PROVIDE

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Advances in WP4 and WP5:
Farmers' preferences for AES in the Biebrza Valley

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Advances

WP4:

- June – August 2017 – choice experiment conducted by rural advisory center (CAPI)
- 270 surveys
- Valuation results

WP5:

- 12.09.2017 – meeting with local stakeholders - environmental experts and workers of the Biebrza National Park
  - practicability and applicability
  - social acceptance
  - policy recommendations
- Cost estimations based on DCE
  - costs of adoption (characteristics of contracts and farms)
  - spatial analysis
- Literature review
  - comparison = predictability and transferability
- Meeting with Agency for Restructuring and Modernization of Agriculture (?)

WP4: Valuation

Study description

Survey construction

1) introduction
   - incentivizing to reveal truthful preferences
2) questions on farm's production, practices, land usage
3) random information treatments
   - additional information on AES benefits
4) preference elicitation
   - farmers are only presented with contracts that could potentially be introduced on their land
5) follow-up questions
   - environmental and policy attitudes
   - knowledge self-assessment
   - quiz: knowledge of local bird species
   - socio-demographic

Contracts

Attributes	Description

Practice	▪ Each contract would require implementation of specific practices…
	▪ Requirements from current AES in Poland
	
	▪ **Arable land**
	  ▪ improved utilization of fertilizers
	  ▪ crop diversification
	  ▪ catch crops
	▪ **Peatland**
	  ▪ basic or extended protection
	▪ **Meadows**
	  ▪ extensive mowing and grazing
	▪ **Livestock production/ mixed crop-livestock production**
	  ▪ reduction of Livestock Unit/ha

Duration	▪ the contract will last for a specified number of years
Termination	▪ possibly to terminate a contract with/without a requirement to pay back the subsidies one have acquired
Subsidy	▪ Enrolling in a particular contract means that you would receive a payment for adopting the practices. The payments would be paid annually per hectare enrolled.

Choice cards

Example of arable land

Assume that from 2018, current AES cease and farmers are offered to enter into new contracts…
Rank options from most to least preferred for your farm.

	Improved utilization of fertilizers	**Crop diversification**	**Catch crops**	**No contract**
Duration	5 years	2 years	10 years	
Termination	Possible without refund	Possible with refund	Possible without refund	
Subsidy	400 PL/ha	200 PLN/ha	900 PLN/ha	
Your ranking from most (1) to least preferred (4)	☐	☐	☐	☐

Results

Arable land

MXL	in WTP-space								
		Means				Standard Deviations			
var.	dist.	coef.	sign.	st.err.	p-value	coef.	sign.	st.err.	p-value
Fertilization - length	n	-0,1267	***	0,0120	0,0000	0,1129	***	0,0115	0,0000
Diversification - length	n	-0,1383	***	0,0125	0,0000	0,1203	***	0,0113	0,0000
Catch crops - length	n	-0,1333	***	0,0127	0,0000	0,1268	***	0,0119	0,0000
Possible to cancel	n	0,2545	***	0,0557	0,0000	0,4249	**	0,0500	0,0240
Subsidy (1000 PLN)	l	1,3137	***	0,1276	0,0000	1,1737		0,1699	0,5066
Model diagnostics									
LL at convergence		-1532,48							
LL at constant(s) only		-1906,58							
McFadden's pseudo-R^2		0,1962							
Ben-Akiva-Lerman's pseudo-R^2		0,3479							
AIC/*n*		2,2322							
BIC/*n*		2,3075							
n (observations)		1391							
r (respondents)		232							
k (parameters)		20							
Estimation method	simulated maximum likelihood								
Simulation with	10000 Sobol draws with random linear scramble and random digital shift (skip = 1; leap = 0)								
Optimization method	trust-region								
Gradient	user-supplied, analytical								

