LVII SIDEA National Conference
September 16-17, 2021, Bologna, Italy

University of Natural Resources and Life Sciences, Vienna
Department of Economics
and Social Sciences

More than private goods? Identifying mechanisms for agriculture's transition to ecologisation.

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More than private goods?

More than private goods?

More than private goods?

Erneuertes

EDICT

wegen

zu verschaffender Vorfluth

und

Räumung der Graben und Bäche.

De Dato Berlin, den 6. Julii 1773.

Gedruckt bey George Jacob Decker, Königl. Hof-Buchdrucker.

Cultivate as much land as possible for agricultural production!

Melioration works (1930)

Komplexmelioration 2nd phase (1961-1985)

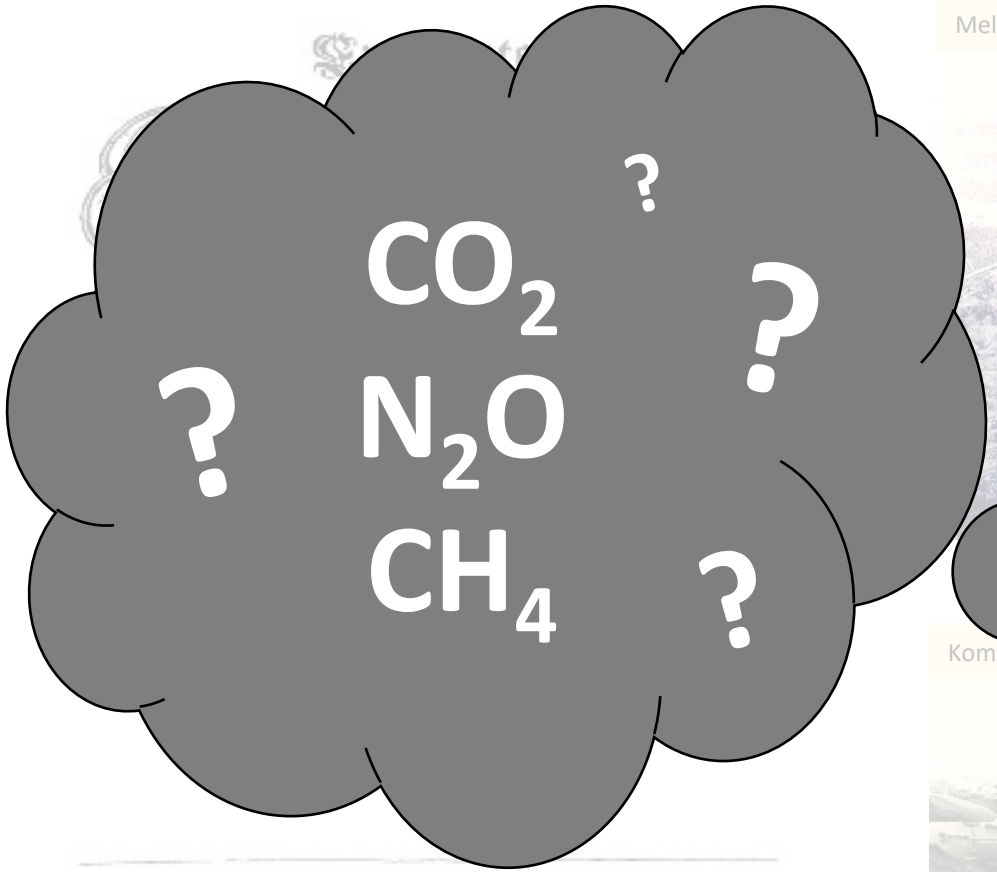
Komplexmelioration 1st phase (1960-1971)

Komplexmelioration 3rd phase (1986-1990)

Every m² counts!

More than private goods?

More than private goods?



