



WARSAW UNIVERSITY

**Warsaw Ecological Economics Center**

# *Estimation of cultural services and non-use values related to different WBZ scenarios*

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# Individuals' motivation for WTP

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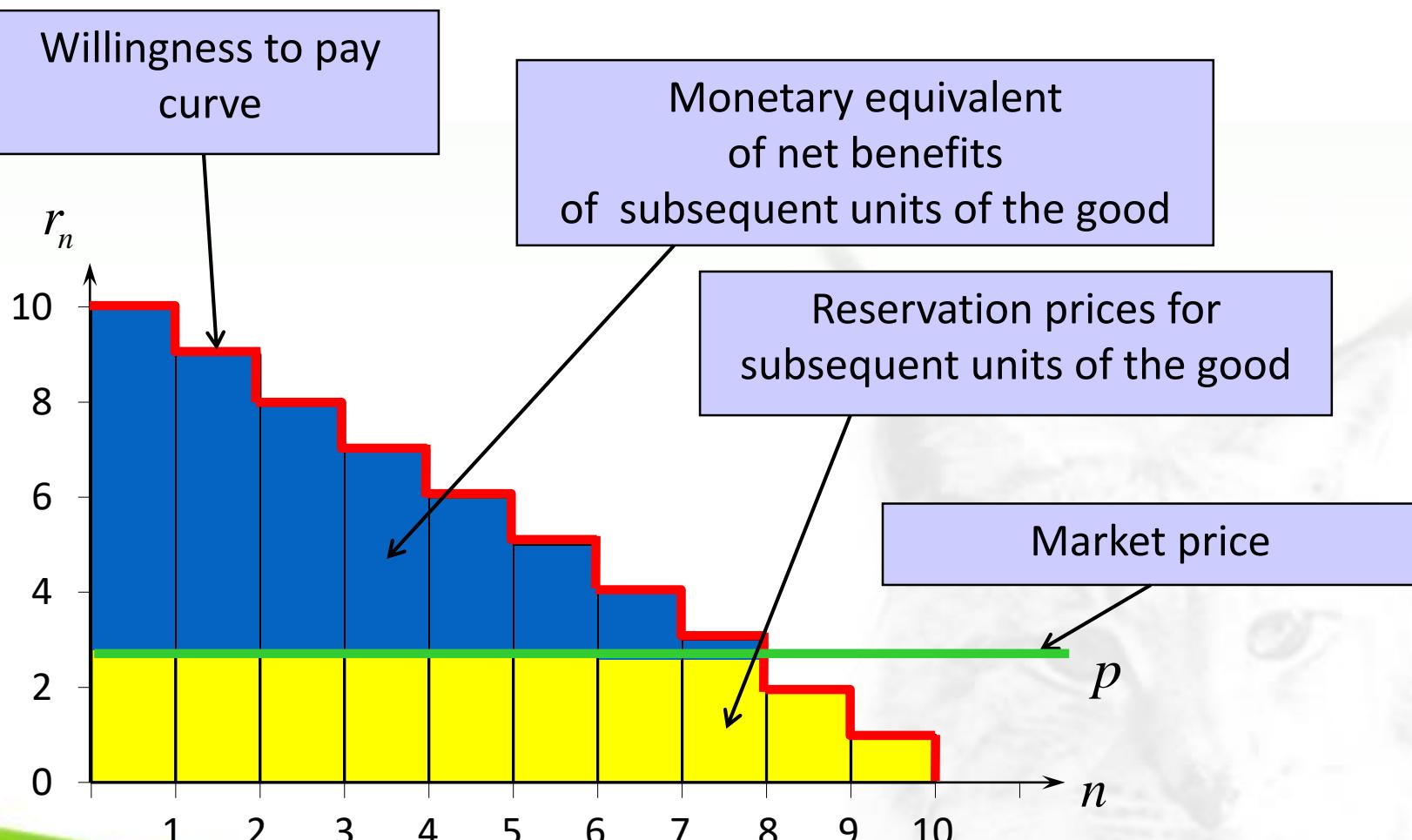
- ▶ Economic value = consumers' aggregated willingness to pay
  - ▶ Based on peoples' preferences
  - ▶ Anthropocentric!
- ▶ Motives are essentially irrelevant for the neoclassical economic theory of value
  - ▶ Economists accept consumer sovereignty
  - ▶ But. this is not to say that motives are irrelevant at all...

