \vdots & \vdots & \vdots \\ I_{il} = J, & \text{if} & \alpha_{J-1l} \le I_{il}^* \end{array} \tag{12}$$

where the α's are the threshold parameters to be estimated for each indicator. This specification leads to the well-known ordered probit likelihood form for I_i:

$$P(I_i \mid \mathbf{LV}_i, \boldsymbol{\Gamma}, \boldsymbol{\alpha}) = \prod_{l=1}^{L}\left(P(I_{il} \mid \mathbf{LV}_i, \boldsymbol{\Gamma}_l, \alpha_l)\right) = \prod_{l=1}^{L}\left(\Phi(\alpha_{kl} - \boldsymbol{\Gamma}_l'\mathbf{LV}_i) - \Phi(\alpha_{k-1l} - \boldsymbol{\Gamma}_l'\mathbf{LV}_i)\right), \tag{1}$$

where $\Phi(\cdot)$ denotes the normal cdf, Γ_l and α_l are the l-th row of the $\boldsymbol{\Gamma}$ matrix and the vector of the threshold parameters for the *l*-th indicator variable, respectively.[20]

[18] Many early hybrid choice model applications used a simple, linear regression even in cases where the dependent variable was clearly ordered (Daly *et al.*, 2012).

[19] It is important to note that the number of measurement equations need not equal the number of latent variables. For instance, cases may arise where more than one indicator for a latent variable may be available (e.g., there may be two survey questions targeting beliefs over policy consequentiality). This framework can accommodate such a setting by specifying multiple measurement equations for a single latent variable.

[20] Note that this likelihood is a factor of likelihoods of each indicator separately. It is so due to the earlier assumption that $\boldsymbol{\eta}_i$ has an identity covariance matrix. This assumption is equivalent to assuming that

Finally, after combining equations, we obtain the full-information likelihood function for our HMXL model, where for ease of exposition we stack the parameter vectors $\boldsymbol{\Lambda}, \boldsymbol{\tau}, \boldsymbol{\theta}, \boldsymbol{\Gamma}, \boldsymbol{\alpha}$ into the single vector $\boldsymbol{\Omega}$:

$$L_i = \int P\left(\mathbf{y}_i \mid \mathbf{X}_i, \boldsymbol{\beta}_i^*, \lambda_i^*, \boldsymbol{\Omega}\right) P\left(\mathbf{I}_i \mid \boldsymbol{\Omega}\right) f\left(\boldsymbol{\beta}_i^*, \lambda_i^* \mid \boldsymbol{\theta}\right) d\left(\boldsymbol{\beta}_i^*, \lambda_i^*\right). \quad (13)$$

As random disturbances of $\boldsymbol{\beta}_i^*, \lambda_i^*$ are not directly observed, they must be integrated out of the conditional likelihood. This multidimensional integral can be approximated using a simulated maximum likelihood approach.[21]

In order to make identification of hybrid choice models possible, the scale of every latent variable needs to be normalized (Daly *et al.*, 2012). We followed Bollen and Davis (2009) to ensure that the necessary condition for identification of structural equation models holds; in particular, the specification satisfies the "2+ emitted paths rule" (the LV has exactly one unique indicator in the measurement equation and is linked with six preference parameters in the discrete choice component).

whole correlation between indicator variables is explained by the latent variables used. However, this assumption can be relaxed, as in Bhat, Varin and Ferdous (2010).

[21] Our model assumes no correlations between the measurement, structural and choice components error terms. This is an issue which could potentially be pursued in the future to investigate if explicitly allowing for some of these correlations could improve the model performance or address the endogeneity issue better.

5 Modelling results

5.1 Białowieża / Biełavieskaja Pušča

The current report comprises the results of the following models, estimated for the Biłowieża Forest case:

- Multinomial Logit Model (MNL);
- Mixed Logit Model (MXL);
- Latent Class Model (LCM), and
- Hybrid Mixed Logit Model (HMXL).

While the MNL, MXL and HNXL have been estimated in the WTP space and therefore the parameters of the each of these models are immediately nominated in tens of 2015 Euros (PPP), the LCM has been estimated in the preference space[22].

Table 1 presents the results of the MNL.

Table 1: Multinomial logit model of choices – Polish (PL) sample and Belarusian (BY) sample

	MNL-PL			*MNL-BY*		
var.	coef.	st.err.	p-value	coef.	st.err.	p-value
SQ	-0.3567	0.0873	0.0000	6.7204	2.0048	0.0008
BY +35km^2	-0.0715	0.0676	0.2903	0.9255	0.5475	0.0910
BY +70 km^2	-0.1164	0.0703	0.0980	1.9372	0.6775	0.0042
BY +105 km^2	-0.2776	0.0731	0.0001	0.9527	0.5491	0.0827
PL +35 km^2	1.0203	0.0789	0.0000	0.6553	0.4891	0.1804
PL +70 km^2	1.2595	0.0779	0.0000	-2.6681	0.7613	0.0005
PL +105 km^2	1.5597	0.0784	0.0000	-1.7155	0.6007	0.0043
COST (10 EUR PPP)	0.6440	0.0152	0.0000	0.0926	0.0210	0.0000
Model characteristics						
LL0	-12095.3422			-12067.9768		
LL	-10880.2726			-12060.2191		
McFadden pseudo R^2	0.1005			0.0006		
Ben-Akiva pseudo R^2	0.4325			0.3988		
AIC/n	1.8027			1.9771		
n	12080 (755)			12208 (763)		
k	8			8		

[22] The results of LCM and HMXL model are scrutinised in the next chapter since they are relevant to testing of the International Public Good hypothesis.

Results of MNL model do not account for preference heterogeneity; instead, they can be interpreted as preferences of a representative consumer and therefore they reflect some generalised tendency in the preferences of the appropriate sample (McFadden, 1974). In general, the results obtained are consistent with economic theory as well as with some of the a priori expectations. Thus, both Belarusians and Poles prefer, ceteris paribus, to pay as little as possible, which is determined by the negative parameter with the BID attribute. Both nations state positive preferences for the greater passive protection of their domestic segment of the Białowieża Forest since the parameters with appropriate dummies are positive and statistically significant. At the same time, preferences of neither nation exhibit strict linearity, and they are each non-linear in a different manner. An important feature is that utility increases when the area of the enhanced protection increases. This is consistent with theoretical expectations (Carson and Mitchell, 1993; Rollins and Lyke, 1998). Indeed, the programme alternatives which contemplated bigger extension of passively protected area on domestic segment of the transboundary Białowieża Forest were systematically assigned higher utility by Polish respondents. Their decreasing marginal utility when increasing the scope, or scale, of protection is well known from former valuation studies (Carson and Mitchell, 1993; Rollins and Lyke, 1998; Veisten et al., 2004) as well.

However, preferences of Belarusian respondents seem to be of bell-shaped character. The utility they derive from extension of the passive protection by additional 70 km^2 exceeds both the utility associated with the extension by 35 km^2 and by 105 km^2 (while at the same time parameters with dummies for these two latter programs are almost equal to each other). The utility per unit of extension follows the same pattern: first it increases when moving from programme of extension by additional 35 km^2 to that of additional 70 km^2, and then decreases when moving from extension by 70 km^2 to that of 105 km^2. For some reason, Belarusian respondents definitely prefer the "medium" programme of extension more than either "lower" or "higher" ones.

At the same time, both Polish and Belarusian respondents also stated some positive preferences towards the current level of protection since the parameter with status quo option in both country-specific models is positive and significant. However, if preferences for status quo are compared against preferences for positive conservation programmes, then a fundamental difference emerges in between Polish and Belarusian respondents. While parameters with the programme alternative dummies exceed parameters with status quo 1.74-2.6 times for Polish respondents, the pattern for Belarusian respondents is reverse and their parameters with dummies denoting positive programme alternatives amount only to 7-15% of their parameter with status quo. Therefore, implementation of any positive conservation programme, contemplated in the survey scenario would imply the net utility loss for the Belarusian respondents, which is not the case for the Polish ones. While Poles, on average, would like to depart from the current level of protection of the Białowieża Forest, their Belarusian counterparts' preferences are dominated with the positive utility they derive from the status quo option.

Possibly, the most striking result of the modelling are the mirror and significant preferences of both nations towards the additional protection of the neighbour's part of the Białowieża Forest, which range from indifference to highly negative preferences. Both the Belarusians and the Poles state their indifference towards the least extensive protection programme of

the three (passive protection of the additional 35 km^2) behind the border; and they state (on average) negative and significant preferences towards the two more spatially extensive programmes contemplated for the passive protection (passive protection of the additional 70 km^2 and 105 km^2) of the foreign segment of the site under consideration. Taken at face value, neither of the nations involved (on average) derives any positive utility from additional protection of the foreign segment of the transboundary Białowieża Forest. Moreover, those of the contemplated bilateral conservation programmes which imply spatially more extensive additional protection of the foreign segment lead to substantial mutual disutility with both the Belarusians and the Poles.

Table 2: Mixed (random parameter) logit model of choices – Polish (PL) sample and Belarusian (BY) sample

	MXL-PL			*MXL-BY*		
	Means					
var.	coef.	st.err.	p-value	coef.	st.err.	p-value
SQ	-0.9981	0.0455	0.0000	7.0416	2.2804	0.0020
BY +35km^2	-0.0332	0.0320	0.3002	1.2140	0.5530	0.0282
BY +70 km^2	-0.0611	0.0376	0.1045	2.3148	0.7064	0.0011
BY +105 km^2	-0.1483	0.0447	0.0009	0.8009	0.5846	0.1707
PL +35 km^2	0.6499	0.0420	0.0000	0.6292	0.4894	0.1986
PL +70 km^2	0.9386	0.0472	0.0000	-2.6637	0.7544	0.0004
PL +105 km^2	1.1855	0.0557	0.0000	-1.7987	0.6055	0.0030
COST (10 EUR PPP)	0.7096	0.0673	0.0000	-2.3243	0.2213	0.0000
	Standard Deviations					
var.	coef.	st.err.	p-value	coef.	st.err.	p-value
SQ	3.0682	0.1289	0.0000	25.6804	5.7572	0.0000
BY +35km^2	0.0160	0.0328	0.6256	0.2632	1.3485	0.8452
BY +70 km^2	0.1324	0.0515	0.0101	0.1811	1.6173	0.9109
BY +105 km^2	0.3954	0.0523	0.0000	4.5209	1.1350	0.0001
PL +35 km^2	0.3512	0.0279	0.0000	2.3018	1.0096	0.0226
PL +70 km^2	0.6080	0.0449	0.0000	0.2605	1.3899	0.8513
PL +105 km^2	1.0041	0.0396	0.0000	0.0670	1.9732	0.9729
COST (10 EUR PPP)	1.3377	0.0742	0.0000	0.4513	0.0840	0.0000
Model characteristics						
LL0	-12095.3422			-12067.9768		
LL	-7116.8255			-9710.7829		
McFadden pseudo R^2	0.4116			0.1953		
Ben-Akiva pseudo R^2	0.5979			0.4906		
AIC/n	1.1809			1.5935		
n	12080 (755)			12208 (763)		
k	16			16		

Statistically significant standard deviations with many of the MXL model parameters (Table 2), noticeable for the both nations show that their preferences exhibit heterogeneity. Thus, standard deviations with seven (out of eight) programme attributes in case of Poland are statistically significant, which points out to considerable heterogeneity of preferences. Poles, on average, state their preference to depart from the current situation and their positive and significant willingness to pay for extension of passive protection regime on the adjacent forest areas in their domestic part of the Białowieża Forest. Their WTP is close to linear in additional area (WTP per sq.km is slightly decreasing). At the same time, Poles are indifferent towards the two minor programmes of the foreign part extension and are clearly negative towards the spatially biggest one.

Belarusians state very high and significant preferences towards retaining the status quo. Considering it, preferences of Belarusians towards extension of their domestic part by another 35 or 70 sq.km (though expressed by the positive and significant model parameters) turn out to be negative. The same is even more profound when it comes to the programme of domestic part extension by another 105 sq.km, since the appropriate model parameter is insignificant. Taking into account the considerable sample, insignificance of parameter in these models should rather be interpreted as the true indifference. Preferences of the Belarusian respondents towards any foreign part extension turn out to be negative[23]. Thus, none of the contemplated protection programmes (including those somehow desired) would compensate the Belarusians their utility loss, arising from the departure from status quo.

5.2 Fulufjäll/Fulufjell

Table describes past and intended visits to Fulufjäll/Fulufjell. The share of respondents that had visited Fulufjäll/Fulufjell is higher among respondents in Sweden (14%) than in Norway (9%) but, yet, quite low for both samples, especially what the visitation of the foreign side concerns. Only 4% of respondents in Sweden had visited the Norwegian part of Fulufjäll/Fulufjell while the share of respondents in Norway who had visited the Swedish part of Fulufjäll/Fulufjell is 3%. The share of respondents who plan to visit Fulufjäll/Fulufjell within the next five years is higher for both samples, but still higher among respondents in Sweden and for planned visits to the domestic part of Fulufjäll/Fulufjell of both respondents in Sweden and Norway

Yet, a clear majority of the respondents (64% in Sweden and 61% in Norway) indicated a positive reaction to extending the protected area and renaturing adjacent forest areas (Table 3). It is important to mention that these questions were asked before the presentation of the specific scenario and the choice questions.

Considering the relatively low share of respondents who had visited or intend to visit Fulufjäll/Fulufjell, we may assess that the support of further protection for most of the

[23] Indifference towards the spatially least (+35 sq.km) programme turns out to negative preferences taking into account the strong preferences for SQ.

respondent is most probably not motivated by their own (existing or potential) use. Thus, most of those supporting nature protection, and who are willing to pay for it, are probably not motivated by the use attach value to the existence of preserved nature (visiting the national park area). However, they may retain an option of a future visit which is beyond the next 5 years).