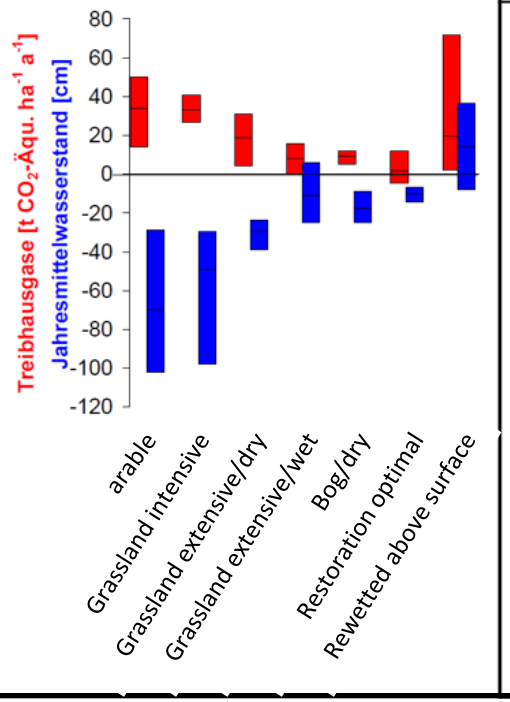
More than private goods?


© Oliver Lange, NLWKN Oldenburg, 2014


© K. Parakenings, 2012


Source: http://exzellent-online.com/wp-content/uploads/2015/05/Linser-2.jpg

More than private goods?



Basic land use		Land use change	
Land use category	Agricultural management	Stepwise mgmt-change along the degree of extensification	Direct change into conservation grassland/ Restoration
Arable	Cash crops Forage crops		
Grassland intensive	Meadows Meadow/pasture Pasture		
Grassland Medium intensity	Meadows Meadow/pasture Pasture		
Grassland extensive	Meadows Meadow/pasture Pasture		
Wet conservation grassland	1 cut meadow (hay, stray, Compost)		
Restoration	No agricultural use		

Extensification

Source: Drösler, M., 2011

Source: Drösler, M., 2011

Source: Schaller, L., 2015

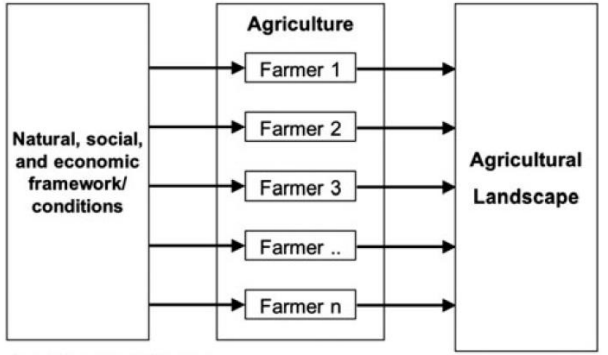
More than private goods?

More than private goods?

Source: Heißenhuber et al., 2004: Visualisierung und Bewertung ausgewählter Landnutzungsentwicklungen

250 €/ha

Integrative landscape model



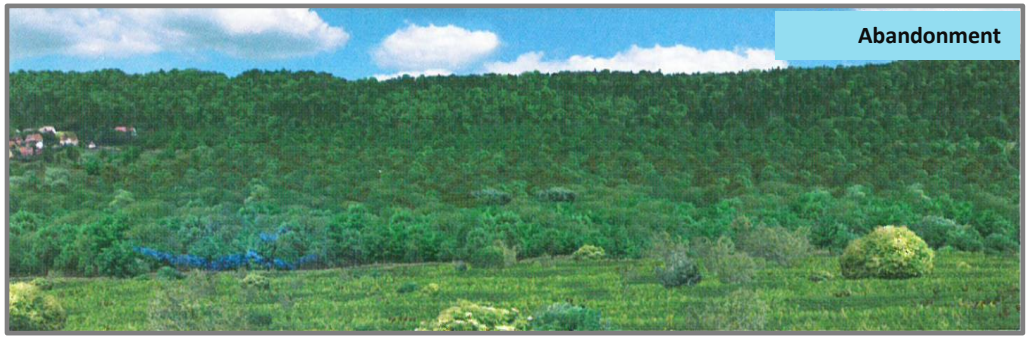
Source: Kantelhardt, 2003

Difference in management costs

- Improving labour efficiency
- Using scale effects
- Lowering management costs

150 €/ha

More than private goods?



Source: Heißenhuber et al., 2004: Visualisierung und Bewertung ausgewählter Landnutzungsentwicklungen

More than private goods?

More than private goods? Frameworks

Multifunctional agriculture

Key elements of Multifunctionality (OECD 2001)

- The existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture
- The fact that some of the non-commodity outputs exhibit the characteristics of externalities or public goods, with the result that markets for these goods do not exist or function poorly.