Results

Arable land

MXL_d	in WTP-space								
		Means				Standard Deviations			
var.	dist.	coef.	sign.	st.err.	p-value	coef.	sign.	st.err.	p-value
Fertilization - 1 year	n	0,0412	***	0,0082	0,0000	0,1641	***	0,0081	0,0000
Fertilization - 2 years	n	-0,0392	***	0,0120	0,0011	0,0601	***	0,0074	0,0000
Fertilization - 3 years	n	-0,1588	***	0,0085	0,0000	0,2540	***	0,0091	0,0000
Fertilization - 5 years	n	-0,3609	***	0,0070	0,0000	0,0364	***	0,0066	0,0000
Fertilization - 10 years	n	-0,6575	***	0,0127	0,0000	0,0848	***	0,0050	0,0000
Fertilization - 20 years	n	-2,2500	***	0,0506	0,0000	1,4577	***	0,0415	0,0000
Diversification - 1 year	n	-0,0018		0,0090	0,8420	0,1010	***	0,0045	0,0000
Diversification - 2 years	n	-0,2028	***	0,0088	0,0000	0,1743	***	0,0053	0,0000
Diversification - 3 years	n	-0,1864	***	0,0117	0,0000	0,2941	***	0,0102	0,0000
Diversification - 5 years	n	-0,3135	***	0,0091	0,0000	0,2129	***	0,0079	0,0000
Diversification - 10 years	n	-1,3098	***	0,0185	0,0000	0,9017	***	0,0161	0,0000
Diversification - 20 years	n	-2,0938	***	0,0549	0,0000	1,2201	***	0,0649	0,0000
Catch crops - 1 year	n	-0,0191	**	0,0092	0,0367	0,3097	***	0,0078	0,0000
Catch crops - 2 years	n	-0,1872	***	0,0123	0,0000	0,0592	***	0,0084	0,0000
Catch crops - 3 years	n	-0,2818	***	0,0135	0,0000	0,2051	***	0,0120	0,0000
Catch crops - 5 years	n	-0,4810	***	0,0136	0,0000	0,0133	*	0,0077	0,0849
Catch crops - 10 years	n	-0,7111	***	0,0042	0,0000	0,4878	***	0,0139	0,0000
Catch crops - 20 years	n	-1,6374	***	0,0118	0,0000	0,9107	***	0,0138	0,0000
Possible to cancel - Fertilization	n	0,1025	***	0,0076	0,0000	0,4279	***	0,0091	0,0000
Possible to cancel - Diversification	n	0,1754	***	0,0086	0,0000	0,5462	***	0,0112	0,0000
Possible to cancel - Catch crops	n	0,3155	***	0,0080	0,0000	0,5757	***	0,0077	0,0000
Subsidy (1000 PLN)	l	1,8467	***	0,4206	0,0000	4,1680	***	0,8653	0,0000
Model diagnostics									
LL at convergence		-1606,30							
LL at constant(s) only		-1906,58							
McFadden's pseudo-R^2		0,1575							
Ben-Akiva-Lerman's pseudo-R^2		0,3322							
AIC/*n*		2,3728							
BIC/*n*		2,5385							
n (observations)		1391							
r (respondents)		232							
k (parameters)		44							
Estimation method	simulated maximum likelihood								
Simulation with	10000 Sobol draws with random linear scramble and random digital shift (skip = 1; leap = 0)								
Optimization method	quasi-newton								
Gradient	user-supplied, analytical								
Hessian	off, retained from optimization								

Results

Peatland

MXL_d	in WTP-space								
		Means				Standard Deviations			
var.	dist.	coef.	sign.	st.err.	p-value	coef.	sign.	st.err.	p-value
Basic protection - length	n	-0,0494	***	0,0004	0,0000	0,0532	***	0,0006	0,0000
ASC - Extended protection	n	-0,4885	***	0,0048	0,0000	0,7648	***	0,0076	0,0000
Possible to cancel	n	0,0808	***	0,0039	0,0000	0,2682	***	0,0028	0,0000
Subsidy (1000 PLN)	l	3,3657	*	1,7334	0,0522	3,6837		2,4199	0,1279
Model diagnostics									
LL at convergence		-192,59							
LL at constant(s) only		-238,06							
McFadden's pseudo-R^2		0,1910							
Ben-Akiva-Lerman's pseudo-R^2		0,4605							
AIC/*n*		1,7596							
BIC/*n*		1,8799							
n (observations)		228							
r (respondents)		76							
k (parameters)		8							
Estimation method	simulated maximum likelihood								
Simulation with	10000 Sobol draws with random linear scramble and random digital shift (skip = 1; leap = 0)								
Optimization method	quasi-newton								
Gradient	user-supplied, analytical								
Hessian	off, retained from optimization								