Table 3: Descriptive statistics for Fulufjäll visits and opinions about Fulufjäll preservation (percent "yes" / "agree")

	Sweden (n=1343)	Norway (n=1184)
Visited Fulufjäll	**14%**	**9%**
Domestic side	12%	7%
Foreign side	4%	3%
Agree to visit Fulufjäll within 5 yrs.	**18%**	**14%**
Domestic side	16%	14%
Foreign side	11%	9%
Think protection should be extended	**64%**	**61%**

Multinomial logit modelling (Table 4) and mixed (random parameter) logit (Table 5) modelling have been used to calculate WTP estimates based on respondents 16 choices between status quo and options involving different national park extensions at each side of the border. The modelling is based on EUR-2015 values based on PPP-weighted exchange from Swedish kroner (SEK) and Norwegian kroner (NOK), which were the currencies used in the survey. Average exchange rates of 2014 adjusted for the purchase power parity (PPP) based on the 2014 GDP per capita have been used for this conversion.

To put it simply, a main difference between the multinomial logit (MNL) and mixed logit (MXL) is that, the MNL model accounts for the preferences of the whole data set, not distinguishing between individuals, while the MXL model accounts for the preferences of individuals, their heterogeneity. The MXL model thus provides estimates of the coefficients (average parameters) per respondent and for the whole population (average of the respondents' averages). In the case of the MXL model, one must specify a statistical distribution of the individual coefficient estimates; and in the following these are assumed having normal distribution.

Table 4: Multinomial logit model of choices – Norwegian (NO) sample and Swedish (SE) sample

	MNL-NO			*MNL-SE*		
var.	coef.	st.err.	p-value	coef.	st.err.	p-value
SQ	0,2000	0,1052	0,0574	0,5164	0,1276	0,0001
NO +20 km²	1,5467	0,0916	0,0000	0,8388	0,0911	0,0000
NO +40 km²	2,4660	0,0974	0,0000	0,9170	0,0976	0,0000
NO +60 km²	2,8792	0,1012	0,0000	1,2176	0,0920	0,0000
SE +20 km²	0,5888	0,0781	0,0000	1,7009	0,1088	0,0000
SE +40 km²	0,7983	0,0821	0,0000	2,4973	0,1130	0,0000

SE +60 km²	0,8892	0,0779	0,0000	2,8648	0,1166	0,0000
COST (10 EUR PPP)	0,4411	0,0130	0,0000	0,3540	0,0105	0,0000
Model characteristics						
LL0	-19793.91			-20010,45		
LL	-18897.89			-19114,65		
McFadden pseudo R²	0.0453			0,0448		
Ben-Akiva pseudo R²	0.3809			0,3708		
AIC/n	2.0135			2,0487		
n	18779			18668		
k	8			8		

Table 5: Mixed (random parameter) logit model of choices – Norwegian (NO) sample and Swedish (SE) sample

	MXL-NO			*MXL-SE*		
	Means					
var.	coef.	st.err.	p-value	coef.	st.err.	p-value
SQ	-2,2359	0,1175	0,0000	-2,1731	0,2043	0,0000
NO +20 km²	1,2322	0,0565	0,0000	0,6039	0,0514	0,0000
NO +40 km²	1,9547	0,0659	0,0000	0,6627	0,0550	0,0000
NO +60 km²	2,2979	0,0792	0,0000	0,8482	0,0535	0,0000
SE +20 km²	0,3669	0,0450	0,0000	1,0850	0,0464	0,0000
SE +40 km²	0,5979	0,0542	0,0000	1,6121	0,0493	0,0000
SE +60 km²	0,6562	0,0551	0,0000	1,9568	0,0675	0,0000
COST (10 EUR PPP)	0,0031	0,0440	0,9433	0,0347	0,0505	0,4921
	Standard Deviations					
var.	coef.	st.err.	p-value	coef.	st.err.	p-value
SQ	7,3737	0,3335	0,0000	7,9508	0,6947	0,0000
NO +20 km²	0,7054	0,0590	0,0000	0,2403	0,0631	0,0001
NO +40 km²	0,8682	0,0569	0,0000	0,7230	0,0504	0,0000
NO +60 km²	1,5723	0,0807	0,0000	0,7918	0,0608	0,0000
SE +20 km²	0,1841	0,0644	0,0042	0,4159	0,0656	0,0000
SE +40 km²	0,5073	0,0591	0,0000	0,5674	0,0475	0,0000
SE +60 km²	0,6936	0,0501	0,0000	1,1679	0,0532	0,0000

COST (10 EUR PPP)	1,0094	0,0453	0,0000	1,1978	0,0472	0,0000
Model characteristics						
LL0	-17276,37			-20010,45		
LL	-10386,57			-11862,14		
McFadden pseudo R^2	0,3988			0,4072		
Ben-Akiva pseudo R^2	0,5603			0,5701		
AIC/n	1,2994			1,2726		
n	16011			18668		
k	16			16		

Estimated parameters with programme alternatives from both models show that the coefficient values are positive and they increase along with the size of the extended park area. However, the «goodness-of-fit» of the MXL model is much better than for the MNL, indicating less discrepancy between observed values and the values expected from the MXL model. Therefore, in the following the WTP estimates from the MXL model will be applied. The MXL models results obtained in Sweden and Norway are quite similar and mirror-like. In the both cases, the considerable heterogeneity of preferences is confirmed with the high significance of standard deviations with all the programme attributes.

Coefficients for retaining SQ are negative in both the Swedish and Norwegian samples, while all coefficients for extending the area under protections are positive. Both Swedes and Norwegians are willing to depart from SQ, whilst they indicate positive WTP for the majority of extension programmes on either side of the border. Moreover, low p-values for almost all coefficients (either negative of positive) indicate that they are statistically significant, i.e. the variable (WTP) actually correlates with choice probability (the extension of the area to be protected), and that WTP is not 0. Thus, both Norwegians and Swedes care about protection of both the domestic and foreign segment of the transboundary site.

Table shows the estimated WTP per square km forest landscape restoration, based on the MXL model. The additional WTP per sq.km decreases as the additional area of passive protection increases in both samples (which is a well-known feature, see, e.g., Carson & Mitchell, 1993; Rollins & Lyke, 1998, Veisten et al., 2004).

Table 6: Estimated annual WTP (per household) per sq. km extension of the transboundary Fulufjället national park – forest landscape restoration by passive protection – Norwegian sample and Swedish sample

Contemplated extension of passive protection	*WTP, EUR PPP per sq.km.*	
	Norwegian sample	Swedish sample
NO +20 km^2	0.5320	0.2639
NO +40 km^2	0.3521	0.1104
NO +60 km^2	0.2375	0.0532

SE +20 km^2	0.0600	0.6348
SE +40 km^2	0.0598	0.4088
SE +60 km^2	0.0195	0.2941

Despite this positive and statistically significant WTP it should be noted that the statistically significant standard deviations show considerable heterogeneity of preferences (Table). The questionnaire included several attitudinal questions, i.e. statements upon which respondents were asked to indicate their level of agreement. It is important to remember that these questions were placed after the choice cards and were included to help explaining the factors behind stated WTP. Table 7 summarizes them.

Table 7: Level of agreement to post-choice statements (percent)

	Sweden (n=1343)		*Norway (n=1184)*	
	Agree	Disagree	Agree	Disagree
Tax funds collected for extension can be lost/stolen	27%	4%	30%	4%
Domestic institutions more responsible than foreign	24%	13%	26%	14%
Prefer (only) domestic park extension ("patriotism"?)	12%	25%	16%	29%
Foreign side of park will be extended anyhow ("int. free rider"?)	45%	12%	53%	10%
The country with the larger share of the area should contribute most	23%	25%	35%	20%
The larger country should contribute most	17%	34%	11%	51%
Foreign side should contribute more because they are the wealthiest	43%	15%	44%	16%
The proposed tax amounts might be introduced	30%	16%	24%	15%
The survey results will have policy consequences	35%	8%	34%	10%

5.3 International public good hypothesis

One of the key objectives of the TRANPAREA project is to investigate whether the transboundary NPAs under study are so-called "international public goods". By definition an "international public good" requires that WTP per km^2 is equal in the foreign and domestic part, i.e. that respondents are willing to pay the same amount for extending the protected area in the domestic and the foreign side.

To test the research hypothesis, it was explicitly communicated to the respondents of all the four countries involved that scientific research demonstrates that there was absolutely no difference from the perspective of the nature conservation if protection regime would

be extended on additional areas in the domestic or in the foreign part of the transboundary site under consideration. What really mattered was that the area of extension was as large as possible, so the survey text did not give the respondents strictly conservationist reasons for systematically picking additional areas for conservation on one or the other side of the border.

Results presented in Table 71-2 and 4-5 indicate that neither Fulufjäll/Fulufjell nor Białowieża Forest qualify for a "perfect" international public good. Since in accordance with LR-test results, WTP for extension of the passive protection regime in domestic parts turned out to be statistically different from (and higher than) the same in the foreign parts. Therefore, two separate public goods exist in any of the cases under consideration, rather than a true international public good (IPG).

Although there is a considerable WTP for extending the part of the transboundary NPA in the neighbouring country, WTP is higher for the domestic part for both Norwegians and Swedes. WTP for the domestic part is higher than for the foreign part. This may be linked to the level of consideration given to the different attributes in the choice cards (Table). Answers to the appropriate question, which followed the choice experiment reveal that, for instance, both Scandinavian samples attached more importance to the extension of the national park within their national border and the cost attribute than to the extension of the national park at the foreign side, which is consistent with the choice experiment outcomes.

Table 8: Post-choice assessment of the three attributes' importance when making the 16 choices

	Sweden (n=1343)	*Norway (n=1184)*
Extension in sq.km of domestic part important in choices	49%	46%
Extension in sq.km of foreign part important in choices	28%	23%
Cost (increased income tax) for financing extended protection important in choices	43%	40%

Moreover, results shown in the Table 6 are consistent with the difference in preferences towards the foreign part of the transboundary Fulufjäll/Fulufjell. While Norwegians are willing to pay more for extension in the domestic part than Swedes, the Swedes are willing to pay more for extension of the foreign part than Norwegians. This reflects the lower difference between WTP for the domestic part and WTP for the foreign part among Swedes, as compared to Norwegians. Thus, we may also argue that Swedes perceive Fulufjäll/Fulufjell as being slightly more an "international public good" or "binational public good" than Norwegians.

Nevertheless, since Swedes and Norwegians do show WTP for extending protection of the nature area on the other side of the border, we may argue that Fulufjäll/Fulufjell is to some extent perceived a "binational public good", which is absolutely not the case for the Białowieża Forest. Possibly, the most striking result of the modelling in the Białowieża case are the mirror and significant preferences of the both nations towards the additional protection of the neighbour's part of the Białowieża Forest, which range from indifference to highly negative preferences.

Both the Belarusians and the Poles state their indifference towards the least extensive protection programme of the three (passive protection of the additional 35 km^2) on the

opposite side of the border. Moreover, they state (on average) negative and significant preferences towards the two more spatially extensive programmes contemplated for the passive protection (passive protection of the additional 70 km^2 and 105 km^2) of the foreign segment of the site under consideration. Therefore, neither Poles nor Belarusians (on average) derives any positive utility from the additional protection of the foreign segment of the transboundary Białowieża Forest. Moreover, those of the contemplated bilateral conservation programmes implying spatially more extensive additional protection of the foreign segment lead to substantial mutual disutility with both the Belarusians and the Poles.

The latter phenomenon was scrutinised with the help of **Latent Class Modelling** (LCM) (Train, 2003). Models with various numbers of latent classes have been estimated. The latent class models with two classes gave the best fit into the data with R^2=0.5-0.6.; therefore the following analyses is based on their results at the most. The results of LCM are presented in Table 9.

For the Polish respondents, the probability ratio of falling into LC I/LC II equals about 51/49. The main difference in between the two latent classes in the case of Polish respondents is encapsulated in their reverse preferences towards the status quo option. The respondents belonging to the LC I state positive and significant preferences towards the current state of protection of Białowieża Forest. They also indicate relatively high cost sensitivity. Their preferences for status quo exceed their preferences towards the spatially least extensive protection programme contemplated for the Polish side, and the estimated utility is not increasing monotonically in increased size of passive protection. Besides, Polish respondents from the LC I state negative and highly significant preferences towards spatial extension of the passive protection of the Belarusian segment of the Białowieża Forest.

Table 9: Latent Class Modelling results (the Białowieża Forest case)

	Poland		Belarus	
	Coefficient	Standard Error	Coefficient	Standard Error
Random utility parameters in latent class I				
BY35	-0.54453***	0.14717	0.01483	0.10748
BY70	-0.53965***	0.16525	0.19835*	0.10538
BY105	-0.62251***	0.18930	0.05109	0.10909
PL35	0.80110***	0.21679	0.04343	0.09295
PL70	1.32194***	0.19980	-0.32619***	0.10021
PL105	1.14424***	0.22274	-0.38189***	0.10297
BID	-0.08302***	0.00608	-0.04108***	0.00857
SQ	0.91528***	0.27566	2.42990***	0.14009
Random utility parameters in latent class II				
BY35	0.02711	0.05184	0.14458***	0.05610
BY70	-0.02472	0.05360	0.22035***	0.05651
BY105	-0.09362*	0.05407	0.10736*	0.05925
PL35	0.75602***	0.05795	0.05956	0.05319
PL70	0.97015***	0.05849	-0.27631***	0.05509
PL105	1.25957***	0.06061	-0.12822**	0.05403
BID	-0.02893***	0.00074	0.00121	0.00537
SQ	-1.33271***	0.07130	-0.44470***	0.08729
Estimated latent class probabilities				
PrbClsI	0.51120***	0.02931	0.57373***	0.03170
PrbClsII	0.48880***	0.02931	0.42627***	0.03170

***, **, * significance at 1%, 5%, 10% level.

On the contrary, the Polish respondents falling into the LC II have a status quo parameter that is negative and highly significant. At the same time, their preferences towards additional protection of the domestic segment of the transboundary Białowieża Forest are significantly positive. Preferences towards additional protection of the Belarusian segment of the transboundary site under consideration for respondents belonging to the LC II are less negative as compared with their LC I counterparts. Therefore, the Polish LC II could be described as more pro-conservationist and more transboundary co-operative as compared with the Polish LC I.

