

Drivers of farmers' willingness to adopt  
extensive farming practices in  
ecologically valuable river valleys  
– the case of Biebrza Marshes

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# Biebrza Valley

“The Valley of Biebrza, the wildest river in Poland, never failed to delight us with harmonic co-existence of people and nature...”

National Geographic Polska

“Aquatic warbler is like a litmus paper, the indicator of environmental conditions in the Valley...”

Małgorzata Górka „Ludzie z bagien”

# Biebrza Valley

## Study area

- a wetland complex and one of the largest wildlife refuges in Europe
- two Natura 2000 sites (“Dolina Biebrzy” and “Ostoja Biebrzańska”)
- partly located in Biebrza National Park

## Problems

- intensification of agricultural land use
- abandonment of traditional agricultural practices
- biodiversity & traditional rural scenery in decline

## Analyzed solutions

1. Agro-environmental schemes (standard approach)
2. Awareness raising among farmers

# Study description

## Method

- choice experiment
- random information treatments + knowledge & attitudes measures
- CAPI
- rural advisory center
- June – August 2017 & March 2018
- 470 farmers, who make managerial decisions (validity - 3% of the farms registered in the region)

## Research questions

- Can information be used to incentivize farmers to participate? (random information treatments)
- Which factors can explain heterogeneity in farmers' preferences?

# DCE contracts

Attributes	Description			
<b>Practices</b>	<ul style="list-style-type: none"> <li>- Each contract would require implementation of specific practices...</li> <li>- Requirements from current AES in Poland</li> </ul>			
	<b>Arable land</b> <ul style="list-style-type: none"> <li>- improved utilization of fertilizers</li> <li>- crop diversification</li> <li>- catch crops</li> </ul>	<b>Peatland</b> <ul style="list-style-type: none"> <li>basic or extended protection</li> </ul>	<b>Meadows</b> <ul style="list-style-type: none"> <li>extensive mowing and grazing</li> </ul>	<b>Livestock / mixed production</b> <ul style="list-style-type: none"> <li>reduction of Livestock Unit/ha</li> </ul>
<b>Duration</b>	the contract will last for a specified number of years			
<b>Termination</b>	possibly to terminate a contract with/without a requirement to pay back the subsidies one have acquired			
<b>Subsidy</b>	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 card