# Economic value – economic theory

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- ▶ What is a ‘value of a good’?
  - ▶ Is the price of a good equal to its value?
  - ▶ ‘Simple case’ – market goods

# Economic value – economic theory



# Non-market valuation methods

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- ▶ Revealed vs. stated preference valuation methods
  - ▶ Revealed preferences (RP)
    - ▶ People's choices are observed in actual market situations
    - ▶ Possible to use indirect (surrogate markets)
  - ▶ Stated preferences (SP)
    - ▶ Choices are observed in hypothetical situations
    - ▶ Usually in a survey context
- ▶ Scope of observed values
- ▶ Flexibility
- ▶ Reliability

# River bed – preferences

Do we measure or create preferences?

*River bed*



*In a moment, you will be presented two sets of photographs of small rivers. Please, imagine that the landscape like this could exist at the closest agriculturally used surroundings of the place where you live.*

Please order the photos below from the most to the least attractive landscapes according to your opinion.

*River bed*



Photo	BEFORE				AFTER			
	Obs	Mean	Std. Dev		Obs	Mean	Std. Dev	
A	138	2.78	0.53		139	2.65	0.68	
B	138	2.02	0.44		139	1.94	0.51	
C	138	1.20	0.54		139	1.42	0.72	

# Vegetation – preferences



# Vegetation



A

B

C

D

E

Photo	BEFORE			AFTER		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
A	138	3.57	1.09	139	3.51	1.04
B	138	4.18	1.06	139	4.17	1.34
C	138	2.01	0.84	139	2.22	0.89
D	138	1.75	1.07	139	2.03	1.32
E	138	3.49	1.19	139	3.07	1.20

# Recreational use

Did you visit the following sites for recreational purposes within the last 12 months:

- River.
- Lake. reservoir or other closed water body.
- Baltic or North Sea
- None of the above.

	N	Mean	Std. Dev.
<b>Rivers</b>	277	0.53	0.50
<b>Lakes</b>	277	0.67	0.47
<b>Sea</b>	277	0.36	0.48
<b>None</b>	277	0.13	0.34

# Recreational use

- ▶ How many times did you travel to the location mentioned within the past 12 months
- ▶ How many times did you travel to the location mentioned within the past 12 months

Variable	Obs	Mean	Std. Dev.	Min	Max
trips_riv	129	16.20155	52.41427	0	365
trips_lake	170	7.382353	17.29421	1	150
trips_sea	93	6.44086	37.78442	0	365

# Recreational use

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Approximately, how far is the location mentioned from the place where you live?

Variable	Obs	Mean	Std. Dev.	Min	Max
riv_km	136	57.40441	113.7352	0	700
lake_km	168	119.6429	229.4119	0	1100
sea_km	92	375.0217	250.6134	0	1600

# CHOICE EXPERIMENT – ATTRIBUTES & LEVELS

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- ▶ ATTRIBUTES AT THE NATIONAL LEVEL
  - ▶ WATER QUALITY IN RIVERS
  - ▶ WATER QUALITY IN THE BALTIC SEA
- ▶ ATTRIBUTES AT THE LOCAL LEVEL (LANDSCAPE AND WILDLIFE IN YOUR LOCAL NEIGHBOURHOOD)
  - ▶ RIVER BED TYPES
  - ▶ VEGETATION TYPE

# WATER QUALITY IN RIVERS

Water quality	Possibility of swimming/bathing
VERY GOOD (strong improvement)	without limitations
GOOD (improvement)	recreational use by adults and elder children, younger children are threatened with the risk of allergy or dermatitis
MEDIUM (current state)	recreational use by adults only – not suitable for children
BAD (worsening)	bathing can involve dermatitis and allergy of adults
VERY BAD (strong worsening)	water is not suitable for bathing