The probability ratio of falling into the appropriate latent class for the Belarusian respondents are 57/43. Belarusian LC I, like with the Polish LC I, state very high preferences towards the status quo option. It indicates that any positive programme implying departure from the current state of protection on any side of the border would yield net disutility to the Belarusian respondents belonging to the LC I. The parameters of extensive passive protection programmes are mostly statistically insignificant.

Belarusian respondents falling into the LC II state their willingness to pay for expanding passive protection in their domestic segment of the transboundary Białowieża Forest, and they are neutral towards the minimal extension of the passive protection in its foreign segment, while their preferences towards the two largest foreign conservation programmes are significantly negative. A somewhat strange feature is the statistically insignificant sign of the cost parameter, which is not consistent with the economic theory.

Assuming the number of latent classes greater than two, provides some interesting insights into how the respondents view the protection of foreign segment of the transboundary Białowieża Forest. For instance, for the Polish respondents, an LCM assuming five latent classes yields one class with positive preferences for both domestic and foreign extension of the passive protection regime. Polish respondents fall into such a class with the probability of twelve per cent. However, even respondents belonging to this class state significantly different preferences towards domestic and foreign protection with the clear dominance of the former. On the contrary, for the Belarusian respondents, similar "co-operative" class does not exist according to LCM estimations with up to seven latent classes assumed. It seems that such a class of willing to co-operate with the richer country does not exist in the poorer one at all.

Hybrid modelling results have been used in order to explain why the transboundary NPAs under consideration are not International Public Goods (IPG) in accordance with people's preferences. The model specification has been altered with this purpose. Programme attributes entered the model linearly, as follows:

$$U = WTPt *(Sd + Sf) + \Delta * Sf \qquad (14)$$

where Sd and Sf is respectively domestic and foreign part spatial extension of the passive protection regime;

WTPt, Δ are respectively willingness to pay for total extension, and additional willingness to pay for foreign part extension alone.

With such a specification IPG-state immediately follows from proximity to zero of willingness to pay for the foreign part extension alone. Certain proportion of WTP for foreign extension is immediately encapsulated in the first component of the function, whilst the second component either adds some extra value or subtracts some proportion of value dependent of the sign of the appropriate parameter. The closer $|\Delta|$ is to zero – the smaller is the difference between willingness to pay for the domestic (WTPd=WTPt) and the total willingness to pay for the foreign part extension (WTPf = WTPt+Δ). If equality Δ=0 holds, then the respondents' willingness to pay for the domestic side extension and her total willingness to pay for the foreign side extension are equal (and equal to WTPt). The transboundary site in such a case qualifies for the true IPG, since the respondents equally care about any sq.km of extension irrespectively of whether it belongs to the domestic or to the foreign segment of the transboundary site.

From the model perspective, this would imply that Δ is statistically insignificant, therefore testing of the main research hypothesis under current model specification immediately follows from the standard z-test procedure for the parameter Δ.

Taking into account the interactions of the latent variables (LV) introduced within the hybrid model framework with the programme attributes, the utility function takes the form

$$U = WTPt*(Sd + Sf) + \Delta*Sf + \Delta_{LV}*LV*Sf \quad (15)$$

and it might be re-written as follows:

$$U = (Sd + Sf)*WTPt + Sf*[\Delta + \Delta_{LV}*LV] \quad (16)$$

where expressions in brackets are appropriate willingness-to-pay, shifted by the LVs. A simulation of such a shift of the parameter with foreign extension, driven by appropriate LV, has been performed in order to identify the respondents' attitudes which shift the preferences in the direction either towards the IPG-state or in the opposite direction.

The appropriate criterion arises from comparison of the Δ before simulation vs. $[\Delta + \Delta_{LV}*LV]$, simulated parameter accounting for impact of the appropriate LV. If the simulated parameter $[\Delta + \Delta_{LV}*LVi]$ appears less different from zero as compared to the original parameter Δ, then latent variable LVi shifts the preferences towards the IPG-state. Since the parameters Δ_{LV}af are estimated for a respondent who's individual-specific LV is one standard deviation to the right from mean, and all the distributions of LV were standardised with mean 0 and standard deviation 1, all the LVs are considered equal to one in the simulation, however individual-specific LVs in fact could take different values.

The subsequent interpretation relies on indicators of correlation of particular LV with the respondents' attitudes given by appropriate measurement equations. The hybrid modelling results are presented in the Table 10, while the results of simulation performed on the basis of the hybrid modelling result are presented in the Table 11.

Table 10: Hybrid modelling results

	Fulufje/ället				Białowieża			
	Norway		Sweden		Belarus		Poland	
Programme attributes	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
SQ	-2.91***	2.10***	-3.97***	6.53***	5.43***	26.26***	-0.96***	2.64***
WTP for 100km² of total extension, x10EUR (2015 PPP)	3.84***	2.07***	3.49***	4.03***	0.68	4.15***	1.07***	1.50***
Δ for extension abroad, x10EUR (2015 PPP)	-3.01***	0.60***	-1.92***	0.15**	-4.31***	1.80	-1.53***	0.06
Interactions of LVs	Measurement equation	Interaction with Δ, x10EUR (2015 PPP)	Measurement equation	Interaction with Δ, x10EUR (2015 PPP)	Measurement equation	Interaction with Δ, x10EUR (2015 PPP)	Measurement equation	Interaction with Δ, x10EUR (2015 PPP)
Intend to visit 'our' part	0.42***	-1.16***	0.13	-1.14***	1.72*	1.39**	0.63**	-0.43***
Intend to visit 'their' part	0.20	-0.97***	0.22	0.87***	1.57	0.23	0.88***	0.78***
SE/PL should pay more because - population	0.14**	1.71***	0.66**	0.26***	0.95*	-1.32	0.17**	-1.20***
NO/PL should pay more because - wealth	0.54***	0.56***	0.03	-0.35***	3.68*	-0.53	0.05	-0.43***
Money transferred abroad can be misused / stolen	1.60***	0.12*	0.20	-0.84***	0.06	1.26	0.20	0.28***
"We" are more responsible	0.11*	-2.93***	0.38***	1.05***	0.12	-0.74	0.33	0.29***
They' will extend anyway	0.51***	0.24**	0.23	0.76***	0.26	0.62	0.32**	-0.77***
WTP for 'our' more - patriotic reasons	0.36***	-1.33***	0.73***	-1.68***	0.55	0.44	0.92**	-0.20

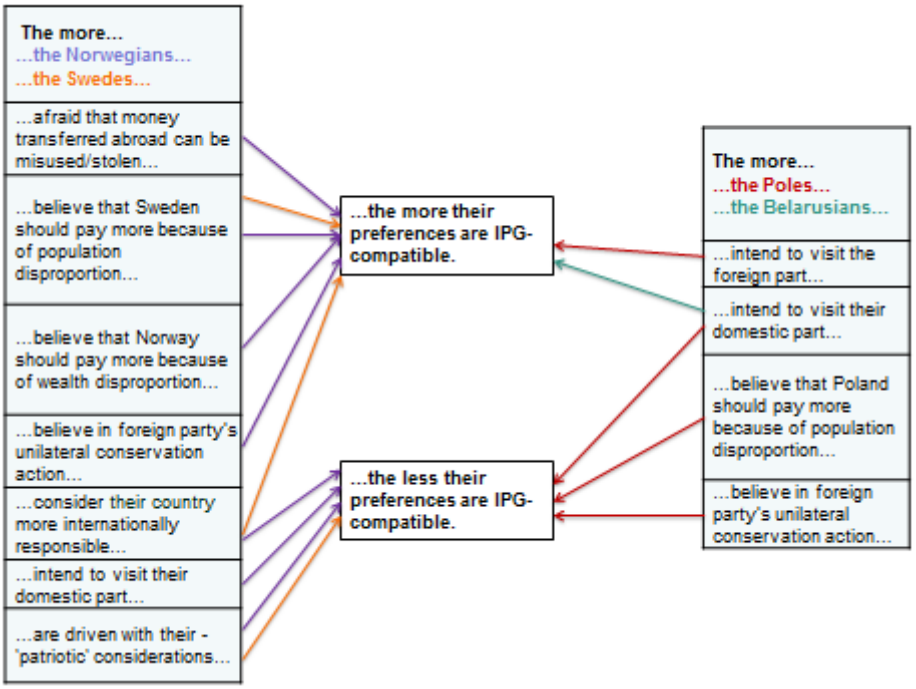
Table 10: Simulation results based on Hybrid modelling

	NO	SE	BY	PL
Additional WTP for extension abroad	**-3.01**	**-1.92**	**-4.31**	**-1.53**
Intend to visit "our" part	**-4.17**	-3.06	**-2.92**	**-1.96**
Intend to visit "their" part	-3.98	-1.04	-4.31	**-0.75**
SE/PL should pay more because of population disproportion	**-1.30**	**-1.66**	-4.31	**-2.74**
NO/PL should pay more because of wealth disproportion	**-2.45**	-2.27	-4.31	-1.97
Money transferred abroad can be misused / stolen	**-2.89**	-2.76	-4.31	-1.26
"We" are more responsible	**-5.94**	**-0.86**	-4.31	-1.24
"They" will extend anyway	**-2.77**	-1.16	-4.31	**-2.30**
WTP for 'our' more - 'patriotic' considerations	**-4.34**	**-3.60**	-4.31	-1.53

Initial additional WTP for extension abroad
Attitudes being IPG-drivers
Attitudes, shifting preferences out from IPG-state
Appropriate LV shifts preferences towards IPG-state, however without clear link to attitudes (being driven by some unobserved factors)
Appropriate LV shifts preferences out from IPG-state, however without clear link to attitudes (being driven by some unobserved factors)
Appropriate latent variables do not shift preferences in either direction

Simulation outcomes are presented on the Fig.6.

Figure 6: Outcomes of the simulation based on the Hybrid MXL model



Interpretation of the hybrid modelling results follows the grammar construction "the more respondents of country X afraid of (believe in, consider or whatever other mental process) factor Y – the more/the less are their preferences IPG-compatible. Some LVs (as well as attitudes linked to them) appeared to have no significant impact on people's preferences in case of particular countries. Thus, in case of Belarus, only one attitude out of eight under consideration proved to have some significant (and positive) impact on preferences towards the IPG-state. At the same time, some other LVs definitely have some impact (ether positive or negative) on the preferences, however they exhibit no significant dependence with any of the attitudes considered. Therefore, some unobservable factor should exist, influencing these LVs.

There is no uniform pattern observed in terms of attitudes influence on preferences, instead there are four country specific profiles. The general tendency is that much more attitudes being IPG-drivers in the Scandinavian case than in Białowieża case – the appropriate score is 6:2. Besides, some links in between attitudes and preferences are lacking any immediate rational interpretation. Thus, the more Norwegian respondents are afraid of money misuse by the Swedish side, the closer their preferences are to the IPG-state. It seems that rational consideration should rather imply the reverse dependence. Similarly, the more Swedes consider their country more internationally responsible, the closer their preferences are to the IPG-state.

Some of the LVs (and attitudes) have reverse impact on preferences of the different countries respondents. Thus, with Norwegian and Swedish respondents, consent to disproportional co-funding justified with various natural disparities between the countries is linked to compliance with greater spatial extension of the passive protection of the foreign segment (and therefore, to spend extra raised funds abroad). However, with Polish respondent the same consideration implies the weaker preferences towards the extension

abroad (which is the same to preference to spend the extra raised funds in the home country). Thus, the same considerations in different countries underpin either co-operative or 'egoistic' preferences.

Interestingly, the same regularity applies to the attitudinal question on trust into the unilateral conservation action of the neighbouring country. While with the Norwegians, the more they believe in the unilateral conservation action of Sweden in Fulufjället – the closer their preferences are to IPG state, with the Poles the tendency is reverse. The more the Polish respondents believe that Belarus will undertake the unilateral conservation action in its part of the site, the less they are willing to co-operate. The latter can be interpreted as a manifestation of strategic behaviour, namely 'free-riding' – an effect widely known in stated preference valuation and in economic theory in general. In anticipation that the good will be paid for by somebody else, the rational consumer tends to understate her WTP for it. The effect applies to the public goods and causes impossibility of their Pareto-optimal market allocation.

Another important tendency relates to the issue of use value. One of the possible sources of the inequality of WTP for the domestic and foreign parts of the transboundary sites is difference in use values assigned to the two national parts of the site under consideration. It would have been quite consistent that the person who visits the domestic part of the transboundary site more frequently than the foreign part (for instance, because of the lower travel costs) or has more realistic plans to visit domestic part in future as compared to the foreign part states greater preferences towards protection of the domestic part. In accordance with the hybrid modelling results, there is an empirical evidence for this regularity in case of Norway in Poland. Indeed, the more both Polish and Norwegian respondents intend to visit the domestic part of the appropriate transboundary sites, the less their preferences are consistent with the IPG-state. Besides, with the Poles their preferences toward the IPG-state are positively influences with their intention to visit the Belarusian part of the Białowieża Forest. However, in case of Belarusian respondents the opposite is true, namely the more they intend to visit the domestic part of the Białowieża Forest, the more they care about the Polish part and, therefore, the closer their preferences are to the IPG-state. The latter phenomenon might be underpinned by the existing border regulations: unlike the other nations under consideration, Belarusians currently have to produce valid visa in order to enter the Polish part of the Białowieża Forest[24]. Therefore, being the most excluded in terms of foreign part visiting opportunities, Belarusian respondent manifest their care about the transboundary site, which is consistent with some positive preferences towards IPG-state.