Table III.5. **Classification of pure public goods, impure public goods and private goods (Sketch)**

	Non-Rival	Congestible	Rival
Non-Excludable	**Pure public goods** • Landscape (non-use value) • Natural habitat (non-use value) • Biodiversity (non-use value)	**Type II** **Open access resources** • Food security • Landscape (use value by visitors)	**Type II** **Open access resources**
(Benefits involve only a small jurisdiction such as municipality)	**Type I** **Local pure public goods** • Flood control • Soil conservation • Land slide prevention • Landscape (use value by residents) • Cultural heritage (non-use value: region-specific) • Positive effects associated with rural employment		
(Excludable only to outsiders of a community)		**Type III** **Common property resources** • Groundwater recharge • Natural habitat (use value) • Biodiversity (use value)	**Type III** **Common property resources**
Excludable	**Type IV** • Natural habitat (non-use value) • Biodiversity (non-use value)	**Type V** **Club goods** • Food Security (if special arrangements were made) • Natural Habitat (non-use value under special conditions) • Biodiversity (Non-use value under special conditions)	**Private goods** • Landscape (use value by visitors if exclusion can be made) • Cultural heritage (use value of historical buildings) • Food security (use value by farmers)

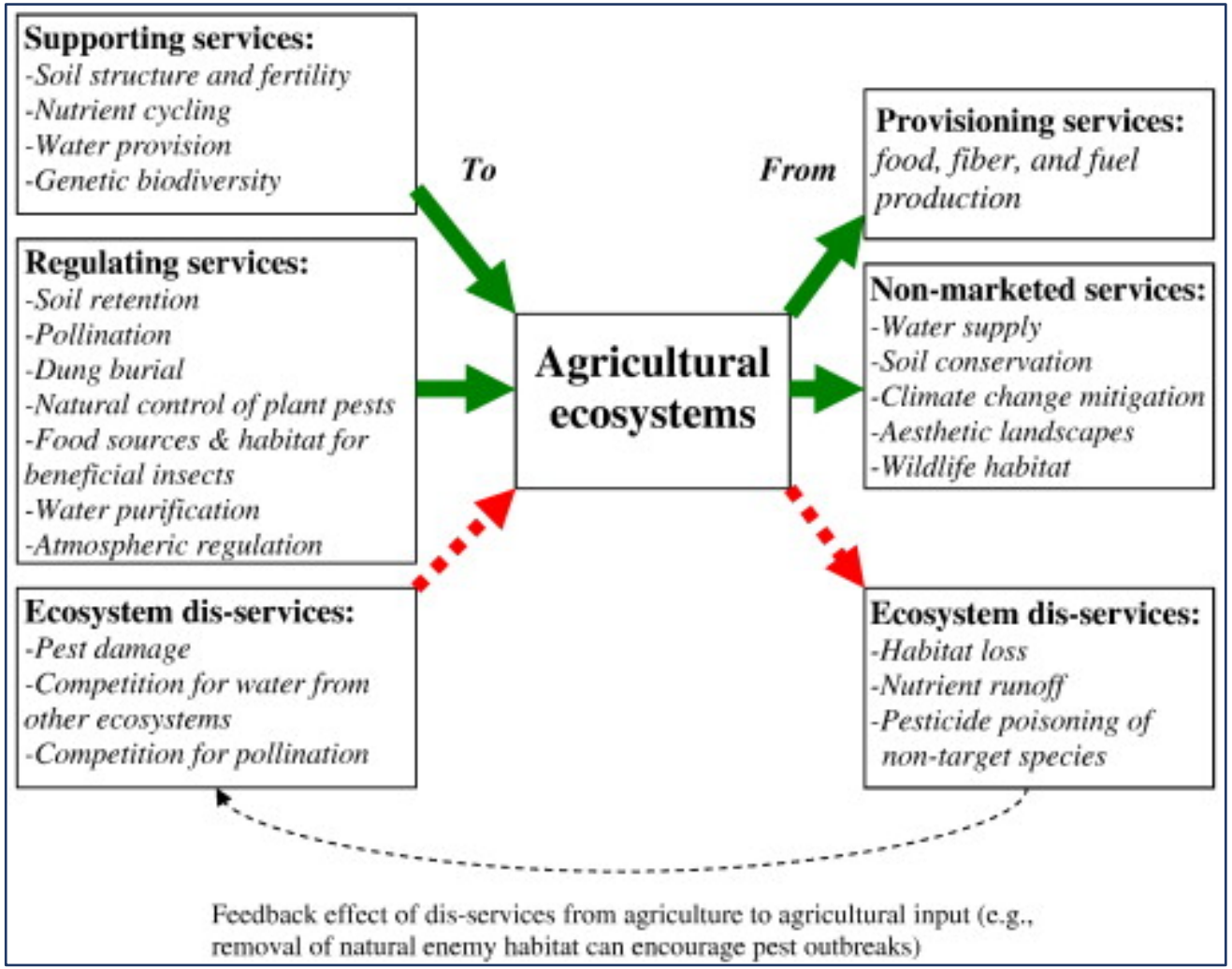
Source: OECD.