Results

Meadows

MXL	in WTP-space								
		Means				Standard Deviations			
var.	dist.	coef.	sign.	st.err.	p-value	coef.	sign.	st.err.	p-value
Extensive meadow use - 1 year	n	-0,3412	***	0,0095	0,0000	0,4229	***	0,0082	0,0000
Extensive meadow use - 2 years	n	-0,3124	***	0,0131	0,0000	0,5996	***	0,0150	0,0000
Extensive meadow use - 3 years	n	-0,3955	***	0,0115	0,0000	0,5099	***	0,0103	0,0000
Extensive meadow use - 5 years	n	-0,4378	***	0,0156	0,0000	0,5123	***	0,0100	0,0000
Extensive meadow use - 10 years	n	-0,9145	***	0,0218	0,0000	1,1105	***	0,0246	0,0000
Extensive meadow use - 20 years	n	-1,2277	***	0,0321	0,0000	1,5348	***	0,0414	0,0000
Possible to cancel	n	0,2159	***	0,0222	0,0000	0,2355	***	0,0085	0,0000
Subsidy (1000 PLN)	l	3,0739	***	0,5709	0,0000	3,5293		0,7121	0,5525
Model diagnostics									
LL at convergence		-643,59							
LL at constant(s) only		-876,94							
McFadden's pseudo-R^2		0,2661							
Ben-Akiva-Lerman's pseudo-R^2		0,6209							
AIC/*n*		1,0255							
BIC/*n*		1,1961							
n (observations)		1341							
r (respondents)		253							
k (parameters)		44							
Estimation method	simulated maximum likelihood								
Simulation with	10000 Sobol draws with random linear scramble and random digital shift (skip = 1; leap = 0)								
Optimization method	quasi-newton								
Gradient	user-supplied, analytical								
Hessian	off, retained from optimization								

Results

Reduction of Livestock Unit/ha

MXL_d	in WTP-space								
		Means				Standard Deviations			
var.	dist.	coef.	sign.	st.err.	p-value	coef.	sign.	st.err.	p-value
DJP reduction	n	-0,1134	***	0,0041	0,0000	0,5235	***	0,0140	0,0000
(DJP reduction/10) ^2	n	-0,6186	***	0,0161	0,0000	0,4613	***	0,0120	0,0000
Contract length	n	-0,1021	***	0,0006	0,0000	0,1242	***	0,0032	0,0000
Possible to cancel	n	0,3970	***	0,0269	0,0000	0,7509	***	0,0299	0,0000
Subsidy (1000 PLN)	l	1,0632	***	0,4025	0,0083	2,4636	***	0,7028	0,0005
Model diagnostics									
LL at convergence		-603,08							
LL at constant(s) only		-853,10							
McFadden's pseudo-R^2		0,2931							
Ben-Akiva-Lerman's pseudo-R^2		0,5240							
AIC/*n*		1,5482							
BIC/*n*		1,6072							
n (observations)		792							
r (respondents)		132							
k (parameters)		10							
Estimation method	simulated maximum likelihood								
Simulation with	10000 Sobol draws with random linear scramble and random digital shift (skip = 1; leap = 0)								
Optimization method	quasi-newton								
Gradient	user-supplied, analytical								
Hessian	off, retained from optimization								