Finally, unlike Poles and Belarusians, the Scandinavian respondents seem to derive a so-called 'patriotic premium' (Dallimer et al., 2015), i.e. the more they are driven with their patriotic considerations, the less IPG-compatible are their preferences.

[24] While the Belarusian part of the Białowieża Forest recently has become more accessible for Poles and foreign visitors in general (on certain conditions, EU countries' citizens can visit the National Park "Bielavieskaja Pušča" for maximum three days without producing valid visa), the Belarusians still very seldom visit the Polish part of the site (a touristic border checkpoint functions within the Białowieża Forest perimeter, however Belarusians need to produce a valid visa in order to cross the border and enter the Polish side of the Forest). Anyway, both cross-border touristic visits and informational exchange between the two parts of the Białowieża Forest remains very limited.

6 Interpretation of results

6.1 Validity of results

Contingent valuation and choice experiments have been criticized because they rely on peoples' stated preferences and hypothetical valuation/choices, as opposed to the preferences that people reveal in their actual behaviour. If respondents are positive to the (increased) provision of the good/service depicted in the scenario, while not believing that they necessarily will have to pay what they state, the estimated WTP may suffer from "hypothetical overstatement" bias. A realistic and plausible scenario is of great importance to ensure that the survey is perceived as consequential.

As shown in Table 7 in the previous section (results), the level of agreement to statements attempting to assess the consequentiality of the scenario indicates that this was perceived as plausible by a majority of respondents. 35 % of respondents in Sweden and 34 % of respondents in Norway agree with the statement that *"the survey results will have policy consequences"*, while the share of respondents that disagree with this statement was 15 % in Sweden and 16 % in Norway. Payment consequentiality was somehow lower and, yet the share of respondents who agreed was higher than those who disagree. 30 % of respondents in Sweden and 24 % of respondents in Norway agree with the statement that *"the proposed tax amounts might be introduced"*, while the shares of those who disagree were, respectively, 16 % and 15 % for respondents in Sweden and Norway. Nevertheless, it must be mentioned that large shares of both samples did not state a clear opinion.

Moreover, the scenario should also be comprehensible to ensure validity of responses. According to results summarized in Table 1 the scenario and choice experiment were well understood.

Table 1: Stated understanding of presentations and explanations in questionnaire (percent)

	Sweden (n=1343)		*Norway (n=1184)*	
	Easy	Difficult	Easy	Difficult
Wood production forests	79 %	3 %	79 %	3 %
Natural forests	79 %	3 %	78 %	3 %
The red line state border in map	81 %	2 %	85 %	3 %
The sizes of the park areas on each side of the border	77 %	3 %	78 %	3 %
The green area showing the park - a mix of bare rock and natural forests	69 %	3 %	71 %	5 %
The sizes of the squares showing 20, 40 and 60 sq.km	59 %	9 %	61 %	9 %
The yellow-striped areas outside the park that could be included	71 %	7 %	72 %	6 %
The sizes of possible extensions of the park	64 %	7 %	67 %	7 %
Size matters in nature preservation	72 %	5 %	72 %	5 %
The cost of extension - financing by increased tax	55 %	11 %	57 %	12 %
The issue that government could need money for financing other public goods than nature protection	53 %	10 %	48 %	14 %

Very low shares of respondents of both samples found it difficult to understand elements of the questionnaire. Especially easy to understand were elements related to the characteristics of natural vs. production forests and the description of the Fulufjäll / Fulufjell area, whereas issues concerning costs/financing/taxes and sizes were to some extent less easy to understand. The fact that respondents had few difficulties to understand the key elements of the choice experiment and scenario, overthrows a further critic raised against choice experiments, i.e. the difficulty of trading off the altering levels of the attributes in a series of choices.

Another feature, probably most related to a lack of scenario comprehension, is the so-called "insensitivity to scope" or "insensitivity to scale", such that estimated WTP is more or less the same for a small change as for a large change. In our Fulufjäll / Fulufjell survey data, respondents were clearly sensitive to the scale, i.e. the estimated WTP increases significantly when increasing the size of the area to be protected. This strengthens the theoretical (construct) validity of the survey results.

6.2 Contextualisation of results

6.2.1 Eastern case

When interpreting the modelling results, an institutionally-related explanation of the mutual disutility phenomenon might be suggested. The Białowieża Forest is subjected to such a strong level of separation between the two national segments, as few other transboundary NPAs in Europe are. Besides the contextually different conservation and management regimes, they are separated *physically* with the border protection fence-like installations, which are almost not penetrable for the big ungulates like European bison or elk. Moreover, the difference in national regulations between Poland (an EU member country with market economy and democratic institutions) and neighbouring Belarus (a country which retained much of the former Soviet socioeconomic and institutional descent) is substantial and comprises symmetric visa regime.

Taking the above into account, it would not seem a big exaggeration to assume that mutually negative preferences revealed by our study are underpinned by the perception of the two parts of the same natural site as being completely separate from each other. Unlike the merely nominal border in between the Scandinavian countries and their quite similar internal regulations, the EU Eastern border still remains a clear division line between the two separate institutional realities which are not mutually transparent to the full extent. This general case division seems to affect the division in the particular case of the transboundary Białowieża Forest.

For instance, the Polish respondents may wonder if the suggested payment vehicle is realistic at all for Belarus (and vice versa), and if the binational nature preservation scenario itself in general is realistic, taking into account its complicated and "fragile" institutional solutions like financial administration of bilateral Polish-Belarusian Fund by the third international party. By this, we are not at all stating that most of the respondents faced the survey with misbelief and mistrust, only that there may exist institutionally related explanations for the above findings, beyond the very preferences for spatial extension of the passive protection.

Status quo preferences seem a relatively truthful representation of Belarusian citizens since

- Firstly, everywhere there is a population division between those who prefer wilderness protection and/or restoration vs. those demanding continuous land use change (i.e. departure from wilderness towards some other state) or supporting projects implying some natural habitat reduction, degradation or fragmentation; and for some kind of wilderness WTP is negative.
- Secondly, it seems to be a global pattern of development, that nations destroy large part of their wilderness before reaching some level of socioeconomic development being a kind of a turning point. Of the four countries under consideration Belarus is the one with lowest PPP, which could be the treated as an indicator or proxy of relative intactness.
- Thirdly, the Belarusians seem to be satisfied with the current level of protection of the Białowieża Forest indeed. Unlike Poland, where there were no noticeable progress in terms of spatial extension of the protection of the Białowieża Forest, the strict conservation zone of the Bielavieskaja Pušča National Park recently has been extended twice and it currently exceeds 57 thousand hectares, while even the area outside the strict conservation zone is classified as IUCN category II.

None of the above elements fully explains the Belarusian results, besides the non-typical features (e.g. price insensitivity, scope insensitivity, bell-shaped preferences) may indicate that part of the respondents did not take the answering very seriously and/or that some of them answered the with a motive of complying with some perceived norms of the survey organiser. Yet, be it whatever reason, status quo is supposedly the preferred option of the Belarusian population, and neither they nor the majority of the Poles regard the strictly protected part of the Białowieża forest as a binational/international good.

6.2.2 Scandinavian case

The establishment of the Fulufjäll / Fulufjell national park on the Swedish side of the border has improved the infrastructure, increased stakeholder cooperation and networking, improved marketing and raised awareness, increased visitation, support the establishment of businesses, create new job opportunities, built new confidence in the future and formed the sustainable profile of the municipality (Wallsten, 2012).

Moreover, based on visitor surveys conducted before (2001), short after (2003) and long after (2014) described in Fredman & Wikström (2015), the establishment of the national park revealed that visitors stay on average longer in the national park, that attitudes towards tourism development in the area within and the national park turned more positive, and that awareness about the existence of the park increased. Moreover, the expenditure level generally increased, at least in the area within the national park. Nevertheless, in the long run fewer visitors were moved to visit Fulufjäll/Fulufjell because of the existence of the park, and the number of visitors in 2014 decreased since 2003 to a level that is slightly above the year before the establishment of the national park[25].

[25] According to the findings by Fredman and Wikström (2015), on average, visitors spent 1.5 days in 2014 compared to 0.8 in 2003 in the national park, and 1.5 days compared to 1.3 in the area surrounding the park. 88% knew that Fulufjället is a national park before visiting the area in 2014 compared to 76% in 2003.

Many of the benefits described in these studies are related to the "use value" of protecting nature, i.e. visitors have the possibility to use the national park (or parts of it) as recreation arena. However, current study has evaluated the willingness to pay (WTP), primarily motivated by non-use value, i.e. the setting into "protection based on natural development" of certain adjacent areas to the national park, at either side of the border. In the study's scenario the inclusion of such areas are to become near-natural forests in the course of time (omitting the forest in Lillådalen Nature Reserve, which is already in a near-natural state). Thus, arguments to protect nature areas that relied on local and regional benefits, used during the creation of the Fulufjället/Fulufjellet National Park (Wallsten, 2012), may not be suitable to communicate the results of this study.

Thus, although the estimated mean WTP from the choice experiment is positive, it is unclear whether this would constitute a strong enough argument for decision-makers. Taken into consideration the relatively recent history of opposition against the creation of the national parks, an extension of the park into areas that are currently managed for other use (forestry) could probably re-ignite the calmed tensions. Would the WTP for park extension "make up" for a renewed conflict with local interests? Would the implementation of a tax collecting stated WTP from the population be sufficient for covering expropriations and remunerations, as well as specific park management and some local area compensations? We are confronting the well-known issue of distribution, i.e. that a decision about a park extension would imply "gainers" and "losers", in line with a positive majority on the national level and a negative majority on the local level.

Furthermore, renaturation of areas previously used for agriculture or forestry has become more popular in the European context, but it has not been part of nature protection traditions in Scandinavia. The scenario presented in the questionnaire is, thus, quite novel for its geographical context, where the assignment of some level of protection status to nature areas has been made based upon whether such areas contain old-growth forest and/or host some rare ecosystem or endangered species. May policy makers be willing to adopt this novel "renaturation" perspective?

Several further questions arise: Do the study's results make sense from an ecological perspective? Do they really serve to plead for stronger protection of natural areas? In order to keep the questionnaire simple, we had to keep the number of attributes of the choice experiment to a minimum, i.e. the size of the area to be protected, side of the border and amount of tax to be paid. However, as focus groups participants pointed out: does not the more specific location of the area matters? Would the outcome of providing a near-natural forest area, over time, in the Fulan area, south of Mörkret, between the river and the eastern border of Fulufjället national park, be equivalent, in some ecological measure, as providing a near-natural forest area, over time, in Bergåadalen, between the north-western

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Expenditures in the national park increase for lodging, food, shopping, and transport but decrease for activities between 2003 and 2014. In the area around the national park expenditures only increased for lodging and transport and decreased food, shopping and activities. 32.8% of respondents indicated that the existence of a national park influenced their decision to visit Fulufjället in 2014 compared to 44% in 2003. In 2003, a year after the establishment of the national park, there were 40% more visitor counts on the trail to Njupeskär, 25% more at Brottbäckstugan and 13% more at Gördalen. In 2014 (compared with 2001), there were 12% more visitor counts in the trail to Njupeskär, 4% less at Brottbäckstugan and 20% less at Gördalen (Fredman & Wikström 2015).

border of Fulufjellet National Park and the south-eastern border of Fregn Nature Reserve? How can we interpret and apply the estimated WTP if the proposed areas for extension do differ in ecological qualities, that it is not purely a matter of habitat size (hectare added to the park)? Or may we take the stated WTP as based on sufficiently informed choices and apply it to the selection of what nature management experts and decision-makers consider the ecologically most convenient areas for obtaining a new protection status?

We have attempted to answer to some of these questions by presenting the study's results to key stakeholders in the area of study and consulting with them the practical implications of these results. The next section summarizes the main topics and conclusions raised during such consultation.

7 Stakeholders consultation

The main objective of the final workshops was two-folded: communicate the studies' findings to a wider audience and work out appropriate recommendations based on the studies' implications.

Potential Fulufjället/Fulufjellet workshops participants were identified among those who had been involved in the hearing of protection proposal described in the Conservation Plan for Fulufjället/Fulufjellet national park and Fregn nature reserve (due to its recentness). Then, corresponding institutions at the Swedish side were identified. They were invited to 1) produce contextually relevant and feasible policy recommendations, and 2) explore how to facilitate its uptake and engage key stakeholders. In case of the Białowieża Forest workshop a long list of target participants was created comprising representatives of the Ministries for Nature Protection of the both countries, top State Forestry servicemen, leading multidisciplinary experts, representatives of NGOs and mass-media.

The Białowieża workshop has been held in Warsaw on 27th July 2016, while the counterpart Scandinavian workshop took place on Thursday, the 2nd of June of 2016 at Knappgården, Särna (Sweden). Significant efforts were made in order to recruit workshop participants. However, only four stakeholder representatives attended the Scandinavian workshop, all from the Swedish side, plus the project member. They represented various institutions and brought valuable knowledge about the area of study from different perspectives. Their interest in the TRANPAREA project was due to the importance of Fulufjället/Fulufjellet for the Älvdalen Municipality and the Dalarna County from a recreational, economic and natural perspective. Fifteen participants of the Białowieża workshop represented the Brest Regional Committee for Nature Protection (BY), Institute for Environment Protection (PL), National Academic Centre for Bioresources (BY), BirdLife Poland, APB-BirdLife Belarus, WWF Poland, Geobotany station in Białowieża (PL), University of Łódź (PL), mass-media.

Workshop participants indicated that they were motivated to attend the workshop either due to their interests in protecting more nature, exploring values attached to protected areas other than timber production (e.g. eco-tourism), finding ways of benefiting more from the national park, or safeguarding the national, regional and/or local interests related to tourism or other activities.