Source: OECD, 2001: Multifunctionality - Towards an Analytical Framework

More than private goods? Frameworks

Ecosystem Service framework

"The conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life". Daily (1997)



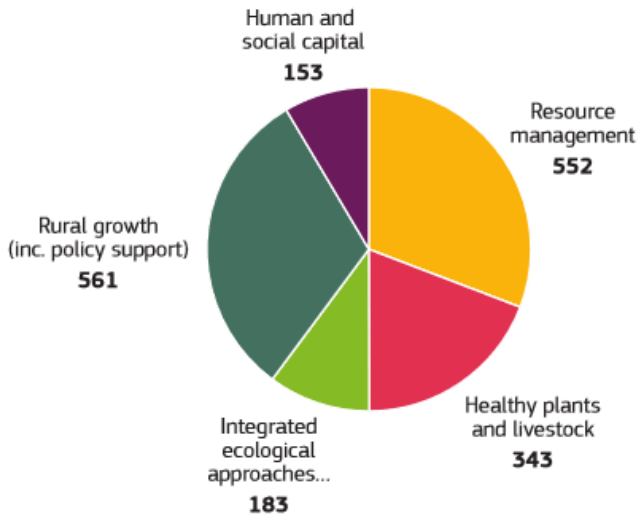
Zhang et al., 2007: Ecosystem services and dis-services to agriculture

Identifying Mechanisms

Identifying Mechanisms

Distribution of budget over priorities

(EUR million - 2014-2020)



Balanced efforts between sustainable primary production and wider rural innovation

Soils
26 projects
EUR 197 million
Soil functions; Soil water resources; Soil-improving cropping systems; Carbon sequestration

Water, nutrients and waste
26 projects
EUR 182 million
Water management; nutrient recycling; fertigation; waste valorisation; bioeconomy

Plant health
29 projects
EUR 161 million
Alternatives to pesticides; Ecosystem services; Emerging diseases; Integrated pest management

Animal health
21 projects
EUR 179 million
Host-pathogen interaction; Vaccinology; One Health; anti-microbial resistance; International cooperation

Genetic resources and breeding
33 projects
EUR 189 million
Biodiversity strategies; Genebanks; Landraces and value chains; Diversifying agriculture and forestry

Animal production systems
22 projects
EUR 132 million
Animal welfare; Feeding sustainability; Efficiency; Economic performance; Resource use

Ecological approaches and mixed farming
36 projects - EUR 213 million
Agroecology; Organic Farming; Biodiversity; Ecosystem Services; Landscape; Agriculture; Agroforestry; pollination; biocontrol; diversification; mixed farming; permanent grassland

Understanding dynamics and modernising policies
23 projects
EUR 107 million
Food and nutrition security policies; Social innovation; Business models; Rural-urban relations; Generational renewal; Foresights; Modelling

Public goods from agriculture and forestry
24 projects
EUR 139 million
Biodiversity; Carbon sequestration; Drinking water; Governance and business models; Land management

Sustainable, circular and innovative value chains
54 projects
EUR 367 million
Integrated biomass logistics; food chain sustainability; food safety / quality / authenticity; short food chains

Taking advantage of the digital revolution
17 projects - EUR 163 million
Internet of things; Precision agriculture; Robotics; Services in rural areas

