Activating the value chain for improved delivery of agri-environmental public goods - What factors are impacting farmers willingness to participate?

Fanny Le Gloux, Theresa Eichhorn, Riccardo d'Alberto, Jochen Kantelhardt, Lena Schaller

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº 817949

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[1]French National Research Institute for Agriculture, Food and Environment (INRAe); [2]University of Natural Resources and Life Sciences; BOKU; [3]University of Bologna

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fanny.le-gloux@inrae.fr
theresa.eichhorn@boku.ac.at

Problem statement and research question

- Overcome public funding and its constraints.
- Farm to fork is emphasizing the inclusions of the food supply chain in the transition to more sustainability (EC, 2020).
- Still little on farmers willingness to enrol/acceptance.

→ This study examines the impact of contract design characteristics on farmers willingness to adopt value chain (VC) contracts for the delivery of agri-environment-climate public goods (AECPG).

Value chain-based contract solutions

Definition and interpretation:

- **Value chain actors collaborate** (farmer, processor, retailer or distributor).
- Market partners voluntarily engage in **private contracts.**
- Single **buyer-seller relation** (e.g. farmer with processor or retailer) or covering the **whole supply chain.**
- The delivery of **environmental benefits** (e.g. water protection, landscape improvement, biodiversity or carbon sequestration) is linked with the production of **private goods.**

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Value chain-based contract solutions

Demand from food chain actors:

- Growing demand for environmentally friendly products among **consumers** (Chobotová, 2013).
- Interest by **other key players** in the supply chain (food companies, retailers) as part of their marketing strategies (Kempa, 2013).
- Some evidence that there can be a substitution between ecolabelling and agri-environment-climate dedicated payments for **farmers** (Tanaka et al., 2021; Chang et al., 2017).

Key characteristics of existing VC contracts:

- Contract terms, transparency, **standards to reach**, governance system (DeSchutter 2017; Trebbin 2014).
- Compensation system: higher buying price, secure commercial outlet, product differentiation on the market (OECD, 2016; D2.1 H2020 CONSOLE).
- Compliance/monitoring rules often provided by an external governance system involving diverse actors (associations, public institutions…) (Le Coq et al. 2011).

Methodological approach – studying the impact of VC contract design on farmers willingness to enrol

Data

- EU – Level survey in the EU-project CONSOLE (2021).
- Sub-sample with Austria and French data: 282 farmers (152 + 130).

Three-parts survey

- Farm and farmers characteristics.
- Effect of 13 contract characteristics on willingness to enrol in contractual solution, including some specific to VC.
- Perception of VC contracts: understandable, applicable on farm, economically beneficial, **willingness to enrol in the future.**
- Questions asked at a 5 point Likert scale, (1… strongly disagree - 5 …. strongly agree).

Methodological approach – studying the impact of VC contract design on farmers willingness to enrol

Ordinal logistic regression (McCullagh, 1980): proportional odds model (maximum likelihood).

- Ordinal response variable Y = likelihood to engage in VC contracts in the future.

$$\Pr[Y \geq j|X] = \frac{1}{1+e^{-(\alpha_j+\beta X)'}} \text{ , where } j = 1, 2, 3, 4, 5$$

Assumptions

(A1) Ordinality assumption: Y "behaves in an ordinal fashion with respect to each predictor" (Harrell, 2001) → checking the consistence of the order of their mean across the levels of Y.

(A2) Proportional regression assumption: model coefficients are independent of the level j → brant test.

Explanatory variables

1. Acceptance of specific VC contract design characteristics (ordinal variables)
2. Anticipation of the effect of VC contract on their farm (ordinal variables)
3. Current or past experience with VC contract (binary variable)
4. Country of the respondent (binary variable)
5. *Other farm or farmer characteristics (not yet explored)*

