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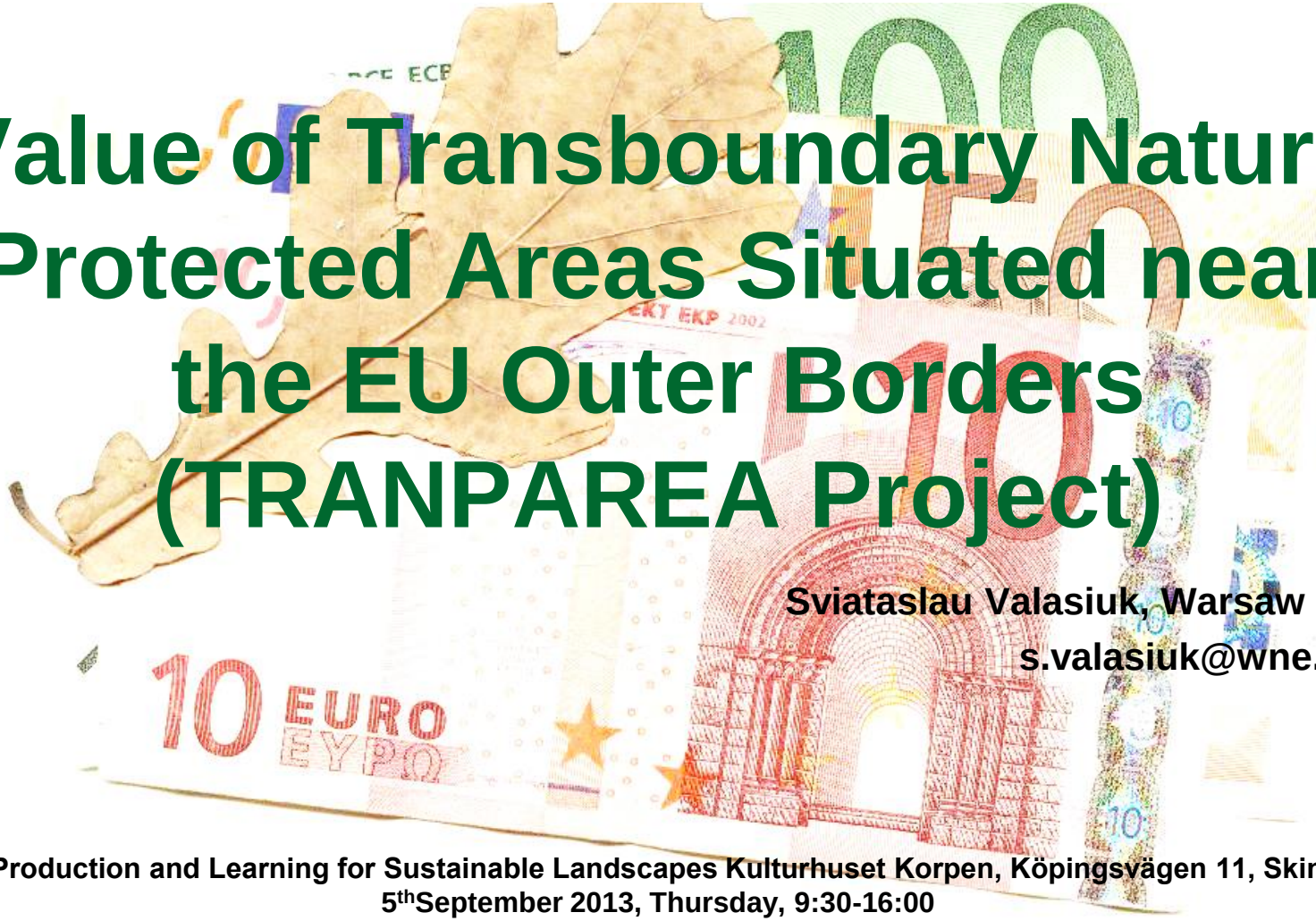

Value of Transboundary Nature Protected Areas Situated near the EU Outer Borders (TRANPAREA Project)