## 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.

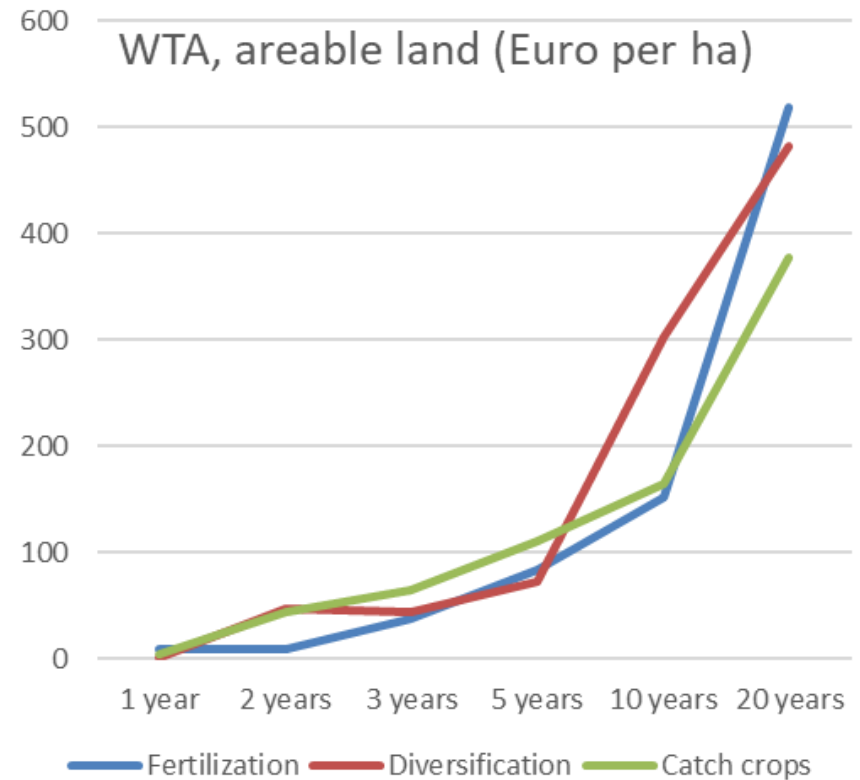
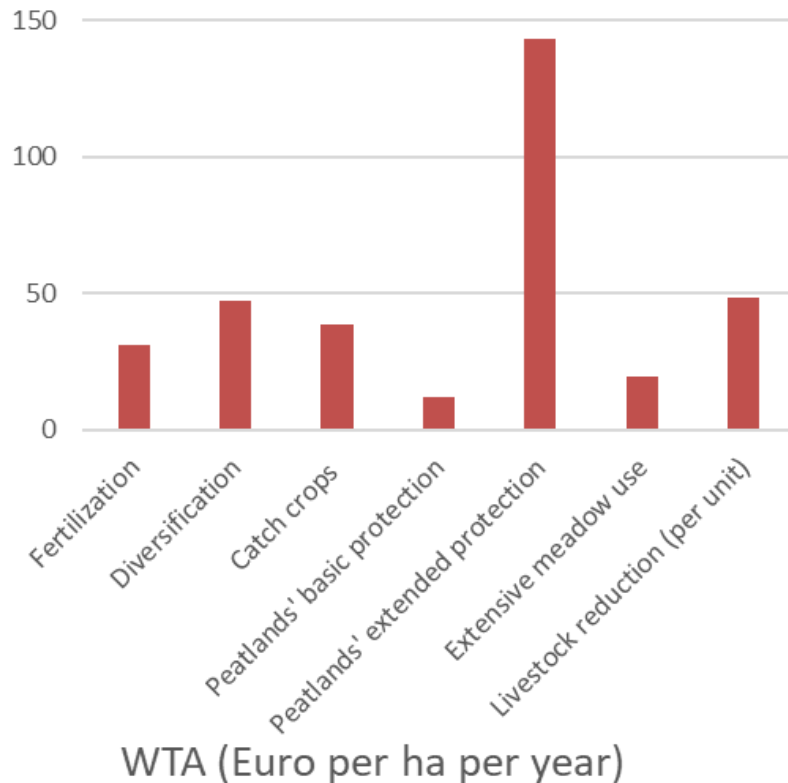
	Improved utilization of fertilizers	Crop diversification	Catch crops	No contract
Duration	5 years	2 years	10 years	
Termination	Possible without refund	Possible with refund	Possible without refund	
Subsidy	400 PL/ha	200 PLN/ha	900 PLN/ha	
Your ranking from most (1) to least preferred (4)	<input type="checkbox"/>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

# Results – MXL in WTA-space (extraction)

	Mean	St. Dev.		Mean	St. Dev.	
Fertilization - length	-0.3086*** (0.0168)	0.3606*** (0.0296)		Extensive meadow use - length	-0.1931*** (0.0140)	0.2702*** (0.0232)
Possible to cancel - Fertilization	0.8554*** (0.0813)	1.3266** (0.1604)		Possible to cancel - Extensive meadow use	0.3506** (0.1530)	1.4611** (0.1724)
Diversification - length	-0.4708*** (0.0236)	0.4062*** (0.0256)		Livestock reduction	-0.4836*** (0.0290)	0.5991*** (0.0511)
Possible to cancel - Diversification	0.5624*** (0.1488)	1.6078* (0.1856)		Livestock reduction - length	-0.2905*** (0.0342)	0.3249*** (0.0342)
Catch crops - length	-0.3868*** (0.0252)	0.3275*** (0.0252)		Possible to cancel - Livestock reduction	0.9374*** (0.3332)	3.3984 (0.4022)
Possible to cancel - Catch crops	0.9462*** (0.1435)	1.6179** (0.1747)				
Basic protection of peatlands - length	-0.1220*** (0.0222)	0.3036*** (0.0300)				
Extended protection of peatlands (premium)	-1.3091*** (0.2508)	2.6604 (0.2693)				
Possible to cancel - peatlands protection	0.2922 (0.1868)	1.4909* (0.2081)				