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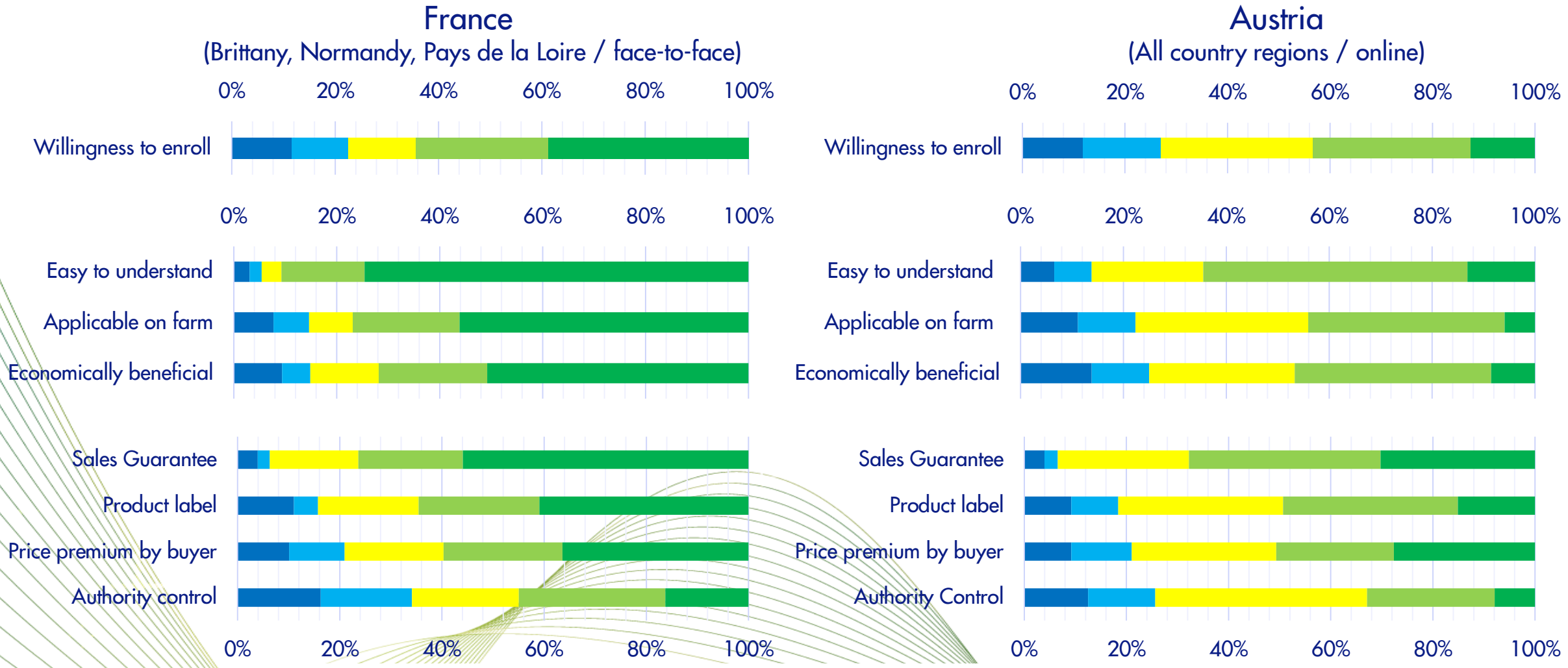
Results – do farmers accept it?



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Results –factors impacting farmers willingness to participate

	Parameter	Std. Error	Odds-ratio
Label	**0,254***	0,122	**1,290**
Sales guarantee	-0,004	0,141	0,996
Price premium	0,080	0,104	1,084
Authority control *Strongly agree =1*	-0,247	0,366	0,781
Understandable	0,202	0,148	1,223
Applicable	**0,965****	0,195	**2,624**
Economically beneficial	**0,565****	0,173	**1,759**
Past or present experience	**2,266****	0,317	**9,638**
France	-0,432	0,292	0,649
Intercepts			
Unlikely | Very unlikely	**3,883****	0,719	
Neutral | Unlikely	**5,629****	0,752	
Neutral | Likely	**7,665****	0,823	
Likely | Very likely	**10,232****	0,925	
AIC	592.5445		
Pseudo-R2	0.351		
Observations	273		
Brant test	P-value = 0.04		

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Discussion

Main findings

- Past/present experience is the most important factor explaining the willingness to participate.
- Other crucial factors: anticipation of applicability on farm and whether it would be economically beneficial.
- Contract characteristics: labelling is significant.

Limitations

- Different data collection conditions in Austria (online, market research institute) and France (face to face, northwest, contact through intermediaries).
- Brant test violated when controlling for country → coefficient is not independent of the level j.

Perspectives

- Other factors to control for (farm specialisation…).
- Additional data from other countries?