Human and social capital and innovation systems
53 projects - EUR 151 million
Agricultural knowledge and innovation systems (AKIS); Education and training; Advice; On-farm Demonstration; Networks; Knowledge exchange

Identifying Mechanisms

Public Goods under Horizon 2020 Societal Challenge 2 (SC2)

25 Projects or expected grants

141 M€ EU contribution 2014-2020

466 Participations in selected projects

Key themes

Public Goods – Drinking Water – Biodiversity – Carbon sequestration – Land management – Agriculture – Forestry – Governance & Business models – Rural-urban

CONSOLE

CONtract Solutions for Effective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry

PROVIDE

PROVIding smart DElivery of public goods by EU agriculture and forestry

EFFECT

CONTRACTS FOR ENVIRONMENTAL GOODS

contracts2.0

Innovative **contracts** for **farmers** and **nature**

PEGASUS

Public Ecosystem Goods and Services from land management – Unlocking the Synergies

LIFT

Low-Input Farming and Territories

Integrating knowledge for improving ecosystem-based farming

UNISECO

AGRO-ECOLOGICAL KNOWLEDGE HUB

- Public goods, from theory to practice (5 projects)
- Land management, high-nature value farming and rural-urban synergies (7 projects)
- Capitalising on native biodiversity in farmland landscape (2 projects)
- Pollinators (1 project)
- Drinking water quality and agriculture (3 projects)
- Forest ecosystem services (4 projects)
- Building resilient mountain value chains delivering private and public goods (1 project)
- Integration of plant protection in a global health approach (1 project)

SHOWCASE

SHOWCASing synergies between agriculture, biodiversity and Ecosystem services to help farmers capitalising on native biodiversity

Identifying Mechanisms

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SHOWCASE

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Identifying Mechanisms

PROVIding smart DElivery of public goods by EU agriculture and forestry

Programme: Horizon 2020
Budget: 2,9 Million Euro
Duration: 01.09.2015 - 31.08.2018
Coordination: UNIBO
Partners: 14 Partners; 13 EU MS

Sister Project:

PEGASUS
Public Ecosystem Goods and Services from land management – Unlocking the Synergies

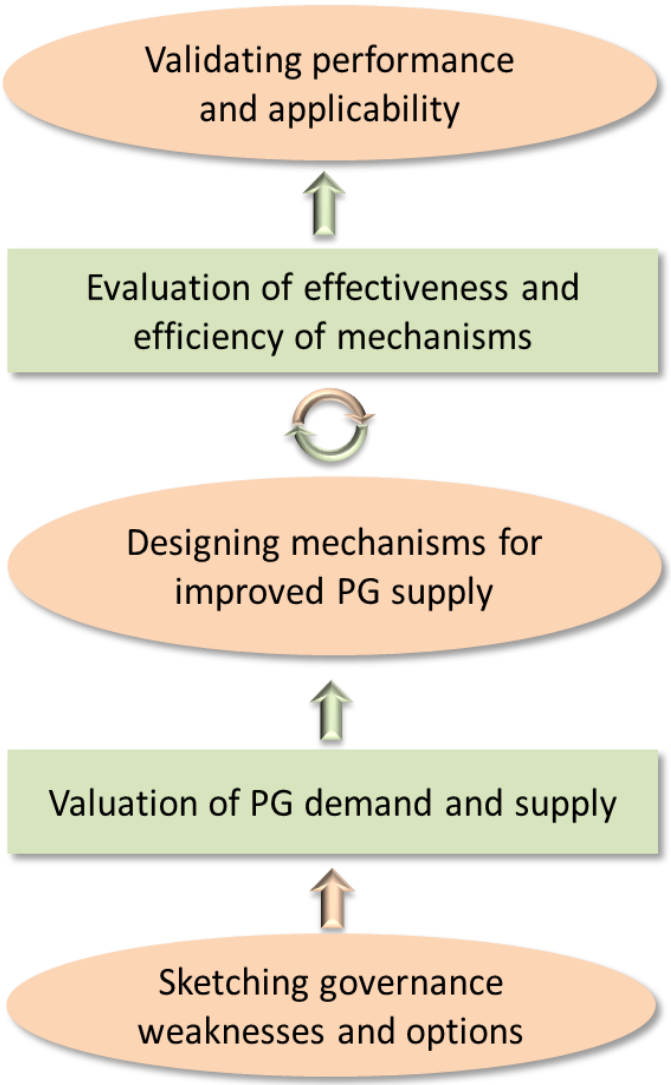
Objective

to provide a (consistent) conceptual basis, evidence, tools and **improved incentive and policy options to support the "smart" provision of public goods** by the EU agriculture and forestry ecosystems in the light of trade-offs and conflicts brought about by prospective intensification scenarios using a **transdisciplinary approach**