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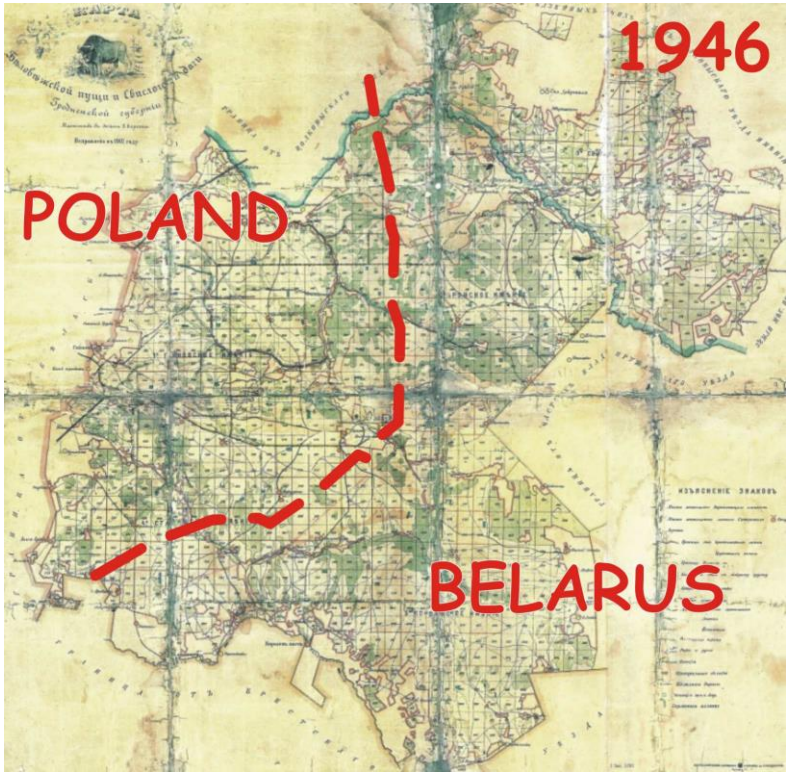
Knowledge Production and Learning for Sustainable Landscapes Kulturhuset Korpen, Köpingsvägen 11, Skinnskatteberg
5th September 2013, Thursday, 9:30-16:00

Narodowe Centrum Badań i Rozwoju
SLU Sveriges Lantbruksuniversitet
norway grants
Polish-Norwegian Research Programme

Motivation

Transboundary Nature Protected Areas (TNPA) – contiguous natural complexes, artificially divided with the state borders, protected on the every side of the border

- 188 TNPA in 112 countries S=3.2mio km2 (≅India), 17% of total PAs' (Conservation International, 2005)
- Significant scientific and popular literature in natural disciplines
- Minimal literature in economics (Busch, 2007)



TRANPAREA Project

- Partnership: WNE UW & TØI
- Support: Polish-Norwegian Research Programme/Norway Grants (Core 2012 call)
- Comparison of the two cases:
  - Fulufjället/Fulufjellet (Sweden/Norway);
  - Białowieża/Biełavieskaja Pušča (Poland/Belarus)

Are TNPAs **international public goods?**

- Natural sciences: definitely
- Economics: far from trivial
  - Non-exclusion principle applies
  - Non-rivalry principle applies
  - Not sold out or exchanged on regular markets => no market prices for them exist

Many natural goods theoretically qualify for being the public goods…

…but empirical verification is needed if the theory is consistent with people's real preferences

Methodology: Stated Preferences

- Simply asking the individual about her preferences;
- Accounts for the non-use values;