After a brief personal presentation and some introductory words about the workshop, participants were made familiar with the TRANPAREA project, i.e. its objectives and method as well as the main concepts the project deals with. Because the project relies on a survey-based methodology (stated preferences methodology and, more specifically, choice experiment), special attention was given to explaining and describing the process of designing the questionnaire, including the valuation scenario and choices. Then, the sample and the main results (section 5) were described and explained. Taking into account the previous record of valuation studies of the Białowieża Forest a special presenatation scrutinised this issue.

Based on the results of the studies, workshops participants were requested to discuss feasible policy recommendations, taking into account the contextual reality, i.e. the recentness of the establishment of the national park (especially in the Norwegian case), the conflicts that arose during the process at both sides of the border and existing traditions in

protecting nature. Moreover, workshops participants were also asked to express their views on how to implement policy recommendations as well as how to further use the TRANPAREA project results. Although most of the discussion took place after having presented the results, workshops participants were encouraged to raise questions and comments from the very beginning of the workshop. To activate the discussion, several questions were proposed by the workshop's moderators, including those raised in the previous section.

Workshop participants perceived the topic of the study, i.e. protecting nature as important and the change in protection tradition (towards "renaturation") as necessary, as few natural areas remain to be protected and some protected areas need to be enlarged or include buffer zones. Exploring whether binational parks are international public goods was also regarded as relevant because there are, indeed, challenges linked to the cross-border nature of transboundary NPAs. It was for instance mentioned that the existence of different regulations and levels of protection at each side of the border as well as the lack of scientific investigations in the Norwegian case to assess the biological and geological value of the national park may be hindering the development of a comprehensive infrastructure for recreational activities such as appropriate trails that do not stop at the border.

Politically support for extension of the passive protection was, however, perceived as complicated and difficult in all the considered cases, especially in Norway, at least within the next five years. Nevertheless, workshop participants believe that the TRANPAREA project results may provide a good basis for a discussion about "renaturation" and extension/connection of natural habitats. The study's results (i.e. that WTP increases with size) were perceived as a strong argument for decision makers, albeit insufficient. Participants indicated that there is need for further communication with forestry industry and local interests in order to get their expectations and viewpoints on whether the estimated willingness to pay for park extension possibly could "make up" for a renewed conflict with forestry and local interests, e.g. how the compensation for those loosing rights to use (as depicted by the TRANPAREA scenario) can be implemented.

Although workshop participants acknowledge that the TRANPAREA project mainly deals with assessing the willingness to pay for the non-use value of protecting nature, they expressed that use values are also important, and that "use" and "non-use" values should be combined. In fact, the "commercial value" of protecting nature (e.g. for tourism) was a recurrent topic during the workshop. Workshop participants believe that nature protection can/should still allow for using that nature for tourism purposes and even some kind of timber production (e.g. in areas where the biological values are not so high). At this point, a participant of the Scandinavian event raised doubts whether visitors would generally perceive an area that resembles a natural forest more attractive than an area, which has been clear-cut by the forestry industry, thereby indicating that this may depend on the recreation purpose and whether visitors experience thickly grown forests as a barrier to enjoy landscape views. The same participant indicated that the forestry industry has contributed to make some areas more accessible, something which may be appreciated by locals, whereas the national park could translate into less accessibility. Quite interestingly, the same concerns have been also address at the Białowieża workshop, since the results of one of the previous valuation studies, conducted in Poland indicate that the forest visitors do not necessarily appreciate semi-intact forests with their typical features like low accessibility or deadwood abundance. However, the similar study indicated the strong

impact of information on preferences – the respondents of the subsample made aware of the significance of deadwood stated considerably more intact forests friendly preferences.

Workshops participants truly engage in giving recommendations on how TRANPAREA results should be communicated in order to increase the impact of the project. According to workshops participants, the potential impact of the study results depends, to a large extent, on how much people know about protecting nature and about transboundary essence of the Białowieża Forest and Fulufjället. They also emphasize the importance of having a proper management, marketing and communication plan, i.e. explain what is the scope of the proposed extension of the protected area, and how can this be communicated. It was also recommended that it should be explain how the study results can be followed-up in a way that makes it as congruent as possible to different interests, such as accomplishing environmental objectives while attracting more visitors (and, thereby, promoting local activity), as well as increasing the cross-border cooperation – for the biodiversity protection as well as for the well-being of the citizens of the area.

Since policy-makers may struggle to adopt the novel "renaturation" perspective, because the long-term process clashes with the short period of time for which they are elected, workshop participants proposed facilitating policy makers the decision by providing them with an idea that preferably brings results within their election period and that is "safe to bet on". A proposed approach was to start by creating awareness and seeking support among local stakeholders and, then, eventually, bring the issue forward to the county-level and regional/national decision-makers.

Another important recommendation was given that TRANPAREA needs to clarify to what extent the survey results, the stated willingness-to-pay for extending Fulufjället/Fulufjellet national park by inclusion of adjacent areas that would become natural forest in the course of time ("renaturation"), could be applied to a slightly adjusted scenario. Although the extension of the passive protection regime was perceived as something positive by workshop participants, it was suggested that it may be easier to protect other adjacent areas and even apply a different level of protection (such as nature reserve). In this respect, it is important to mention that choosing another area adjacent to the sites under consideration would be congruent with the stated WTP, but not necessarily setting a different level of protection and/or an area that is not adjacent to the national park and, thus, quite distant from the survey scenario.

We must consider that these recommendations while valuable may be limited as only few stakeholder representatives were present. One participant did not believe that lack of attendance indicated lack of interest, whereas another participant mentioned that the reason might have been the invitation design, focusing too much on the project and too little on what we were intending to achieve by the workshops. Although it was recommended to conduct a new Scandinavian workshop to reach a broader range of stakeholder. Since TRANPAREA is limited in scope, resources, and duration, it was suggested that a new workshop would have to take place within the framework of another project, where TRANPAREA results could be briefly summarized and serve as one point

of departure for a discussion centred on stakeholders' concerns[26]. Further ways of communicating the TRANPAREA project results to the broader audience recommended by workshops participants were social media, articles in traditional media (including local newspapers) – and leaflets at the visitor centres of the appropriate national parks.

[26] One project mentioned was an INTERREG project led by one of the workshop participants (Agneta Arnesson-Westerdahl), focusing on developing a strategy to increase the number of visitors to Fulufjället/Fulufjellet national park, as well as in improving cooperation between Norway and Sweden.

8 Conclusions and policy recommendations

To conclude, the study revealed the following principle results:

- none of the sites under consideration appear to be IPG i.e. representative samples of none of the countries equally care about domestic and foreign segments of the transboundary sites under consideration;
- while Scandinavian respondents still state some positive preferences for the foreign side conservation, both Belarusians and Poles are either neutral or negative towards prospects of participation in bilateral conservation programme;
- while Poles are, on average, willing to pay for extension of the passive protection of the Białowieża Forest on the Polish side of the border, preferences of Belarusians are dominated by their highly positive preferences towards status quo;
- similarly, unlike Poles, a minor class of which demonstrate their care for the Belarusian segment of the Białowieża Forests, Belarusians seem not be willing to pay for any additional protection in the economically richer Poland;
- there is no universal tendency in influence of respondents' attitudes on their preferences, instead, four country-specific profiles of such an influence emerged;
- besides, some links in between the people's preferences and their attitudes are lacking any immediate rational explanation;
- however, some particular attitudes, like, for instance, respondents' patriotic considerations, their past record or prospects of visiting the site in future, and existing border regulations in between countries sharing the same transboundary site, underpin the appropriate preferences in a rational manner.

Based on the study results, the following conclusions and policy implications were derived:

- the current state of cross-border co-operation in transboundary NPAs management and governance, where bilateral efforts very seldom happen, is underpinned by the preferences of the nations under consideration and therefore is economically optimal and socially desirable;
- difference in national regulations matters for shaping preferences towards the transboundary NPAs – far less different regulations (viz. in between the Scandinavian countries, as compared to the case of Poland and Belarus) imply much more co-operative preferences;
- for Fulufjellet as well as for the Polish part of the Białowieża Forest, spatial extension of passive protection aimed at the forest landscape restoration should be considered; moreover, in the case of Fulufjellet, appropriate accession can be implemented within the framework of transboundary co-operation;

- transboundary co-operation of the concerned institutions of Norway and Sweden though feasible and socially desirable, should account for the fact that citizens of the both countries care more about protection of the domestic part of the transboundary site as compared to its foreign part;
- passively protected part of the Belarusian segment of the Białowieża Forest currently matches the people's preferences well and, therefore any spatial changes would have been an economically suboptimal strategy;
- if transboundary co-operation in protection of the transboundary NPAs remains desirable as voiced by conservationists, a greater effort should be made in terms of information and promotion of this idea.

The results, conclusions and political implications of the study have been communicated to the professional community and wider audience. The Partners are planning further promotion and dissemination of the study findings also in the post-project period in order to ensure the economically optimal and socially desirable management and governance of the transboundary NPAs under consideration. At the same time the appropriate issue deserves and requires follow up studies and discussion in the concerned audiences.

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Appendix A

Table A1: Descriptive statistics for socio-economic characteristics of the respondents, Sweden (n=1343) and Norway (n=1184)

	Sweden			Norway		
	Mean	Min	Max	Mean	Min	Max
Age	64,14	18	97	66,06	19	97
Gender (male)	0,53	0	1	0,54	0	1
University degree	0,27	0	1	0,15	0	1
Children (below 18 years) in household	0,37	0	1	0,37	0	1
No. of children (< 18 yrs.) in household	0,52	0	5	0,52	0	7
Household members	1,85	1	7	1,90	1	7
Employed household members	1,23	0	6	1,15	0	6
Income (household monthly net income, SEK/NOK, estimated from midpoints of income intervals)	*36 400*	0	*120 000*	*41 800*	0	*120 000*
Income missing (did not state income)	0,17	0	1	0,21	0	1
Supernumerary income (money available beyond everyday needs)	0,57	0	1	0,76	0	1
Live in town/city (5000-100,000)	0,40	0	1	0,38	0	1
Live in larger city (>100,000)	0,31	0	1	0,23	0	1

Table A2: Response and filling in indicators, Norway and Sweden

	Sweden		Norway	
Response indicators				
Invitations sent	6753	100%	9656	100%
Invitation rejections	300	4%	240	2%
Unanswered invitations	3832	57%	6679	70%
Questionnaires started	2621	39%	2744	28%
Filling in indicators				
Questionnaires started	2621	100%	2744	100%
Complete	907	35%	907	33%
Incomplete	631	24%	665	24%
ScreenOut	217	8%	125	5%
QuotaFull	866	33%	1047	38%
Filling in time (mm:ss)	16:36	-	16:07	-

Table A3: Dissemination activities

Date	Type of dissemination	Location / Publication
September 2013	Academic workshop	"Knowledge production and learning for sustainable landscapes", held by the FORESTY-LANDSCAPE-SOCIETY research at the School of Forest Management of the Swedish University of Agricultural Sciences (SLU), Skinnskatteberg, Sweden
November 2013	Interdisciplinary workshop	Oslo, Norway
December 2013	Interdisciplinary workshop	Warsaw, Poland
April 2014	Conference	Core Programme Kick-off Conference, held by NCBiR, Warsaw, Poland
September 2014	Conference	"Świadczenia ekosystemów jako przedmiot badań transdyscyplinarnych", Poznań, Poland
June 2015	Management planning workshop	Biełavieskaja Pušča management planning workshop, NP Biełavieskaja Pušča Headquarters in Kamiamiuki, Belarus

Appendix B – Questionnaires

You are kindly asked to fill in the attached questionnaire prepared at the order of the University of Warsaw and the Institute of Transport Economics, Oslo. It will take you about 20 minutes.

While answering the questions please remember to express your own opinion exclusively. There are no good or bad answers to the questions contained in the questionnaire, all answers are valuable to us.

The questionnaire is anonymous, which means that no individual person can be identified from the responses to our survey. All results will be presented as sums or averages.

I. Recreation in the forest

1. How often have you been to the forest in the last 12 months?

1.1. At least three times a week
1.2. Once or twice a week
1.3. Several times a month
1.4. About once a month
1.5. One or several times a year
1.6. I haven't been to the forest in the last 12 months -> Go to question 5.

2. Please think about your typical visit to the forest in the last 12 months. How far was the forest from the place of your residence?

2.1. Less than 1 km
2.2. 1 -3 km
2.3. 4 -6 km
2.4. 7-10 km
2.5. 11-20 km
2.6. 21-50 km
2.7. 51-100 km
2.8. 101-200 km
2.9. More than 200 km

3. What did you do in the forest that you usually visited during the last 12 months? (you can choose more than one answer)

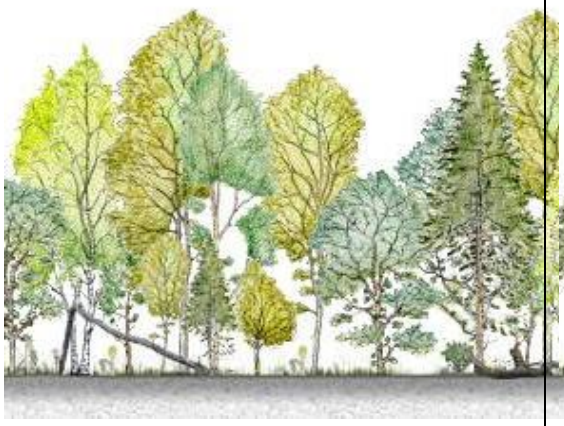
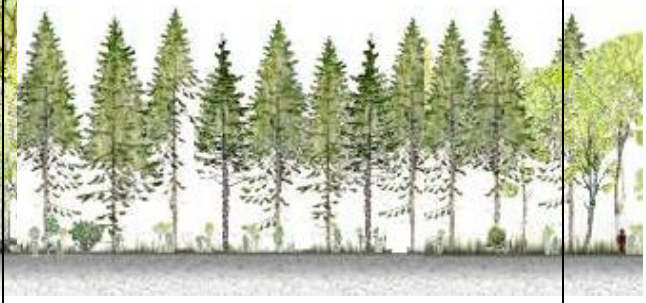
3.1. I walked
3.2. I watched the nature
3.3. I played sports, exercised, jogged
3.4. I picked mushrooms/berries
3.5. I hunted
3.6. Other activities (specify)

_____

II. Production forest and natural forest

Forests cover nearly 40% of Norway's surface. Forests fulfil various functions: they are used for wood and energy production, for relaxation, and they are the place of living of many species of plants, animals and fungi. Forests also protect the soil against erosion, regulate hydrographic conditions and the local climate.