- strong heterogeneity of preferences
- preferences for flexibility:
  - shorter contracts
  - option to cancel

# Results – MXL in WTA-space (extraction)



accuracy of the pattern confirmed: support practitioners' observations

length of contract as the key factor: WTA, with contracts over the currently used 5 year duration becoming 3.5 to 6 times more expensive









# Knowledge, information treatments

I know a lot about protected species of birds in the Biebrza Valley.

I know agricultural practices needed to protect these species of birds in the Biebrza Valley.

- between-group, random treatment
- right before elicitation of preferences
- additional factual information explaining why a specific agricultural practice is introduced and what are the benefits of it
- matched AES measures

Please select a species name:		
		
a) Pipit b) Lark c) <u>Aquatic warbler</u> d) I don't know	a) <u>Northern lapwing</u> b) White-winged tern c) Montagu's harrier d) I don't know	a) Black grouse b) <u>Ruff</u> c) Western capercaillie d) I don't know
		
a) Corn crane b) <u>Black-tailed godwit</u> c) Great snipe d) I don't know	a) <u>Eurasian curlew</u> b) Montagu's harrier c) Common snipe d) I don't know	a) <u>Eurasian wigeon</u> b) Common starling c) Greater white-fronted goose d) I don't know

Sources of pictures:

1. Aquatic warbler: <http://ptaki.info/wodniczka>
2. Northern lapwing: <http://www.bird-watching.pl/picture.php?3036/category/110> (Author: Marcin Łukawski)
3. Ruff: <http://www.birdwatching.pl/galeria/ostatnio-dodane/zdjecie/37759> (Author: Tomasz Skorupka)
4. Black-tailed godwit: <http://ptaki.info/imgkoprojekt/image/ptaki/komentarze/367.jpg> (Author: Łukasz Talaga)
5. Eurasian curlew: <http://www.birdwatching.pl/galeria/kategoria/191-kulik-wielki-numenius-arquata/zdjecie/52068> (Author: Adam R. Markowski)
6. Eurasian wigeon: <https://ciechus.flog.pl/wpis/6805645/swistun> (Author: Adrian Ciechanowski)

# Knowledge, information treatments

	Main effects		Interactions			
	Mean	St. Dev.	Subjective bird knowledge (normalized)	Subjective AE practices for birds knowledge (normalized)	Number of birds recognized	Info treatment
Fertilization - length	-0.1786*** (0.0560)	0.4146*** (0.0275)	0.0437*** (0.0157)	0.0343** (0.0162)	-0.0609*** (0.0091)	-0.0149 (0.0206)
Diversification - length	-0.5087*** (0.0646)	0.4786*** (0.0307)	-0.0128 (0.0168)	0.0728*** (0.0151)	-0.0310*** (0.0075)	0.0425 (0.0260)
Catch crops - length	-0.5278*** (0.0615)	0.3947*** (0.0272)	-0.0410*** (0.0090)	0.0280*** (0.0090)	-0.0153* (0.0084)	-0.0222 (0.0224)
Basic peatland protection - length	-0.2265*** (0.0876)	0.2558*** (0.0228)	0.1109*** (0.0204)	-0.0356 (0.0252)	0.0136 (0.0196)	0.0334 (0.0273)
Extended peatland protection - length	-0.7591*** (0.1275)	0.5043*** (0.0394)	0.0060 (0.0277)	0.0186 (0.0267)	0.0482*** (0.0170)	-0.0078 (0.0386)
Extensive meadow use - length	-0.5147*** (0.0482)	0.3172*** (0.0159)	-0.0031 (0.0125)	0.0367*** (0.0114)	0.0187*** (0.0057)	0.0777*** (0.0188)
Livestock reduction	-1.1034*** (0.2188)	0.5910*** (0.1140)	0.0637 (0.0470)	0.1642*** (0.0582)	0.0472 (0.0526)	-0.0988 (0.0720)
Livestock reduction - length	-0.1790 (0.1258)	0.4065*** (0.0619)	0.1142** (0.0517)	0.0383 (0.0575)	-0.0255 (0.0333)	-0.0897 (0.0695)
Possible to cancel	1.1991*** (0.2573)	0.9433*** (0.0564)	-0.0961* (0.0565)	0.1189** (0.0548)	-0.1086*** (0.0361)	-0.2686*** (0.0931)