Results
Combined

MXL	in WTP-space								
		Means				Standard Deviations			
var.	dist.	coef.	sign.	st.err.	p-value	coef.	sign.	st.err.	p-value
Fertilization - length	n	-0,1485	***	0,0106	0,0000	0,1538	***	0,0146	0,0000
Diversification - length	n	-0,1549	***	0,0125	0,0000	0,1532	***	0,0154	0,0000
Catch crops - length	n	-0,1323	***	0,0081	0,0000	0,1512	***	0,0127	0,0000
Basic peatland protection - length	n	-0,0355	***	0,0090	0,0001	0,0659	***	0,0149	0,0000
Extended peatland protection	n	-0,4207	***	0,0846	0,0000	0,9361		0,1743	0,3776
Extensive meadow use - length	n	-0,0779	***	0,0069	0,0000	0,1355	***	0,0133	0,0000
DJP reduction	n	-0,2034	***	0,0183	0,0000	0,2726	***	0,0205	0,0000
DJP reduction - length	n	-0,1232	***	0,0160	0,0000	0,1515	***	0,0158	0,0000
Possible to cancel	n	0,2886	***	0,0471	0,0000	0,4148	***	0,0335	0,0000
Subsidy (1000 PLN)	l	0,9018	***	0,0911	0,0000	1,1558		0,1103	0,1631
Model diagnostics									
LL at convergence		-3013,44							
LL at constant(s) only		-3967,94							
McFadden's pseudo-R^2		0,2406							
Ben-Akiva-Lerman's pseudo-R^2		0,4606							
AIC/*n*		1,6410							
BIC/*n*		1,7489							
n (observations)		3752							
r (respondents)		264							
k (parameters)		65							
Estimation method	simulated maximum likelihood								
Simulation with	10000 Sobol draws with random linear scramble and random digital shift (skip = 1; leap = 0)								
Optimization method	quasi-newton								
Gradient	user-supplied, analytical								
Hessian	off, retained from optimization								

Results

Correlations

	Fertilization - lengtl	Diversification - ler	Catch crops - lengtl	Basic peatland prot	Extended peatland	Extensive meadow	DJP reduction	DJP reduction - leng	Possible to
Fertilization - lengtl	1,0000	0,7492	0,6599	0,4592	0,5357	0,3368	0,5795	0,4366	0,2999
Diversification - ler	0,7492	1,0000	0,8383	0,7322	0,8139	0,5242	0,4891	0,2657	0,3740
Catch crops - lengtl	0,6599	0,8383	1,0000	0,4907	0,6717	0,4694	0,4009	0,3192	0,3845
Basic peatland prot	0,4592	0,7322	0,4907	1,0000	0,8205	0,8714	0,3647	0,2419	0,0877
Extended peatland	0,5357	0,8139	0,6717	0,8205	1,0000	0,7380	0,3415	0,5337	0,0268
Extensive meadow	0,3368	0,5242	0,4694	0,8714	0,7380	1,0000	0,5149	0,4523	0,0250
DJP reduction	0,5795	0,4891	0,4009	0,3647	0,3415	0,5149	1,0000	0,4185	0,2939
DJP reduction - leng	0,4366	0,2657	0,3192	0,2419	0,5337	0,4523	0,4185	1,0000	-0,0264
Possible to cancel	0,2999	0,3740	0,3845	0,0877	0,0268	0,0250	0,2939	-0,0264	1,0000

Interactions: Characteristics of farms and farmers

interaction/attribute	Fertilization - length	Diversification - length	Catch crops - length	Basic peatland protection - length	Extended peatland protection	Extensive meadow use - length	DJP reduction	DJP reduction - length	Possible to cancel	Subsidy (1000 PLN)
Crop prod. (vs. mixed prod.)		+ + +	+					-		
Livestock prod. (vs. mixed prod.)							+ +	-		
DJP normalized	+						- - -	- -	+ +	- - -
Farm land (ha) normalized	+ + +	+ + +					+ + +		+ + +	
Arable land normalized	+ + +	+ + +						- -	+ + +	
DJP / ha normalized		- - -				- - -	+ + +		+ + +	- - -
Number of crops normalized				-			+ + +	- - -	+ +	- - -
Have participated agri-env schemes	+ +	+ +		+ + +		+ + +	+ + +			
Work force normalized	+ + +	+ + +	+ + +				-	- - -	+ + +	
Age normalized	+ +				+		- - -	+ +		
HH size normalized	+	+ + +	+				+ +	- - -	+ + +	
Income normalized	+ + +	+ + +	+ + +			- - -	+ + +	- -		- - -
Farm income only							- - -			
Works on farm	+ + +					+ + +	+ + +	+ + +		
Works outside farm			- -	+ +	+ + +		+ + +		- -	
Education normalized		- - -	- - -	+	+ + +		- - -			