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Discussion

More research for successful implementation

- Learn more from farmers/successful experiences who have a positive attitude towards participation → what makes a good VC contract?
- Is product labelling a good lever to boost participation? Which type of label?
- VC-based contracts can improve the delivery of a multitude of AECPGs with partial or full independence from public funds (Kroeger and Casey, 2007)… they can also bear the risk of power imbalances and dependence from the rest of the food chain (DeSchutter, 2017). Farmers prefer engaging in marketing contracts with food chain actors they trust (Roe et al., 2004; Schipmann and Qaim, 2011).

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Thank you!

For further information please visit:

https://console-project.eu/

Console project partners :

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CONSOLE – **CON**tract **SOL**utions for **E**ffective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry

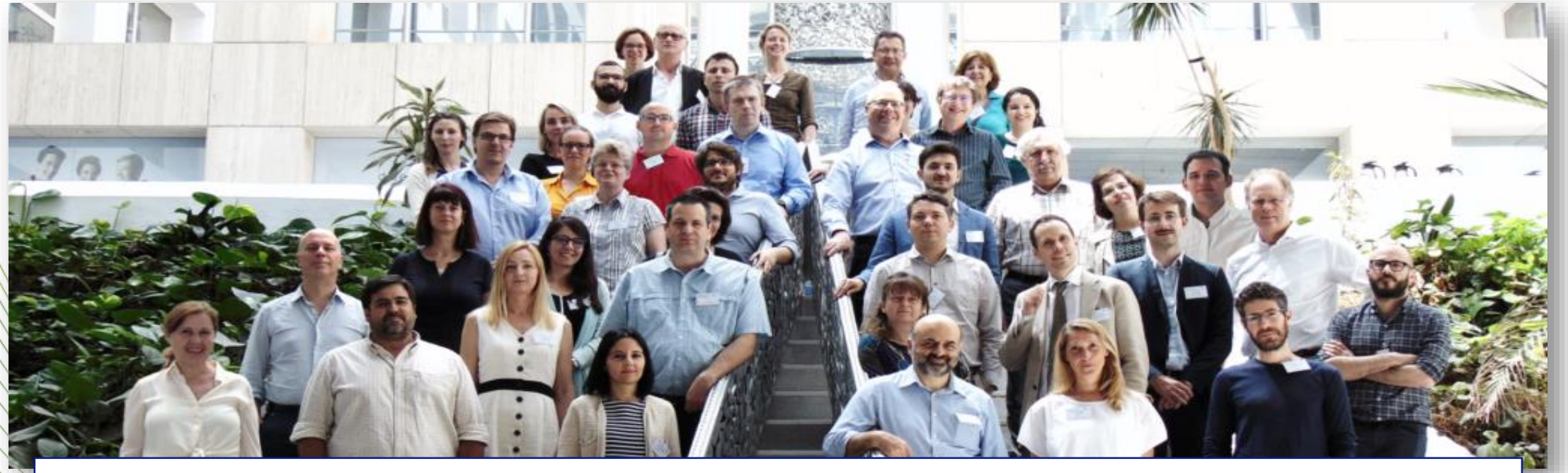
H2020, (GA 817949)

Project start/end: 2019/05/01 – 2022/30/04

Partners: 24 Partners in 13 countries

Budget: 5 Mio. Euro

Coordinator: UNIBO, Prof. Davide Viaggi



Main objective: to boost innovation in the lasting delivery of Agri-Environmental-Climatic Public Goods by EU agriculture and forestry

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VC contract definition

"As a producer, you are part of the value chain (producer, processor, retailer, distributor). You engage in a contract where you commit to deliver ***environmental or climate benefits connected to the production of selected products****, e.g. by carrying out management measures which contribute to water protection, landscape improvement, biodiversity or carbon sequestration. Often these products get a special label. You are* ***paid*** *for it* ***by the market,*** *mainly through a premium price paid by the processor or retailer "*

Value chain-based contract solution

With the “Carta del Mulino”-program a value chain contract solution has been introduced for the farmers that supply Barilla with soft wheat. Farmers have to respect ten rules that affect their way of production.

Involved parties:

- 500 farmers
- 14 mills
- Barilla (private company)

Conditions of participation

10 rules – e.g crop rotation, a minimum percentage of area allocated to flowers, specific variety selection, certified seeds, no use of neonicotinoids, no use of glyphosate, etc.

➢ **Farmers receive a price premium from the mills with which they sign a contract. Barilla purchase the products from the mills**