# WATER QUALITY IN THE BALTIC SEA

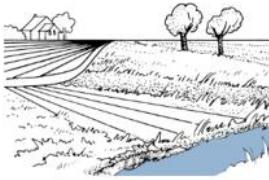
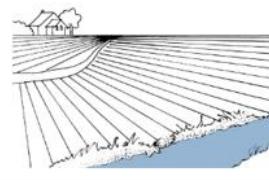
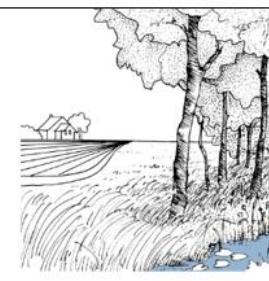
Water quality	Cyanobacteria blooms	Prohibition of bathing
VERY GOOD  (strong improvement)	Very rare	No limitations
GOOD  (improvement)	Rare, locally	1-3 days a year
MEDIUM  (current state)	Possible almost every summer, medium extent	4-10 days a year
BAD  (worsening)	Possible every summer, widespread	11-20 days a year
VERY BAD  (strong worsening)	Possible every summer, extremely widespread	The water is not suitable for bathing



# RIVER BED SHAPE

	regulated straightened riverbed	regulated curvy riverbed	naturally meandering riverbed
Riverbed shape and dynamics			
POTENTIAL FOR SUPPORTING OF			
river water purification	- Very low	 medium	 high
high biodiversity	- Very low	 medium	 high

# VEGETATION TYPE

Riparian vegetation type	<i>Low-intensity agriculture</i>	<i>Intensive agriculture</i>	<i>Wild marshes</i>	<i>Wetland agriculture</i>
Illustrative photo depicting a given Vegetation type				
Icon representing a given vegetation type				
<b>POTENTIAL FOR SUPPORTING</b>				
Riverine water purification	 Low	- Very low	 High	 High
High biodiversity	 Low	- Very low	 High	 High



# BEST PROGRAMME CHOICE

- ▶ **BEST PROGRAMME CHOICE**
- ▶ In a moment you will be presented 12 possible variants of the programme **designed for management and governance of the small rivers in Poland** and you will be asked to make your choice.
  
- ▶ **WHEN MAKING YOUR CHOICES, PLEASE REMEMBER THAT:**
- ▶ Every combination should be treated independently of the others. For every comparison we ask you to pick a combination which is the best from your point of view.
- ▶ The programme will be carried out in the entire country, including the region where you live.
- ▶ The programme will be implemented also in other Baltic Sea countries.
- ▶ If you consider some of the variants too expensive, or all the programmes on the screen are too expensive than in every comparison you can choose a **STATUS QUO** option, which means continuation of the current management and does not imply any additional costs for you.



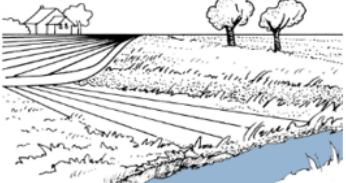
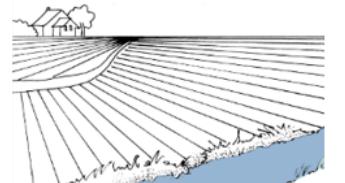
# WHEN MAKING YOUR CHOICES, PLEASE REMEMBER THAT:

- ▶ Changes on the country scale and your residence close vicinity are independent of each other.
- ▶ This means, for instance, that in your residence close vicinity the wetland buffer zones will be restored, improving the rivers water purity locally, however if the mitigation measures are insufficient in other regions, then despite the positive local effects, the rivers' water purity on the country scale might not improve.
- ▶ The reverse is possible, i.e. in the close vicinity of your residence changes worsening the rivers water quality will happen locally.
- ▶ However, in many other places throughout Poland appropriate improvements will be made, so the overall effect on the country's scale might be positive.



- ▶ The quality of water in the Baltic Sea depends on the co-ordinated efforts of all the countries, from which rivers flow into the Baltic Sea.
- ▶ Therefore, you will likely face some programme combinations where improvement of the water purity of the Polish rivers does not mean improvement of the water purity in the Baltic Sea. It will be the case if mitigation measures are not undertaken simultaneously in other countries of the Baltic Sea basin.
- ▶ The reverse situation is also possible, when in other Baltic Sea countries mitigation measures are undertaken to such extent that the Baltic Sea state improves even without similar measures undertaken in Poland.
- ▶ You will now see a series of 12 screens, every screen comprising 3 programmes. Please, pick one programme on every screen, the one which you consider your best choice.