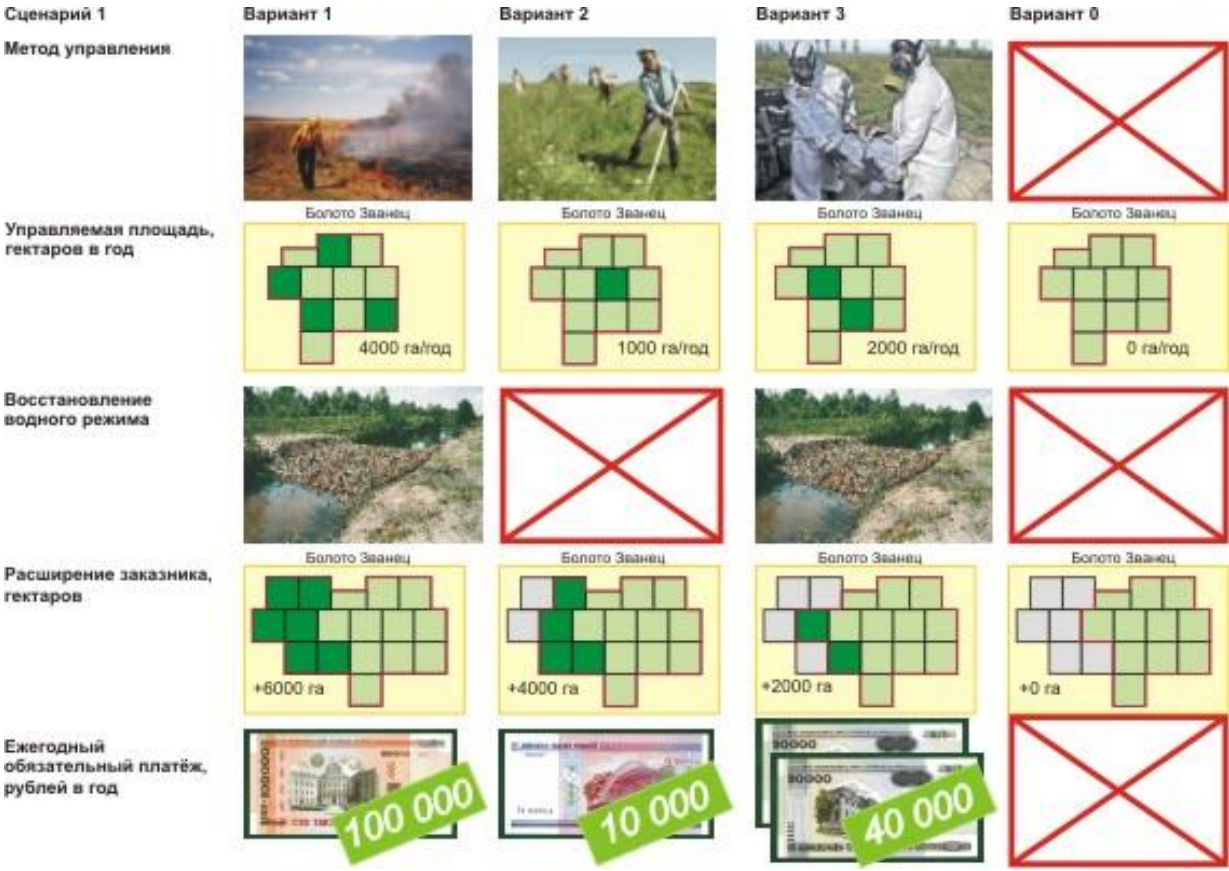
Two elicitation formats:

- contingent valuation (CVM);
- choice experiment (CE).

[Carson&Groves, 2007]

Choice Experiment (CE):

- Respondent makes a series of discrete choices amongst alternatives organised into choice sets;
- Each alternative is described with several attributes including a monetary one;
- Each attribute exists on different levels;
- The respondent is asked either to make her best choice or range the alternatives, taking into account their attributes and levels and thus **making trade-offs between them**;
- Requires the survey of representative sample of population to be conducted to ensure scientific/political soundness (N=1000x4 countries within TRANPAREA)



Parameters of utility function and willingness to pay (WTP) for the entire good and its particular components are calculated following the Random Utility Modelling technique

RUM [McFadden, 1974]: $U_{ni} = V_{ni} + \varepsilon_{ni}$ $\quad P_{ni} = \Pr(V_{ni} + \varepsilon_{ni} > V_{nj} + \varepsilon_{nj} \forall j \neq i)$

Under IID assumption – MNLModel

$$P_{ik} = \frac{e^{\beta' x_{ni}}}{\sum_j e^{\beta' x_{nj}}}$$

x explanatory variables' vector, a *β* – parameters' vector.

Ranking [Train, 2003].

$$P_{(RankingC,B,D,A)} = \frac{e^{\beta' x_{AC}}}{\sum_{j=A.B.C.D} e^{\beta' x_{nj}}} \frac{e^{\beta' x_{AB}}}{\sum_{j=A.B.D} e^{\beta' x_{nj}}} \frac{e^{\beta' x_{AD}}}{\sum_{j=A.D} e^{\beta' x_{nj}}}$$

Under assumption of preferences' heterogeneity RPL model (panel version)

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

Expected results

- WTP calculated.
- Comparison between cases and between the national samples within each case conducted.
- Hypothesis: ‘TNPAs are international public goods in accordance with people’s preferences’ tested.