Dependent on the level of human interference into forest development processes, **natural** and **production** forests can be distinguished.

Natural forest	Production forest
	
	
In the natural forest 1) Trees are not cut down. They are left in the forest until they get old, fall and decay. 2) Trees seed and grow naturally. 3) Trees of various age are growing next to one another.	**In the production forest** 1) After attaining a certain age the forest is logged. There are hardly any single old trees. 2) The majority of trees are being human-planted on the former cuts. 3) Trees are mostly of the same age.

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4) There are usually many species of trees. 5) There is a lot of dead wood (ca. 100 m^3/ha). 6) Greater diversity of species of plants, animals and fungi. Many **rare** (endangered) species grow only in natural forests.	4) One tree species is dominant (in Norway it is usually the spruce or pine tree). 5) There is a small volume of dead wood (ca. 6 m^3/ha). 6) Relatively small diversity of species of plants, animals and fungi. Rare (endangered) species do not have good conditions in production forests.
Natural forests cover an area of ca. 6000 km^2 in Norway, which constitutes about 5% of the forest area.	Around 95% of Norway's forests can be described as production forests.

QUESTION? Please check your understanding of natural forests and production forests:

	Difficult to understand	Neither easy nor difficult	Easy to understand
Production forests are used for production of wood, usually with one dominant tree species and trees of similar age.	☐	☐	☐
Natural forests fulfil protective functions, with several tree species of various ages, providing living areas for many rare and endangered species.	☐	☐	☐

Production forest areas that border with natural forests will, under **protection**, after a long time period start resembling natural forests.

III. Fulufjellet

Please get familiar with the basic facts about the forest on the slopes of Fulufjellet.

One of the places in Scandinavia where fragments of the **natural forest** remain is on the slopes of Fulufjellet mountain plateau, located on the border between Norway and Sweden – in Trysil/Hedmark and Älvdalen/Dalarna.

4. Have you ever been to the Fulufjellet?

4.1. Yes, on the Norwegian side (how many times?)_____

4.2. Yes, on the Swedish side (how many times?)_____

4.3. No, never -> go to Part IV

5. When were you last in the Fulufjellet?

5.1. In the last 12 months

5.2. More than 12 months ago but less than 5 years ago

5.3. 5 years ago or more

6. What was the <u>main</u> reason for your visit to the Fulufjellet?

6.1. To watch the Njupeskär waterfalls

6.2. To watch animals and plants / wildlife

6.3. To rest close to nature

6.4. With business purposes/being on mission

6.5. I have family/friends in the immediate neighbourhood

6.6. Other reasons (specify)

_____

7. Did you visit any of the following places while in the Fulufjellet? (you can choose more than one answer)

7.1. Njupeskär waterfalls trail

7.2. The National Park in general

7.3. The National Park's Visitor Centre

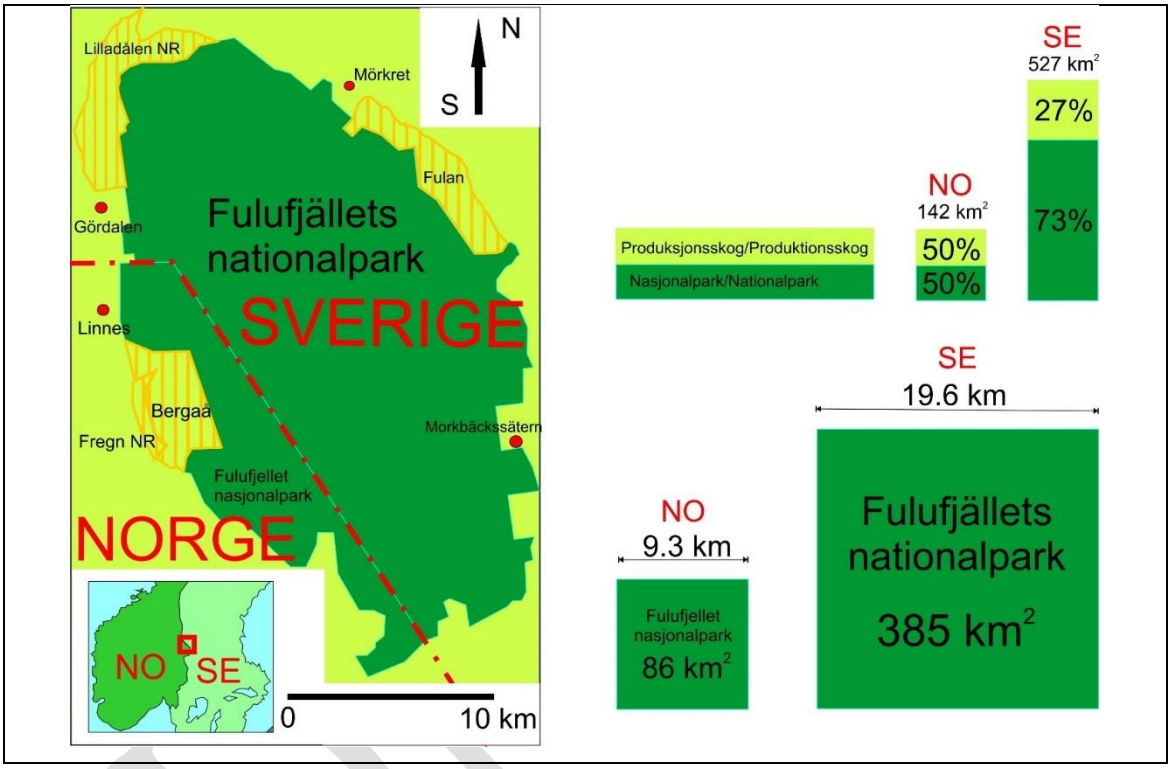
7.4. The forest

7.5. The naked rocks

IV. The forest within and outside Fulufjellet National Park

The total surface of the Fulufjell/Fulufjäll area is about 700 square kilometres (km^2). About one fourth of this area is on the Norwegian side and about three fourths on the Swedish side of the border.

The forests in Fulufjellet are located primarily on the peripheries of the mountain plateau, on the steep slopes and in some of the cirques. Some major forest areas currently not included in Fulufjellet National Park, on both sides of the Norwegian-Swedish border, are mapped below (as yellow-striped areas).



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QUESTION? Please check your understanding of the map and the meaning of the areas and colours:

	Difficult to understand	Neither easy nor difficult	Easy to understand
The red line marks the border between Norway (NO) and Sweden (SE).	☐	☐	☐
A larger share of Fulufjellet is on the Swedish side (ca 527 km^2, vs ca 142 km^2 in Norway), and a larger share on the Swedish side is currently a national park (ca 73%, vs ca 50% in Norway).	☐	☐	☐
The dark green area is the transboundary national park, that consists primarily of naked rock and some natural forest.	☐	☐	☐
The Swedish national park area would equal a square where all sides are about 19.6 km of length; while the Norwegian national park area would equal a square where all sides are about 9.3 km of length.	☐	☐	☐
The yellow-striped areas are forest areas outside the national park.	☐	☐	☐

The three yellow-striped areas and other forest areas outside the national park are now mostly closer to production forests than natural forest. However, because these areas border with natural forests in the national park, if **protection based on natural development** was also introduced in these areas, after **about 200 years** these forests would be close to natural forests, both as regards more large and old trees, more deadwood, and more species of animals, plants and fungi.

Increasing the size of the protected natural forest area in Fulufjellet would provide a larger living area for many rare and endangered species, thus increasing the probability for their survival.

However, increasing the national park area would imply restrictions on human activity. In addition to a ban on logging and use of motor vehicles, hunting and fishing

One of the three yellow-striped forest areas in Sweden, Lillådalen (to the north), already has some level of protection. The yellow-striped forest area on the Norwegian side, Bergådalen (to the west) has been subjected to tree logging in recent years, but, if protected, it could serve as a link between Fulufjellet national park and the small, protected area, Fregn.

might also be restricted.

8. **What would be your initial reaction to a proposal of extending the national park area in Fulufjellet, including more forest that over time can develop towards natural forest?**

   I would have supported the proposal of extending the national park

   I would not have supported the proposal of extending the national park

   I don't know

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V. V. The Fulufjellet protection programme

It is currently being considered if the programme aimed at increasing the protection of selected forest areas of Fulufjellet can be implemented in Sweden and Norway.

Three alternative levels of national park extension are considered, on each side of the border, that would cover forest areas that over time would resemble natural forest:

20 km²

4.5 km

40 km²

6.3 km

60 km²

7.7 km

You can assume that all the forest areas that are considered, from 20 to 60 km², and on both sides of the border, **have the same protection potential in terms of providing future natural forest habitat for rare and endangered species**.

These three alternative levels of national park extension could comprise part of the three yellow-striped areas that you saw on the map of Fulufjellet (Lillådalen, the Fulan river area, and Bergådalen), or they could comprise even more forest areas.

20 km² is an area of smaller size than one of the yellow-striped forest areas, while 60 km² is an area of a size that is somewhat larger than two of the yellow-striped forest areas.

QUESTION? Please check your understanding of the alternative forest areas:

	Difficult to understand	Neither easy nor difficult	Easy to understand
A forest area of 40 km² has the same size as a square where all sides are about 6.3 km of length.	☐	☐	☐
Size matters. Increasing the area of protected forests will increase the probability for the survival of rare and endangered species.	☐	☐	☐

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PLEASE, NOTE THE FOLLOWING:

- Financial means are necessary for the implementation of the new Fulufjellet protection programme, including for payments to compensate the current owners of the new protected areas.
- Suppose that the Norwegian and Swedish governments are expected to establish a common Fund responsible for coordination of the forest protection programme and the Fund would have at its disposal means from **taxes** paid by **each tax-payer** in Norway and Sweden during a **five-year period**.

QUESTION? Please check your understanding of the need for financing national park extensions:

	Difficult to understand	Neither easy nor difficult	Easy to understand
You could have to incur costs as a result of each option of additional forest area protection.	☐	☐	☐
The increased income tax could be spent on other governmental tasks, or you could spend the money on other purposes, if the protection programme is not launched.	☐	☐	☐

9. You will be presented with 16 comparisons of different options of the extension of the protection of forest areas on the slopes of Fulufjellet. Each option in a comparison is described by

- **the national park extension on the Norwegian side,**
- **the national park extension on the Swedish side, and**
- **the cost for yourself.**

NOTE:

- In some comparisons you may find that one option implies more forest protection for a lower cost compared to the other option. Please, just indicate for each comparison the best option **from your point of view**.
- One of the options available in each comparison is "no change" at zero cost.
- Your answers could be considered in the decision-making.

Protection programme	**No change**	**Option 1**	**Option 2**
National park extension on the Norwegian side of Fulufjellet (share of the area protected on the Norwegian side)	**+ 0 km²** (50%)	**+ 20 km²** (61%)	**+ 40 km²** (72%)
National park extension on the Swedish side of Fulufjellet (share of the area protected on the Swedish side)	**+ 0 km²** (73%)	**+ 60 km²** (85%)	**+ 20 km²** (77%)
Additional amount of income tax, which you would have to pay annually during five years	**0 kroner**	**500 kroner**	**750 kroner**
Your choice	☐	☐	☐

+15 choice-sets

10. How important were the three aspects of the forest protection in your choices between alternatives.

	I have taken it into account – it is very important	I have taken it into account – it is less important	I have payed no attention to it at all

National park extension on the Norwegian side of Fulufjellet	☐	☐	☐
National park extension on the Swedish side of Fulufjellet	☐	☐	☐
Additional amount of income tax you would have to pay annually during five years	☐	☐	☐

11. (For those who have consequently chosen no change option). **Please tick the statement below that best represents your position:**

1)	Understanding the alternatives was difficult. Picking **No change** was the easiest choice.	☐
2)	I would not like my money to be spent on conservation of forest in Fulufjellet.	☐
3)	I do not care about the future of the forest in Fulufjellet.	☐
4)	All the option but **No change** were too expensive.	☐
5)	Financing of nature conservation programs is a duty of government, not mine.	☐
6)	Other. Please, specify_____ _____	☐

Protection of nature that is shared between two or more countries is an issue in many areas of the world, including many European countries. There will of course be different opinions about a proposal of extending the binational Fulufjellet National Park and about the financing, as it will be for the protection of other transboundary nature areas. We have collected a set of such reactions to the proposal. You may find some of the following statements strange in a Scandinavian context, but please indicate if you agree or disagree.

12. Do you agree or disagree with the following statement:

	I definitely do not agree	I quite don't agree	I neither agree nor disagree	I quite agree	I definitely agree	It is hard to say
I expect Sweden to extend the National Park of Fulufjellet on its side of the border whether or not the bilateral	☐	☐	☐	☐	☐	☐

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programme discussed in the questionnaire is implemented.						
I expect Norway to comply with the international agreement to a larger extent than Sweden.	☐	☐	☐	☐	☐	☐
I am afraid that money spent on the protection on the Swedish side of Fulufjellet could be misused.	☐	☐	☐	☐	☐	☐
I believe that the participation of Sweden in the programme funding should be higher than the participation of Norway because the area of Fulufjellet on the Swedish side is greater than on the Norwegian side.	☐	☐	☐	☐	☐	☐
I believe that the participation of Sweden in the programme funding should be higher than the participation of Norway because the Swedish population is greater than the Norwegian population.	☐	☐	☐	☐	☐	☐
I believe that the participation of Norway in the programme funding should be higher than the participation of Sweden because Norwegians are wealthier.	☐	☐	☐	☐	☐	☐

Here are some further statements. Please indicate if you agree or disagree.

