Farmers' biodiversity-related decision-making: Explaining stakeholder roles by means of a Perception Matrix

I 5 0 Y E A R S F E A T U R I N G

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Implementing more biodiversity-friendly farm management practices can contribute ...

Introducti

... to reduce the ongoing loss of biodiversity [1]. To steer farmers towards the voluntary implementation of more biodiversityfriendly management practices through pro-biodiversity initiatives, a profound knowledge of their decision-making is required. Private, public and community stakeholders such as input suppliers, advisory services or neighbours are shown to influence farmers' decisions, e.g. on the level of fertilizer/pesticide input [2, 3] or adaption of sustainable soil innovations [4]. Still, little is known on the role of these stakeholders in farmers' decision-making regarding biodiversity management ("biodivDM").

Our goal is to understand and compare stakeholders' roles in biodivDM in our study area ...

- ... by eliciting farmers' general and biodiversity-related perceptions towards multiple private, public and community stakeholders.
- ... by exploring how farmers assess these stakeholders' effect on their biodivDM.
- ... overall aiming to identify highly influential stakeholders who, when involved, might help to improve future pro-biodiversity initiative design.



Study area: Experimental **Biodiversity Areas** in 9 countries Sweden, Estonia, Spain, Portugal, United Kingdom, Switzerland, Romania, the Netherlands, Hungary © The authors, 2022; EuroGeographics for the administrative boundaries.

We applied mixed methods ...

- ... to collect primary data through 45 farmer interviews:
- **Perception Matrix** to elicit farmers' perceptions: adapted

Perception statements as 5-point scales

(SH₁₋₁₂ stands for the 12 stakeholders included, see below) © The authors, 2022.

ID	1-point end (negative)	SH 1-12	5-point end (positive)
B1	biodiversity protection in agri- culture is not their goal at all		biodiversity protection in agriculture is a major goal

from Moon et al. [5] via multi-actor approach; 12 generic stakeholders to be quantitatively rated against 8 *perception statements* worded as 5-point scales

- **Likert Scale** to explore intensity & direction (+/-) of effect \bullet
- qualitative follow-up questions for context

... to analyse collected data:

- descriptive statistics, randomization test, content analysis
- differences/similarities of perception & effect ratings bw. stakeholders and groups of farmers (clustered nationally/socio-demographically)
- **correlations** bw. perception & effect ratings
- qualitative connection of findings

We found

- ... first significant **differences** bw. certain stakeholders in both effect and perception ratings. However, the group of farm input suppliers was broadly rated **similarly**.
 - Different stakeholder (groups) have different roles in biodivDM.
- ... only **positive** sign. correlations bw. perception & effect ratings.

B2	doesn't/don't take on responsibility with regards to biodiversity	•••	takes(s) on responsibility with regards to biodiversity	
B3	isn't/aren't objective about biodiversity	•••	is/are objective about biodiversity	
B4	doesn't/don't treat me as a partner with regards to biodiversity	•••	treat(s) me as a partner with regards to biodiversity	
G1	doesn't/don't understand farmers' reality		understand(s) farmers' reality	
G2	isn't/aren't trustwothy		is/are trustworthy	
G3	hinder(s) me from farming in a future-proof way	•••	enable(s) me to farm in a future-proof way	
G4	isn't/aren't reliable with regards to their medium- and/or long-term behaviour		is/are reliable with regards to their medium- and/or long-term behaviour	

Average perception and effect ratings <u>across</u> countries 1=lowest, 5=highest score // green=highest/red=lowest rating per column, B1-G4 refer to perception statements (see above) © The authors, 2022.

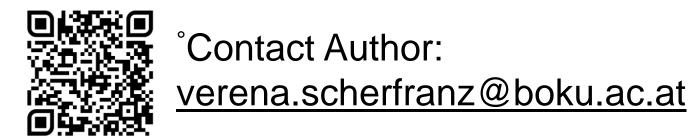
Stakeholders ₁₋₁₂	Perceptio	Effects		
	biodiversity-related statements (<u>B1-B4</u>)	general state- ments (<u>G1-G4</u>)	overall state- ments (<u>B1-G4</u>)	Likert scale
Government	2.62	2.47	2.54	3.64
Researchers	3.94	3.74	3.84	4.23
Agr. advisors	3.12	3.90	3.51	4
Other farmers	2.85	3.85	3.45	3.65
Prod. organizations	3.27	3.95	3.61	3.81
Fertilizer suppliers	2.20	3.37	2.77	3.08
Crop protection suppliers	2.36	3.32	2.82	3.11
Machinery suppliers	2.23	3.41	2.82	3.24
Bulk buyers	2.96	3.20	3.08	3.59
End-consumers	End-consumers 3.21		3.24	3.98
People in general	2.71	2.91	2.81	3.68
Soc. environment	3.44	3.82	3.63	3.89

Well-perceived stakeholders might have stronger effects on biodiv-DM. Data will be clustered for further analysis to test this first conclusion, identify well-perceived stakeholders for different farmer groups & consider national variation in stakeholders' functions.

... that correlations bw. effect & perception ratings depend on the stakeholder in question.

Different stakeholders could affect biodivDM for different reasons. Additional qualitative & quantitative analysis will be run to explore these reasons.

References: [1] IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services. S. Díaz, J. Settele, E. S. Brondízio, H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBES secretariat, Bonn, Germany. 56 pages. https://doi.org/10.5281/zenodo.3553579 [2] Bakker, L.; Sok, J.; van der Werf, W.; Bianchi, F.J.J.A. (2021): Kicking the Habit: What Makes and Breaks Farmers' Intentions to Reduce Pesticide Use? Ecological Economics 180, 106868. [3] Stuart, D.; Denny, R.C.H.; Houser, M.; Reimer, A.P.; Marquart-Pyatt, S. (2018): Farmer selection of sources of information for nitrogen management in the US Midwest: Implications for environmental programs. Land Use Policy 70, 289-297. [4] Rust, N.A.; Stankovics, P.; Jarvis, R.M.; Morris-Trainor, Z.; de Vries, J.R.; Ingram, J.; Mills, J.; Mills, J.; Glickman, J.A.; Parkinson, J.; Toth, Z.; Hansda, R.; McMorran, R.; Glass, J.; Reed, M. (2022): Have farmers had enough of experts? Environmental Management 69 (11), 31-44. [5] Moon, K.; Blackman, D.A.; Adams, V.M.; Kool, J. (2017): Perception matrices: An adaptation of repertory grid technique. Land Use Policy 64, 451-460.



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