# Other farm characteristics:

Characteristics	Major conclusions
<ul style="list-style-type: none"><li>— Type of production (crop, livestock, mixed)</li><li>— Livestock</li><li>— Farm land</li><li>— Number of crops</li><li>— Arable land</li><li>— Work force</li><li>— Streams of rivers</li><li>— Area subject to flooding</li><li>— Natura 2000 share   Biebrza National Park</li><li>— Previous participation in AES</li></ul>	<ul style="list-style-type: none"><li>— WTA decreases with previous AES participation, and related to AES aspects of farm specialization</li><li>— Positive correlation of preferences to participate in different contracts</li></ul>

# Other farm characteristics

	Main effects		Interactions					
	Mean	St. Dev.	Crop prod. (vs. mixed prod.)	Livestock prod. (vs. mixed prod.)	Livestock normalized	Farm land (ha) normalized	Livestock / ha normalized	Number of crops normalized
Fertilization - length	-0.1786*** (0.0560)	0.4146*** (0.0275)	-0.1296*** (0.0252)	-0.3166*** (0.0419)	0.0833** (0.0324)	0.0122 (0.0266)	-0.0085 (0.0406)	-0.0154 (0.0136)
Diversification - length	-0.5087*** (0.0646)	0.4786*** (0.0307)	0.0588* (0.0327)	-0.2017*** (0.0499)	-0.0184 (0.0402)	0.0323 (0.0295)	0.0550 (0.0426)	0.0418*** (0.0125)
Catch crops - length	-0.5278*** (0.0615)	0.3947*** (0.0272)	0.1294*** (0.0285)	-0.2109*** (0.0246)	-0.0260 (0.0264)	-0.0167 (0.0225)	0.1671*** (0.0274)	-0.0075 (0.0109)
Basic peatland protection - length	-0.2265*** (0.0876)	0.2558*** (0.0228)	-0.1329*** (0.0422)	-0.2253*** (0.0548)	0.1060 (0.0768)	-0.0809 (0.0500)	-0.0594 (0.0446)	-0.0502** (0.0227)
Extended peatland protection - length	-0.7591*** (0.1275)	0.5043*** (0.0394)	-0.0741 (0.0476)	-0.2020*** (0.0782)	0.0860 (0.0838)	-0.1316** (0.0596)	-0.0285 (0.0584)	-0.0571** (0.0267)
Extensive meadow use - length	-0.5147*** (0.0482)	0.3172*** (0.0159)	-0.1271*** (0.0247)	-0.0964*** (0.0269)	0.1094*** (0.0310)	-0.0707** (0.0281)	-0.0968*** (0.0242)	0.0658*** (0.0115)
Livestock reduction	-1.1034*** (0.2188)	0.5910*** (0.1140)	0.3147 (0.3726)	-0.1231 (0.0908)	0.0621 (0.0826)	-0.1404* (0.0747)	-0.0415 (0.0817)	-0.0246 (0.0218)
Livestock reduction - length	-0.1790 (0.1258)	0.4065*** (0.0619)	-0.3735*** (0.1299)	-0.0526 (0.0961)	0.2806*** (0.0855)	-0.2564*** (0.0647)	-0.2027*** (0.0700)	-0.0831* (0.0439)
Possible to cancel	1.1991*** (0.2573)	0.9433*** (0.0564)	-0.0548 (0.1153)	-0.7260*** (0.1430)	0.5558*** (0.1534)	0.0073 (0.1142)	0.1725 (0.1428)	0.1430*** (0.0515)