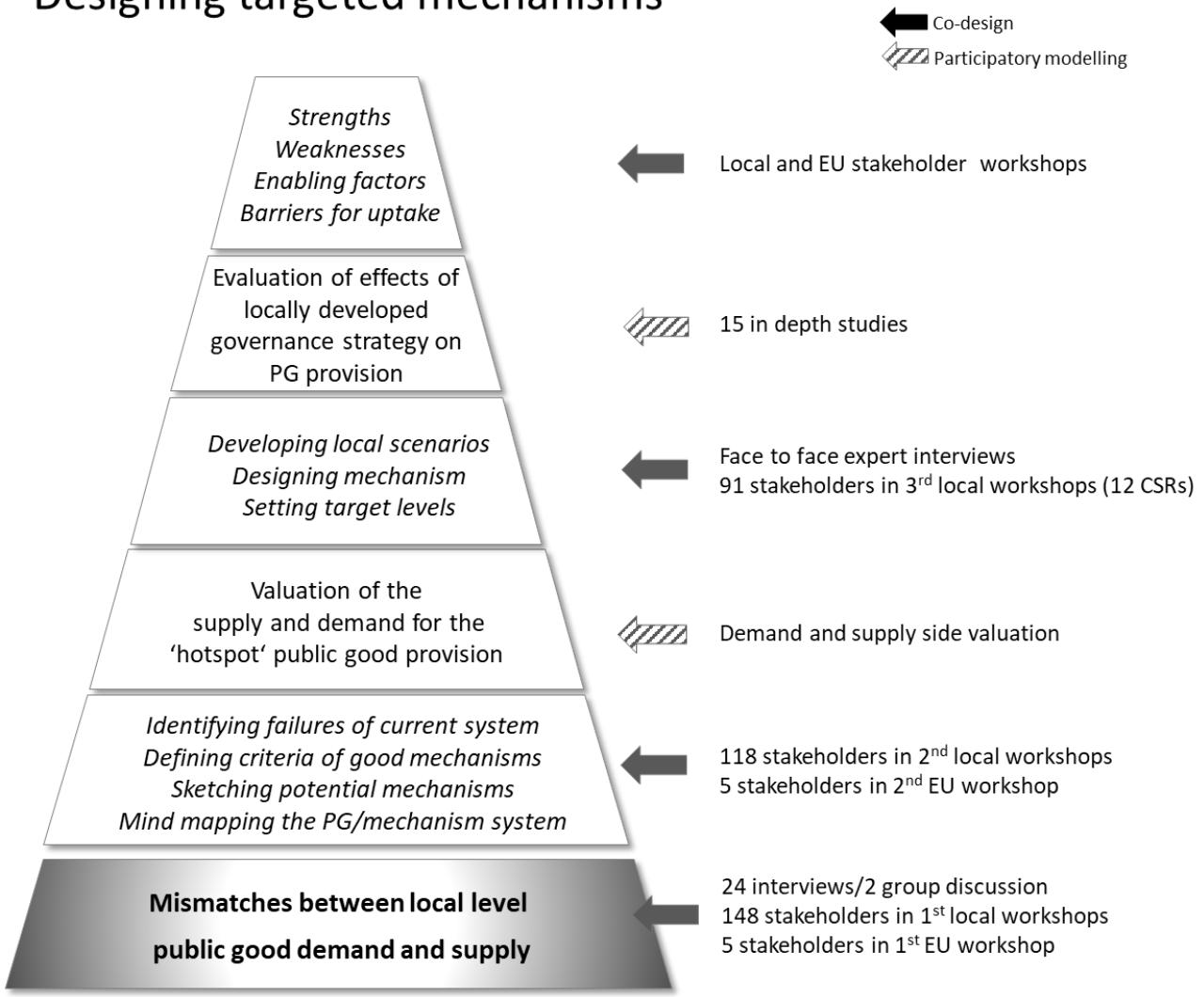
Specific objective

to design and evaluate improved, applicable governance mechanisms for the smart delivery of public goods and avoidance of public bads.