	CURRENT MANAGEMENT CONTINUATION	PROGRAMME A (CHANGE IN MANAGEMENT)	PROGRAMME B (CHANGE IN MANAGEMENT)
<b>On the country's scale</b>			
<b>Water quality of the rivers in 10 years (water fit for bathing)</b>	Medium (for adults only)	Good (for adults and elder children)	Very good (for everyone without limitations)
<b>Water quality of the Baltic Sea in 30 years</b>  Cyanobacteria blooms  bathing prohibition	Bad  Possible every summer, extensive  11-20 days	Medium  Possible almost every summer, limited extension  4-10 days	Very good  Rare, locally  0 days
<b>On the local scale</b>			
<b>Riverbed type</b>			
	Regulated straightened	Regulated curvy	Naturally meandering
<b>Riverine vegetation type</b>	Extensive agriculture	Intensive agriculture	Wild marshes
  <b>PROGRAMME'S COST</b> <b>Annual change in the taxes you pay</b>			<b>The tax reduced by 100 zł per year</b> <b>The tax raised by 250 zł per year</b>
<b>Your choice</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# MODEL RESULTS

		Standard		Prob.	95% Confidence	
	CH1	Coefficient	Error	z	z >Z*	Interval
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	RIV_1	.33317***	.08867	3.76	.0002	.15938 .50696
	RIV_2	.32967***	.07993	4.12	.0000	.17300 .48634
	RIV_4	-.66367***	.08412	-7.89	.0000	-.82854 -.49880
	RIV_5	-.60626***	.09545	-6.35	.0000	-.79334 -.41918
	SEA_1	1.02541***	.08934	11.48	.0000	.85030 1.20052
	SEA_2	.83402***	.07863	10.61	.0000	.67991 .98814
	SEA_3	.58193***	.08023	7.25	.0000	.42468 .73918
	SEA_5	-.31157***	.09540	-3.27	.0011	-.49855 -.12459
	MEANDERING	.38575***	.07003	5.51	.0000	.24849 .52301
	NATUR	.41040***	.05946	6.90	.0000	.29386 .52694
	INTEN	-.23323***	.07513	-3.10	.0019	-.38048 -.08598
	DRY	.07993	.10083	.79	.4280	-.11770 .27755
	WILD	.11389	.07501	1.52	.1289	-.03312 .26090
	AGRI	.06178	.07509	.82	.4106	-.08538 .20895
	COST_NEG	.00393***	.00065	6.03	.0000	.00266 .00521
	COST_POST	-.00362***	.00037	-9.68	.0000	-.00435 -.00288
	SQ	-.36729***	.10924	-3.36	.0008	-.58139 -.15319
<hr/>						

Note: \*\*\* / \*\* / \* ==> Significance at 1%, 5%, 10% level.

# WTP (in PLN)

		Standard Error	z	Prob.   z   > Z *	95% Confidence Interval
WaldFcns	Coefficient				
<b>RIV_1  </b>	92.1474***	22.09455	4.17	.0000	48.8428 135.4519
<b>RIV_2  </b>	91.1794***	22.32349	4.08	.0000	47.4262 134.9326
<b>RIV_4  </b>	-183.555***	31.00561	-5.92	.0000	-244.325 -122.786
<b>RIV_5  </b>	-167.678***	34.22594	-4.90	.0000	-234.760 -100.597
<b>SEA_1  </b>	283.605***	28.94818	9.80	.0000	226.868 340.343
<b>SEA_2  </b>	230.671***	27.85080	8.28	.0000	176.085 285.258
<b>SEA_3  </b>	160.948***	28.10928	5.73	.0000	105.855 216.041
<b>SEA_5  </b>	-86.1731***	28.44135	-3.03	.0024	-141.9171 -30.4290
<b>MEANDER  </b>	106.690***	22.31824	4.78	.0000	62.947 150.433
<b>NATUR  </b>	113.507***	18.99254	5.98	.0000	76.283 150.732
<b>INTEN  </b>	-64.5066***	21.45302	-3.01	.0026	-106.5537 -22.4595
<b>DRY  </b>	22.1060	28.21095	.78	.4333	-33.1864 77.3985
<b>WILD  </b>	31.4997	20.94883	1.50	.1327	-9.5592 72.5587
<b>AGRI  </b>	17.0883	21.00590	.81	.4159	-24.0825 58.2591

Note: \*\*\*, \*\*, \* ==> Significance at 1%, 5%, 10% level.



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