# Other farm characteristics

	Main effects		Interactions					
	Mean	St. Dev.	Arable land normalized	Work force normalized	Farm with streams or rivers	Farm with areas subject to flooding	Share of land in Natura 2000 and National Park	Has participated agri-env schemes
Fertilization - length	-0.1786*** (0.0560)	0.4146*** (0.0275)	0.0936*** (0.0253)	0.0271*** (0.0092)	-0.0052 (0.0296)	0.1386*** (0.0251)	-0.1132 (0.1407)	0.1454*** (0.0403)
Diversification - length	-0.5087*** (0.0646)	0.4786*** (0.0307)	0.0651*** (0.0202)	0.0550*** (0.0101)	0.0376 (0.0283)	-0.0915*** (0.0340)	0.0908 (0.1516)	0.2299*** (0.0316)
Catch crops - length	-0.5278*** (0.0615)	0.3947*** (0.0272)	0.0621*** (0.0211)	0.0033 (0.0117)	0.0300 (0.0294)	-0.0662** (0.0287)	0.2844*** (0.1018)	0.2667*** (0.0326)
Basic peatland protection - length	-0.2265*** (0.0876)	0.2558*** (0.0228)	0.0808** (0.0388)	-0.0632*** (0.0203)	0.0649 (0.0497)	-0.0339 (0.0541)	0.8173** (0.3298)	0.0626 (0.0634)
Extended peatland protection - length	-0.7591*** (0.1275)	0.5043*** (0.0394)	0.0666 (0.0446)	0.0007 (0.0242)	0.2826*** (0.0871)	-0.1290** (0.0607)	1.0527** (0.5225)	0.1434 (0.0985)
Extensive meadow use - length	-0.5147*** (0.0482)	0.3172*** (0.0159)	-0.0151 (0.0237)	0.0023 (0.0152)	0.0810*** (0.0257)	-0.0593** (0.0240)	0.8792*** (0.1728)	0.2324*** (0.0427)
Livestock reduction	-1.1034*** (0.2188)	0.5910*** (0.1140)	0.1756*** (0.0328)	0.0412 (0.0517)	-0.0825 (0.2068)	0.4655*** (0.1240)	0.0761 (0.2169)	0.4515*** (0.0946)
Livestock reduction - length	-0.1790 (0.1258)	0.4065*** (0.0619)	0.0890* (0.0541)	-0.0766 (0.0504)	0.2588** (0.1211)	-0.1498** (0.0752)	0.2905 (0.4214)	-0.0093 (0.1026)
Possible to cancel	1.1991*** (0.2573)	0.9433*** (0.0564)	-0.0645 (0.0926)	0.1483*** (0.0523)	0.5077*** (0.1264)	-0.2958** (0.1266)	0.7118 (0.5484)	0.1415 (0.1753)

# Summary of DCE results

- Substantive differences in mean **willingness to accept** for 4 agri-environmental practices (as presented)
- Strong **heterogeneity** of preferences
- Preference for **flexibility** (shorter contracts, option to cancel)
- Willingness to accept decreases with:
  - **Experience** in contracts implementation
  - **Specialization** (crop farms, dairy farms)
- **No systematic, contract-dependent** effects of **socio-economis** and **farm characteristics**
- Positive effects of **knowledge and information**

# Summary of consultations

- possible to lower payments when increasing flexibility and limiting contract duration, but **need for consensus between flexibility and long-term perspective of environmental goals**
- **tension between the environmental goals** (long-term schemes, little flexibility thus high payments) **and farmers' motivations and financial goals** (short-term schemes, high flexibility)
- need of differentiation of payments depending on the farm size
- need for improved AES coverage and monitoring results, especially on effectiveness

# Ongoing work...

- moderating impact of knowledge when measuring effects of info. treatments
- green efficacy, neighbourhood ties and social norms



# Thank you!

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