14. Do you agree or disagree with the following statements:

	I definitely do not agree	I quite don't agree	I neither agree nor disagree	I quite agree	I definitely agree	It is hard to say
I prefer better to protect the Norwegian side of Fulufjellet because it belongs to Norway.	☐	☐	☐	☐	☐	☐

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I believe that the tax values presented in the questionnaire, connected with different options of Fulufjellet protection programme are real tax rates that may be introduced.	☐	☐	☐	☐	☐	☐
I expect the results of this survey to be used for the selection of the new protection programme for Fulufjellet.	☐	☐	☐	☐	☐	☐
I expect to visit the Norwegian side of Fulufjellet in the next five years.	☐	☐	☐	☐	☐	☐
I expect to visit the Swedish side of Fulufjellet in the next five years.	☐	☐	☐	☐	☐	☐

The remaining part of the questionnaire relates to you sociodemographic characteristics. We remind that the survey is anonymous, the obtained data serves to statistical purposes exclusively.

M1. Please, specify your sex

☐ Male ☐ Female

M1a. Please indicate your postal code

M1b. Please specify your location

M2. Please specify the type of your settlement

Rural area (sparsely populated area)	☐
A town with 200 – 1000 inhabitants	☐
A town with 1000 – 5000 inhabitants	☐
A town with 5 – 25 thousand inhabitants	☐
A town with 25 – 100 thousand inhabitants	☐
A city with over than 100 thousand inhabitants	☐

M3. Please, specify the year of your birth

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M4. What is your education? Please, choose from the following options

Primary	☐
Secondary	☐
secondary-technical	☐
higher	☐
difficult to answer	☐

M5. Have you got children?

☐ Yes ☐ No

M6. What is the structure of your household (including yourself)?

Under 'household' we here understand the people who live in the same house/apartment and have the common family budget

Number of adult persons	
Number of currently employed persons	
Number of children below 18 years old	

M7. Please, specify those positions from the listed below which reflect best your average monthly net individual income as well as the average monthly net income of your household (that is the income after tax paying). Please, account for all the sources of income including salaries, pension, capital income (like deposit interest, dividends etc.).

Kr	Average monthly net individual income	Average monthly net income of the household
0 - 10 000	☐	☐
10 001 - 20 000	☐	☐
20 001 - 30 000	☐	☐
30 001 - 40 000	☐	☐
40 001 - 50 000	☐	☐
50 001 - 60 000	☐	☐
60 001 - 70 000	☐	☐
80 001 - 90 000	☐	☐
90 001 - 100 000	☐	☐
100 000 - 120 000	☐	☐
Over 120 000	☐	☐
Difficult to answer	☐	☐

M8. Please pick from the list below the option which is the best to describe the financial state of your household

We are short of funds even to cover the primary demand	☐
We have to deny ourselves many things in order to sustain our living	☐
We cover everyday needs however we are lack of money on substantial goods	☐
We have enough money and are able to save a part of them to purchase substantial goods	☐
We have enough money and do not have to save on substantial goods	☐
It is difficult to answer	☐

Thank you for your participation!

If you like, you may leave your comment about this survey.

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You are kindly asked to fill in the attached questionnaire prepared at the order of Warsaw University. It will take you about 20 minutes.

While answering the questions please remember to express your own opinion only - do not present the opinion of other people or the whole society. There are no good or bad answers to the questions contained in the questionnaire, all answers are valuable to us.

The questionnaire is anonymous.

III. Recreation in the forest

4. How often have you been to the forest with recreational purposes in the last 12 months?

4.1. Several times a week or more often
4.2. About once a week
4.3. Several times a month
4.4. About once a month
4.5. Several times a year
4.6. I haven't been to the forest in the last 12 months -> Go to part II.

5. Please think about your typical visit to the forest in the last 12 months. How far was the forest from the place of your residence?

5.1. Less than 1 km
5.2. 1-3 km
5.3. 4-6 km
5.4. 7-10 km
5.5. 11-20 km
5.6. 21 - 50 km
5.7. 51 – 100 km
5.8. 101 – 200 km
5.9. Over 200 km

6. What did you do in the forest in the last 12 months? (you can choose more than one answer)

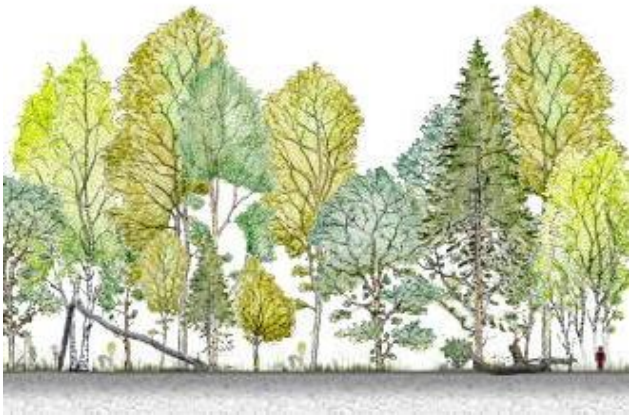
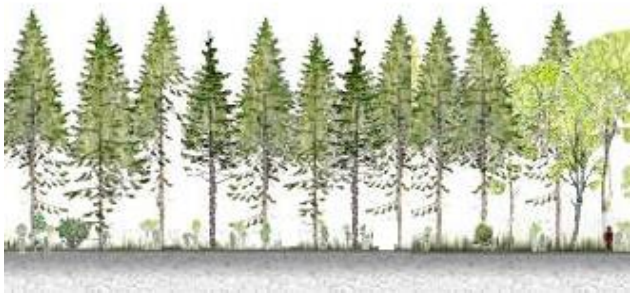
6.1. I walked
6.2. I watched the nature
6.3. I played sports
6.4. I picked mushrooms/berries
6.5. I hunted
6.6. Other activities (specify)_____

IV. Production forest and natural forest

Before starting the next part of the survey, please read about the difference between a production forest and a natural forest.

Forests cover almost 30 per cent of the area of Poland, they serve as a source of timber and firewood, recreation and leasure, as well as they fulfil protectional functions, i.e. they are the place of living of many species of plants, animals and fungi, they protect the soil against erosion, regulate hydrographic conditions and the local climate. Dependent on the extent of human intervention into forest development processes, there are **natural** and **production** forests.

The following photos, ilustrations and descriptions represent the difference between the typical production forest vs. natural forest

Natural forest	**Production forest**
	
	

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7) trees are not cut down. They are left in the forest until they get old, fall and decay. 8) trees are sown and grow naturally 9) trees of various ages are growing next to one another 10) there are usually many species of trees in such a forest. 11) there are a lot of dead and rotting trees (ca. 100 m^3/ha). 12) there is a greater diversity of species of plants, animals and fungi. Many rare species live only in the forests with a large quantity of old rotting trees.	7) after attaining a certain age the forest is logged. Old trees a met rarely. 8) the majority of trees are being planted artificially on the clearcuts. 9) trees are at the same age. 10) one species of trees is dominant (in Poland it is usually the pine tree). 11) There is a small volume of dead wood (ca. 6 m^3/ha). 12) there is a much smaller diversity of species of plants, animals and fungi. Rare species do not have good conditions to live here.
Semi-natural forests cover about 550 sq.km I Poland which makes up 0,6% of all the country's forests	About 99% of forests in Poland are production forests

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V. The Białowieża/Biełavieskaja Pušča Forest

Please get familiar with the basic facts about the Białowieża/Biełavieskaja Pušča Forest.

The total area of the Białowieża/Biełavieskaja Pušča Forest is over 2 160 km^2, which similar to the square with the side about 46 km long. About 1/3 of the Białowieża/Biełavieskaja Pušča Forest lies on Polish whilst 2/3 – on the Belarusian side.

5. Have you ever been to the Białowieża/Biełavieskaja Pušča?

8.1. Yes, on the Polish side (how many times?)_____

8.2. Yes, on the Belarusian side (how many times?)_____

8.3. No, never -> go to the point IV

9. When were you last in the Białowieża/Biełavieskaja Pušča?

9.1. In the last 12 months

9.2. More than 12 months ago but less than 5 years ago

9.3. 5 years ago or more

10. What was the main reason for your visit to the Białowieża/Biełavieskaja Pušča?

10.1. To watch the European bison

10.2. To watch other animals and plants / wildlife

10.3. To rest close to nature

10.4. To visit the Białowieża/Biełavieskaja Pušča Forest as one of the most famous tourist attractions in Poland

10.5. I was in the vicinity, so I decided to go to the Forest

10.6. I was there on mission

10.7. I have family/friends in the immediate neighbourhood

10.8. Other reasons (specify)

_____

11. Did you visit any of the following places while in the Białowieża/Biełavieskaja Pušča Forest? (you can choose more than one answer)

11.1. European Bison Show Reserve

11.2. Strict Protection zone (guided tour)

11.3. Museum of Nature and Forest of the Białowieża/Biełavieskaja Pušča National Park

11.4. Landmarks on the Polish side

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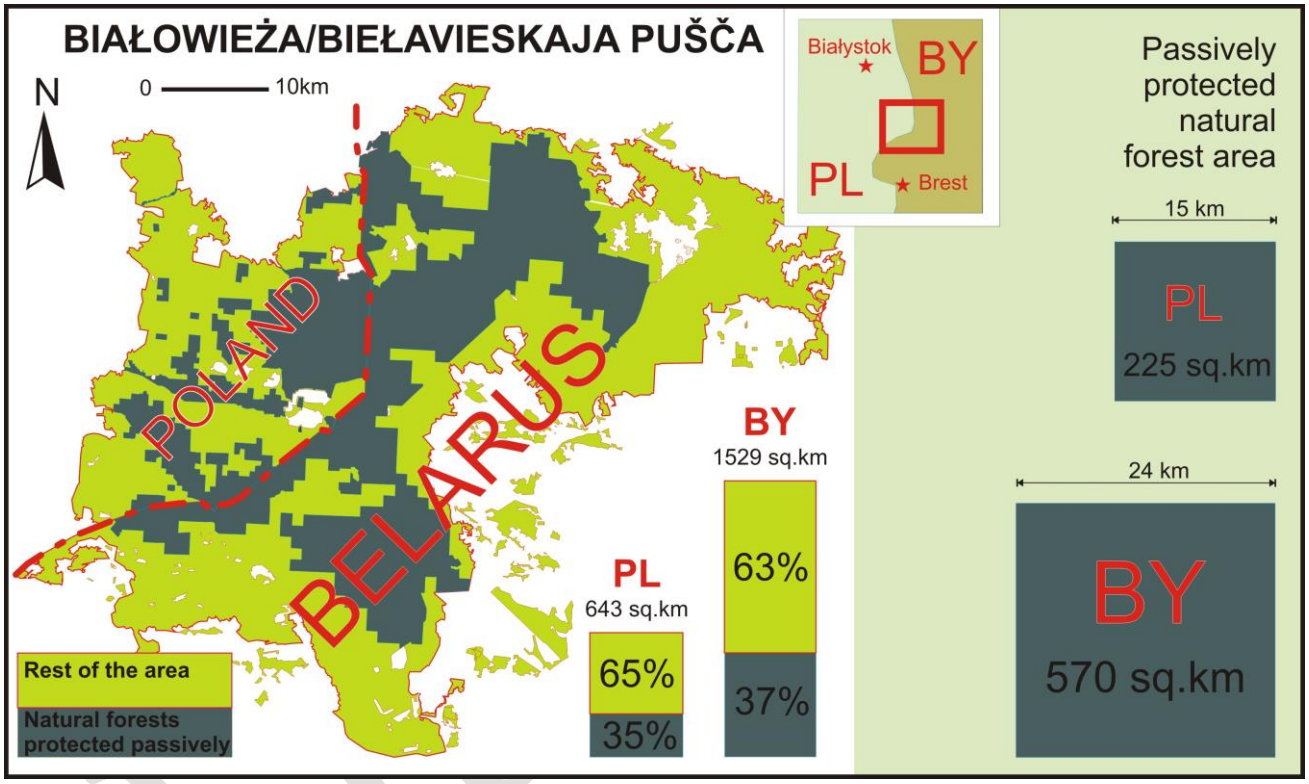
VI. Infromation on the Białowieża/Biełavieskaja Pušča Forest

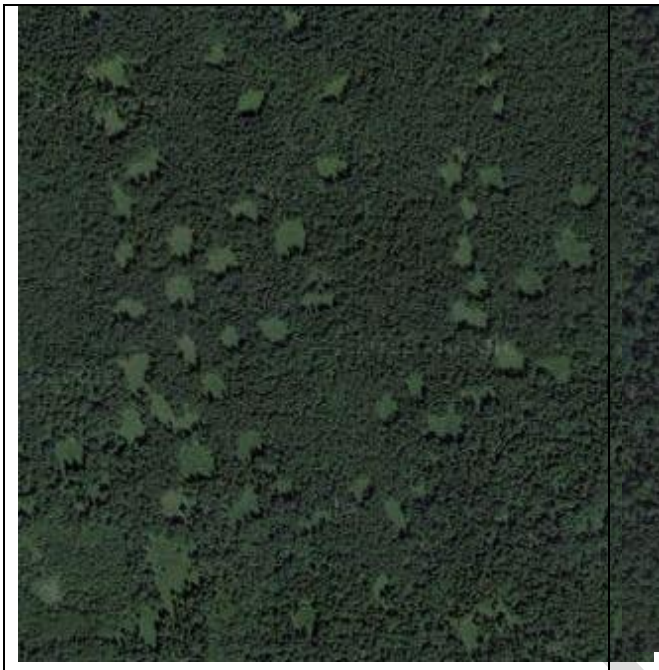
What distinguishes the Białowieża/Biełavieskaja Pušča Forest from all other forests in Poland and Europe are preserved large fragments of the natural forest. At 1/3 of its area, the Białowieża/Biełavieskaja Pušča Forest has never been logged – this part of the the Białowieża/Biełavieskaja Pušča Forest is covered by natural

These areas, located on both sides of the border, are marked on the below map. The Białowieża/Biełavieskaja Pušča Forest is the only place in Poland where natural forests have been preserved on such a big area.