TRANPAREA: Respondent's utility function draft specification

$V=\beta_{SD}*S_D + \beta_{SF}*S_F + \beta_{COST}*Bid,$

where

S_D – strict reserve area on domestic side, ha

S_F – strict reserve area on foreign side, ha

Bid – individual annual tax for the conservation programme, $

Results' Interpretation

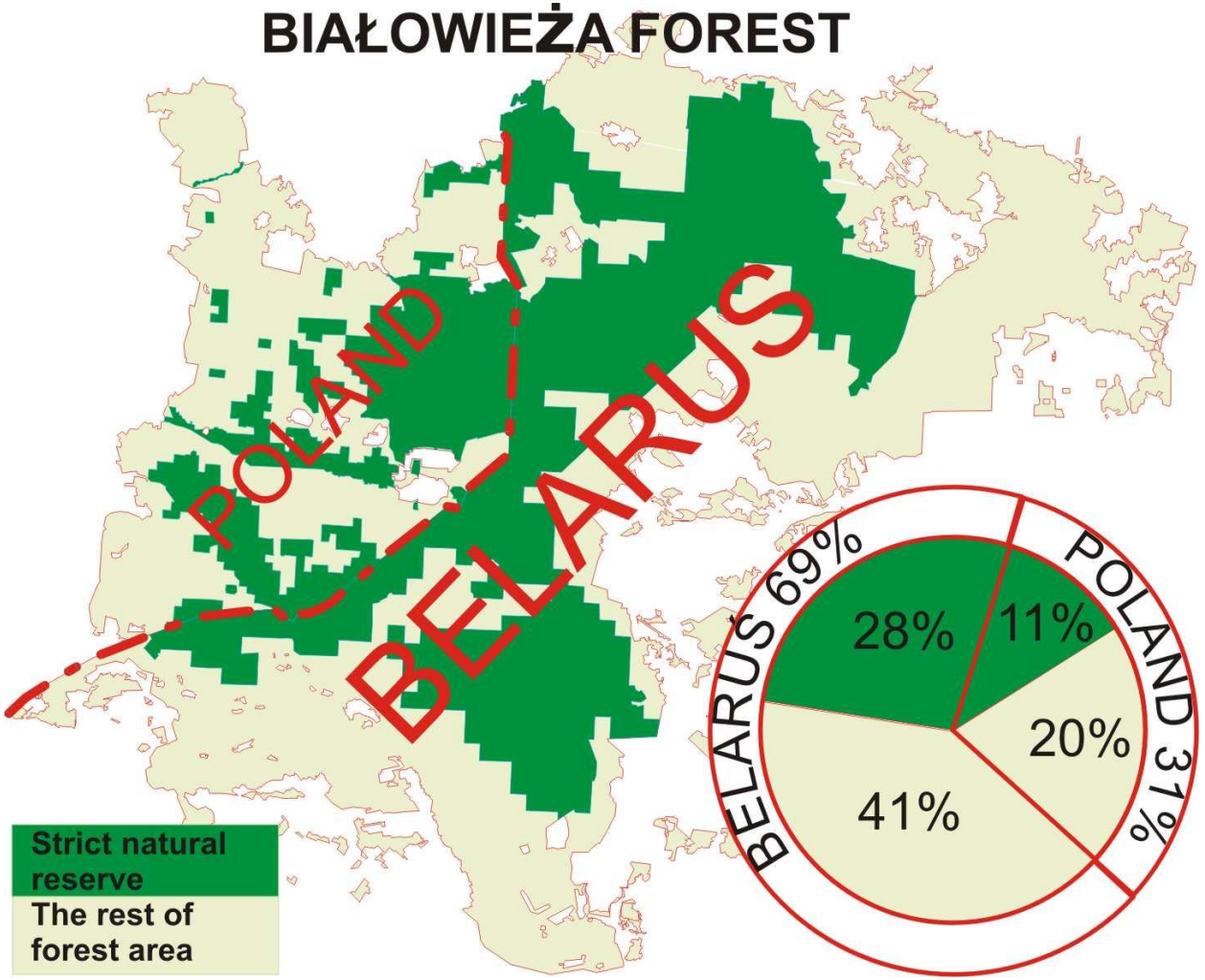
Comparison of β_{SD} against β_{SF} in the subsample of respondents assigning **non-use value only**. Three possible profiles of respondents according to their individual preferences:

- "Patriot": $\beta_{SD} > \beta_{SF}$, maximises S_D on average;
- "???" (various explanations) $\beta_{SD} < \beta_{SF}$, maximises S_F;
- "Citizen of the Earth" $\beta_{SD} = \beta_{SF}$, maximises S_F+S_D.

If $\beta_{SD}= \beta_{SF}$ in the subsample of those who assign non-use value only => TNPA **is the international public good** in accordance with preferences of the given population.