Interactions: Environmental attitudes

interaction/attribute	Fertilization - length	Diversification - length	Catch crops - length	Basic peatland protection - length	Extended peatland protection	Extensive meadow use - length	DJP reduction	DJP reduction - length	Possible to cancel	Subsidy (1000 PLN)
Info treatment	-				- -		- - -	- - -	- -	
Subjective bird knowledge normalized	+ + +		+ + +	+ + +	+ + +				+ +	
Subjective AE practices for birds knowledge normalized		+ +					+ +			
Number of birds recognized				+ + +	+ + +	+ + +	+ + +	- -		
Env. important	- - -	- - -		+ +		+ + +	+ + +	+ +		
No point in env. prot. if others don't	-	+ + +	- - -			+ + +	- - -		- - -	+ + +
I don't influence env.	+ + +	+ + +	+ + +	+ +	+ +			- - -	- - -	
My farm influences env.		+ + +	+ + +		+ +	+ + +	-			+ + +
Would participate in AES even if no subsidies			+ + +			+ + +	+ + +			
I follow good agr. practices	+ + +			+			- - -	- - -	- - -	
Crop prod. intens. danger							- - -	+ + +		+
Livestock conc. danger	- - -	- -				-	+ + +	-		
Waste management danger							- - -	+ + +		+ + +
Biodiversity loss danger	- -					- -			+ +	
Air pollution danger		+					- -	+ +	- - -	

Interactions: Social preferences

interaction/attribute	Fertilization - length	Diversification - length	Catch crops - length	Basic peatland protection - length	Extended peatland protection	Extensive meadow use - length	DJP reduction	DJP reduction - length	Possible to cancel	Subsidy (1000 PLN)
Local gov. resp.				+ +			- - -	+	+ + +	+
Country gov. resp.					+ +		- - -	+ +	- - -	+ + +
Citizens resp.		- - -					- - -		- - -	
Industry resp.	+ + +	+ + +	+ + +	+ +	+ + +		+	+ + +		
Can trust people	- - -	- - -	- - -			- - -		- - -		-
People get along	+ + +				+ + +			+ + +	- -	
People help	+	+ +	+ + +			+ + +		- - -		- -
Often talk problems	+ + +	+ + +	+	- - -	- -	+ +		+ +	+ + +	+
People ready to pay more for env.	- - -		- -			- - -			+ +	- -
People AES because env. benefits						+ + +	+ + +	- - -	- -	+ + +

WP5: Meeting with authorities of the Biebrza National Park

1. „How DCE works?” What we can tell from the data?
2. Short presentation of results (valuation + selected interactions)
3. Discussion of results
4. Discussion of potential policy changes (barriers, opportunities)

WP5: Summary of conclusions

- Results – support practitioners' observations
- Spatial analysis
- Poor control of agir-envi. practice selection by farmers (environmental experts, costs of expertise by ornithologist (spices protection) is lower than expertise by botanist (habitats), and payments for „birds" are higher than for habitats) and implementation (farms perceived as profit maximizers - lack of trust between stakeholders)
- Currently monitoring of environmental effects
- Important aspects of practices implementation cannot be controlled – not included in AES requirements

WP5: Summary of conclusions

- About characteristics of contracts:
  - termination – seasonal flooding
  - optimal duration = 5 years, consensus reached – enough time for envi. benefits to appear
  - size of payment – principle of compensation for profits foregone
    - as a result of reduced mowing profits forgone can be huge in this region (oriented on milk production, bales of hay)
    - no differences in schemes between regions, generalizations
    - no principle of habitat uniqueness = universal schemes (habitats too rare to be on the AES list)
    - payments too low
    - differences in levels of payments within EU

WP5: Summary of conclusions

- Anxiety about long-run EU funding of agro-envi. schemes
- Practices inadequate to local conditions (seasonal flooding of meadows, land abandonment – much more costly than extensification)
- AES more attractive to big farms (payments too low for small farms)
- Ministry of Agriculture and Agency for Restructuring and Modernization of Agriculture not interested in environment protection