The best preserved forests, 35% of the Polish part and 37% of the Belarusian part respectively are covered by the **passive protection regime** which exludes any kind of human intervention into the natural processes.

The other fragments of the Forest, currently neighbouring with passive protection zones, are forests that have been used for production purposes in the last 100 years. As a result, the forests in Białowieża/Biełavieskaja Pušča are currently diverse as regards the naturalness degree, as it can be seen on the satellite images presented below.

	
The Białowieża/Bielavieskaja Pušča Forest beyond the borders of the **passive protection zone**. Lighter spots present the places of timber production.	Thick **natural forest** stand of the areas of the Białowieża/Bielavieskaja Pušča Forest subject to **passive protection**

VI. **Programme of extention of the passive protection in Białowieża/Bielavieskaja Pušča Forest**

We would now like to present you possible ways of changing conservation of the Białowieża/Bielavieskaja Pušča Forest area

The programme of additional protection of the Białowieża/Bielavieskaja Pušča Forest is being considered currently. It is intended to extend the **passive protection** regime on the currently production forests of Białowieża/Bielavieskaja Pušča. Extention of the passive protection regime would mean cancellation of any human intervention into natural processes (logging and removal of trees, access roads paving, use of chemical pesticides etc).

Production forests of the Białowieża/Bielavieskaja Pušča are currently human-transformed to different extent. However, because they border with natural forests, if **passive protection** was also introduced in these areas, after **about 200 years** these forests would be close to **natural forests**, both as regards the look and the species of animals, plants and fungi.

The photos below represent the current look of production forests as well as how they have looked in about 200 years after their coverage by the **passive protection** regime.




12. **Should, in your opinion, the passive protection zone be extended in the Białowieża/Bielavieskaja Pušča Forest?**
    Yes

    No

    I don't know

In this survey we would like to learn your opinion on which part of extension should be on the Polish and which part on the Belarusian side. Scientific researches indicate that it does not matter for the nature of the Białowieża/Bielavieskaja Pušča Forest, if the new areas will be granted protection in its Polish or Belarusian part; what really matters is that the total **passively protected** area in it is as large as possible.

NOTE:

- financial means are necessary for the implementation of the new Białowieża/Bielavieskaja Pušča Forest protection programme, for example for payment of compensation for the new areas covered by **passive protection**.
- to assure effectiveness of the activities related to the **passive protection** of the additional areas of the Białowieża/Bielavieskaja Pušča Forest, it is planned to establish the Polish-Belarusian Fund responsible for coordination of the **passive protection** activities on both sides of the Białowieża/Bielavieskaja Pušča Forest;
- to guarantee full reliability and transparency of the activities the Fund would function under the supervision of one of the most reputable international organisations, for example UNESCO;

- the Fund would have at its disposal means from **higher taxes** paid **proportionnaly to income** by **each** tax-payer in Poland and Belarus;
- implementation of the programme would have meant **increase of taxes** for the citizens of the both countries.

9. In a moment we will present you 16 comparisons of variants of passive protection extension in the Białowieża/Biełavieskaja Pušča Forest. Different variants emphasise different scope of passive protection area spatial extension, different proportion of its distribution between Polsh and Belarusian sides and they incurre different costs. We ask to treat every comparison independently of the others – for every comparison we ask you to pick a variant which is the best <u>from your point of view</u> out of all presented variants.

WHEN MAKING YOUR CHOICES, PLEASE REMEMBER THAT:

- your answers may influence the decision about how the Białowieża/Biełavieskaja Pušča Forest region would be governed;
- every option of additional protection would have incurrance of additional costs for you. Though increase of taxes would have depended of the income level, the tables contain sums **in zlotys for the person with as high income as yours;**
- in every household the money are necesary for other needs, therefore when choosing variants of programmes, please remember that funds they require could have been spent on other purposes;
- if you consider some of the variants or all of them too expensive – so that you would not choose to pay for them – please, do not pick them. Every comparison always contains a „status quo" option, that is **no changes**, which **does not imply any additional cost incurrance for you.**

Variants comparison 1	Status quo	Variant 1	Variant 2	Variant 3
Additional area in the Polish part of the Białowieża Forest covered by passive protection regime (Total proportion of passive protection zone in the Polish part of the Białowieża Forest)	+ 0 km^2 (35%)	+ 105 km^2 (51%)	+ 70 km^2 (46%)	+ 0 km^2 (35%)
Additional area in the Belarusian part of the Białowieża Forest covered by passive protection regime (Total proportion of passive protection zone in the Belarusian part of the Białowieża Forest)	+ 0 km^2 (37%)	+ 105 km^2 (44%)	+ 0 km^2 (37%)	+ 35 km^2 (40%)
Additional sum of taxes, imposed on your income annually during the five next years	None	100 PLN	50 PLN	75 PLN
Please, pick your best variant	☐	☐	☐	☐

10. When assessing particular programmes you have taken into account the following things: additional passive protection area in Poland or in Belarus, and additional cost. In the table below, please mark which of those things was the most important for you, and which was less important?

	I have taken it into account – it is very important	I have taken it into account – it is less important	I did not pay any attention to it at all
Dodatkowe obszary w polskiej części Puszczy Białowieskiej objęte **ochroną bierną**	☐	☐	☐
Dodatkowe obszary w białoruskiej części Puszczy Białowieskiej objęte **ochroną bierną**	☐	☐	☐
Dodatkowa kwota podatków od Pana/Pani dochodów pobierana raz do roku przez pięć lat	☐	☐	☐

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11. (For those who picked status quo in all the choice-tasks). **You have consequently picked the Status quo option. Please, choose your main reason for it:**

7)	I had a problem with understanding of the presented programmes. Picking **Status quo** option has been the easiest possible choice.	☐
8)	I would not like that my money are spent on the Białowieża/Biełavieskaja Pušča Forest protection.	☐
9)	I do not care what will happen with the Białowieża/Biełavieskaja Pušča Forest in future.	☐
10)	Variants other than **Status quo** were too expensive.	☐
11)	It is the government who must finance protection programmes, not me.	☐
12)	Other. Please specify _____	☐

12. Do you agree with the below statements?

	Definitely disagree	Rather disagree	Neither agree, nor disagree	Rather agree	Rather disagree	Do not know/ difficult say
I am afraid that the money spent on the protection on the Polish side of the Białowieża/Biełavieskaja Pušča Forest could be embezzled (stolen)	☐	☐	☐	☐	☐	☐
I expect that Poland will comply with the international agreement to a larger extent than Belarus	☐	☐	☐	☐	☐	☐
I prefer to pay more for **passive protection** of the Polish side of the Białowieża/Biełavieskaja Pušča Forest because it belongs to Poland	☐	☐	☐	☐	☐	☐
I expect that Belarus will extend the **passive protection** zone of the Białowieża/Biełavieskaja Pušča Forest on its side of	☐	☐	☐	☐	☐	☐

	Definitely disagree	Rather disagree	Neither agree, nor disagree	Rather agree	Rather disagree	Do not know/ difficult say
the border whether or not the bilateral programme discussed in the questionnaire is implemented						
I believe that the participation of Belarus in the funding of **passive protection** extension programme should be higher than the participation of Poland because the area of the Białowieża/Biełavieskaja Pušča Forest on the Belarusian side is greater than on the Polish side	☐	☐	☐	☐	☐	☐
I believe that participation of Poland in the funding of **passive protection** extension programme should be higher than the participation of Belarus because Poles are wealthier	☐	☐	☐	☐	☐	☐
I believe that results of this survey will be used for the selection of the new protection programme for the Białowieża /Biełavieskaja Pušča Forest	☐	☐	☐	☐	☐	☐
I do believe that in the event of the implementation of the new Białowieża/Biełavieskaja Pušča Forest protection programme I will be charged its costs (in the form of higher taxes)	☐	☐	☐	☐	☐	☐

	Definitely disagree	Rather disagree	Neither agree, nor disagree	Rather agree	Rather disagree	Do not know/ difficult say
I believe that tax values presented in the questionnaire, connected with different options of the Białowieża/Biełavieskaja Pušča Forest protection programme are real tax rates that can be introduced	☐	☐	☐	☐	☐	☐
I expect to visit the Polish side of the Białowieża/Biełavieskaja Pušča Forest in the next 5 years	☐	☐	☐	☐	☐	☐
I expect to visit the Belarusian side of the Białowieża/Biełavieskaja Pušča Forest in the next 5 years	☐	☐	☐	☐	☐	☐

The next part of the questionnaire serves for learning your sociodemographic characteristics. We remind that the survey is anonymous, the obtained data will be used exclusively for statistical purpose.

M1. Please, specify your sex

☐ Male ☐ Female

M2. Please specify the type of your settlement

Rural area	☐
A town with less than 25 thousand inhabitants	☐
A town with less than 25 – 100 thousand inhabitants	☐
A city with over than 100 thousand inhabitants	☐

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M3. Please, specify the year of your birth

19 _____

M4. What is your education? Please, choose from the following options

primary	☐
secondary	☐
vocational	☐
higher (bachelor)	☐
higher (magister)	☐
other	☐

M5. Have you got children?

☐ Yes ☐ No

M6. What is the structure of your household (including yourself)?

Under 'household' we here understand the people who live in the same house/apartment and have the common family budget

Number of adult persons	
Number of currently employed persons	
Number of children below 18 years old	

M7. By this study we want to estimate the dependence between the answers to the previous questions and respondents' income level. Please, remember that the survey is anonymous and your personal data is not subjected to separate publishing. Please, specify those positions from the listed below which reflect best your average monthly net individual income as well as the average monthly net income of your household (that is the income after tax paying). Please, account for all the sources of income including salaries, pension, capital income (like deposit interest, dividends etc.)

PLN	Average monthly net individual income	Average monthly net income of the household
0 – 1 000 zł	☐	☐
1 001 zł - 2 000 zł	☐	☐

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2 001 zł - 3 000 zł	☐	☐
3 001 zł - 4 000 zł	☐	☐
4 001 zł - 5 000 zł	☐	☐
5 001 zł - 6 000 zł	☐	☐
6 001 zł - 7 000 zł	☐	☐
7 001 zł - 8 000 zł	☐	☐
8 001 zł - 9 000 zł	☐	☐
9 001 zł - 10 000 zł	☐	☐
Ponad 10 000 zł	☐	☐
Difficult to say	☐	☐

M8. Please pick from the list below the option which is the best to describe the financial state of your household

We are short of funds even to cover the primary demand	☐
We have to deny ourselves many things in order to sustain our living	☐
We cover everyday needs however we are lack of money on substantial goods	☐
We have enough money and are able to save a part of them to purchase substantial goods	☐
We have enough money and do not have to save on substantial goods	☐
It is difficult to answer	☐

Thank you for filling in the questionnaire!

Appendix C – Attitudinal questions

Attitudinal questions For the Norwegian respondents	
I expect Sweden to extend the National Park of Fulufjellet on its side of the border whether or not the bilateral programme discussed in the questionnaire is implemented	1=definitely disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=definitely agree, 6=difficult to say[27]
I expect Norway to comply with the international agreement to a larger extent than Sweden	
I am afraid that money spent on the protection on the Swedish side of Fulufjellet could be misused	
I believe that the participation of Sweden in the programme funding should be higher than the participation of Norway because the area of Fulufjellet on the Swedish side is greater than on the Norwegian side	
I believe that the participation of Sweden in the programme funding should be higher than the participation of Norway because the Swedish population is greater than the Norwegian population.	
I believe that the participation of Norway in the programme funding should be higher than the participation of Sweden because Norwegians are wealthier	
I prefer better to protect the Norwegian side of Fulufjellet because it belongs to Norway	
I believe that the tax values presented in the questionnaire, connected with different options of Fulufjellet protection programme are real tax rates that may be introduced	
I expect the results of this survey to be used for the selection of the new protection programme for Fulufjellet	
I expect to visit the Norwegian side of Fulufjellet in the next five years	
I expect to visit the Swedish side of Fulufjellet in the next five years	
For the Swedish respondents	
I expect Norway to extend the National Park of Fulufjellet on its side of the border whether or not the bilateral programme discussed in the questionnaire is implemented	1=definitely disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=definitely agree, 6=difficult to say
I expect Sweden to comply with the international agreement to a larger extent than Norway	
I am afraid that money spent on the protection on the Norwegian side of Fulufjellet could be misused	
I believe that the participation of Sweden in the programme funding should be higher than the participation of Norway because the area of Fulufjellet on the Swedish side is greater than on the Norwegian side	

[27] Options 3=neither agree nor disagree and 6=difficult to say have been treated the same way when analysing the data

I believe that the participation of Sweden in the programme funding should be higher than the participation of Norway because the Swedish population is greater than the Norwegian population	
I believe that the participation of Norway in the programme funding should be higher than the participation of Sweden because Norwegians are wealthier	
I prefer better to protect the Swedish side of Fulufjellet because it belongs to Sweden	
I believe that the tax values presented in the questionnaire, connected with different options of Fulufjellet protection programme are real tax rates that may be introduced	
I expect the results of this survey to be used for the selection of the new protection programme for Fulufjellet	
I expect to visit the Swedish side of Fulufjellet in the next five years	
I expect to visit the Norwegian side of Fulufjellet in the next five years	