Otherwise two separate national public goods exist instead of the common one

Pilot study: Białowieża case (Belarus, July 2012, N=32)

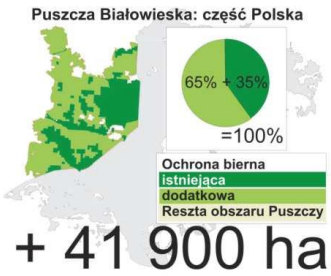
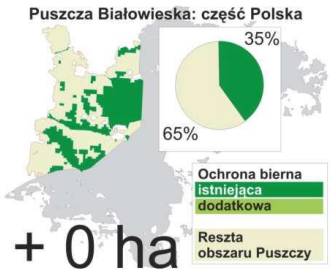
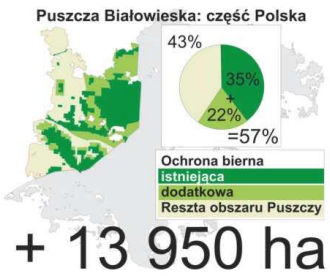
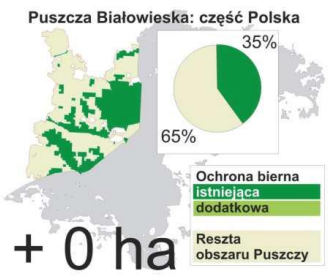
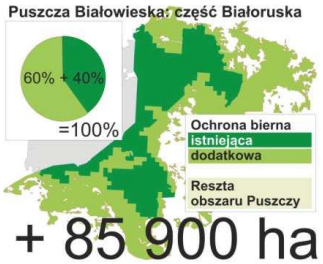
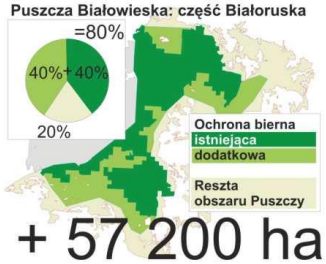
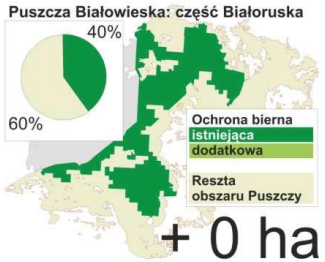
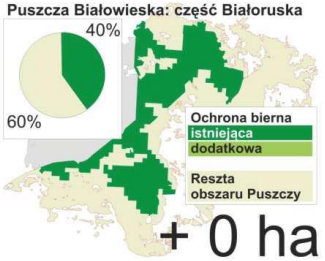


Pilot survey: attributes and their levels

Expansion of the strict reserve protection regime on Belarusian part of the Białowieża forest	Additionally enlarging protection level of the reserve in the Belarusian part of Białowieża forest from the current area. BAU*= +0 ha	1) +0 ha 2) +28 600 ha 3) +57 200 ha 4) +85 900 ha
Expansion of the strict reserve protection regime on Polish part of the Białowieża forest	Additionally enlarging protection level of the reserve in the Polish part of Białowieża forest from the current area. BAU*= +0 ha	1) +0 ha 2) +13 950 ha 3) +27 900 ha 4) +41 900 ha
Cost (annually paid tax)	Annual cost per person (2012 prices) BAU = 0	1) 6 USD 2) 12 USD 3) 18 USD 4) 24 USD

*BAU: Business-as-Usual

Pilot survey: choice-set example

Sytuacja 1	Opcja 1	Opcja 2	Opcja 3	Opcja status-quo
Powierzchnia poszerzenia strefy ochrony biernej Puszczy Białowieskiej po stronie Polskiej, hektarów	 + 41 900 ha	 + 0 ha	 + 13 950 ha	 + 0 ha
Powierzchnia poszerzenia strefy ochrony biernej Puszczy Białowieskiej po stronie Białoruskiej, hektarów	 + 85 900 ha	 + 57 200 ha	 + 0 ha	 + 0 ha
Roczna stawka podatku, złotych na rok	**140**	**70**	**105**	**0**
Proszę wystawić oceny tutaj →				

Pilot survey: results (best choice)

Variables	Coeff.	t-rat.
SQ**	-1.407	-6.994
S_BY**	0.127D-04	6.024
S_PL*	0.945D-05	2.410
Bid**	-0.091	-9.405

Statistically significant at * 0,05 **0,01

Thank you for your attention!

Literature

Busch, J. 2008. Gains from configuration: The transboundary protected areas as a conservation tool. Ecological Economics 67: 394 – 404.

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McFadden, D. (1974) Conditional logit analysis of qualitative choice behaviour, in: P.Zarembka, editor. Frontiers in Econometrics, New York, Academic Press, pp. 105-142

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