Identifying Mechanisms



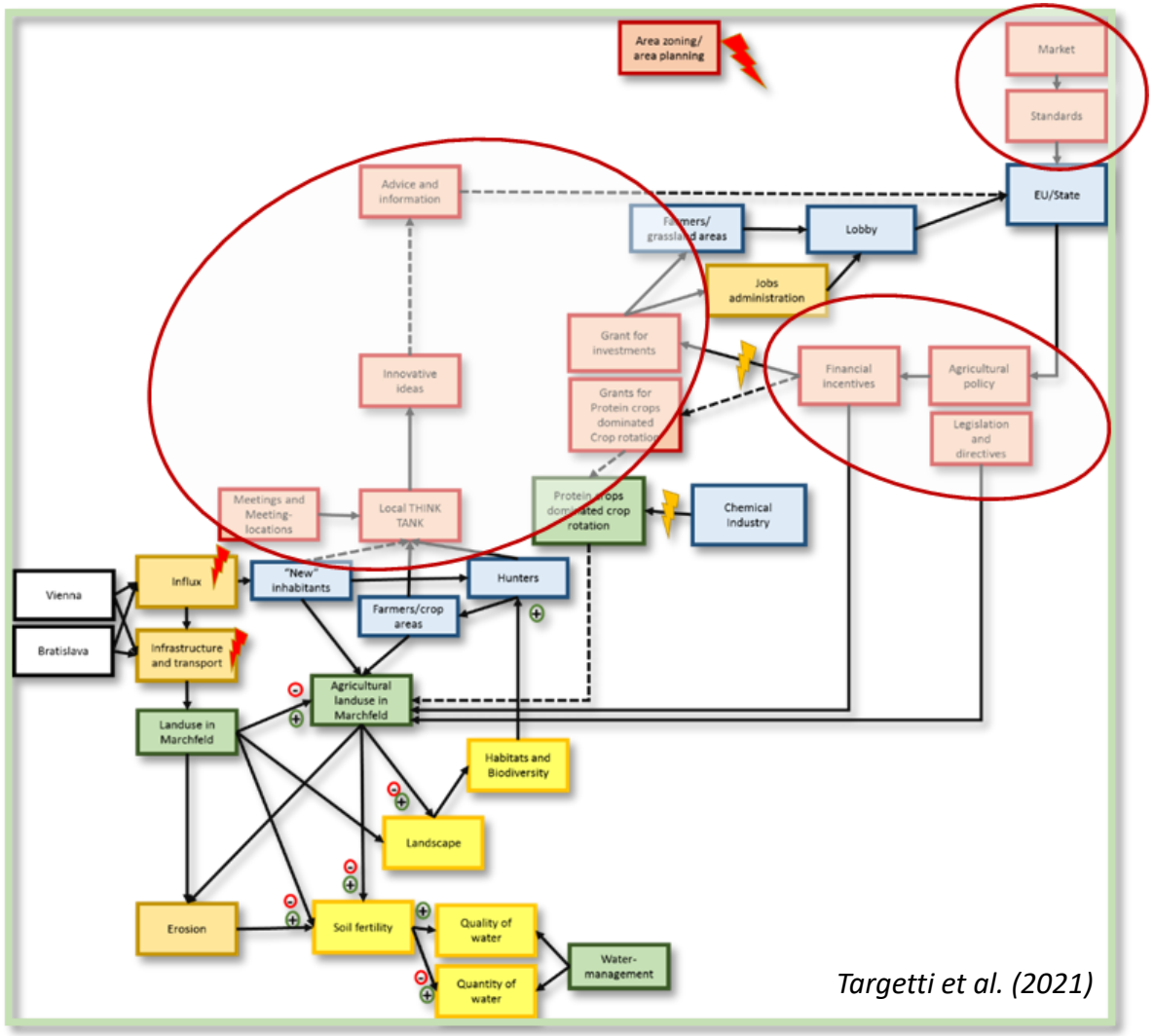
Designing targeted mechanisms



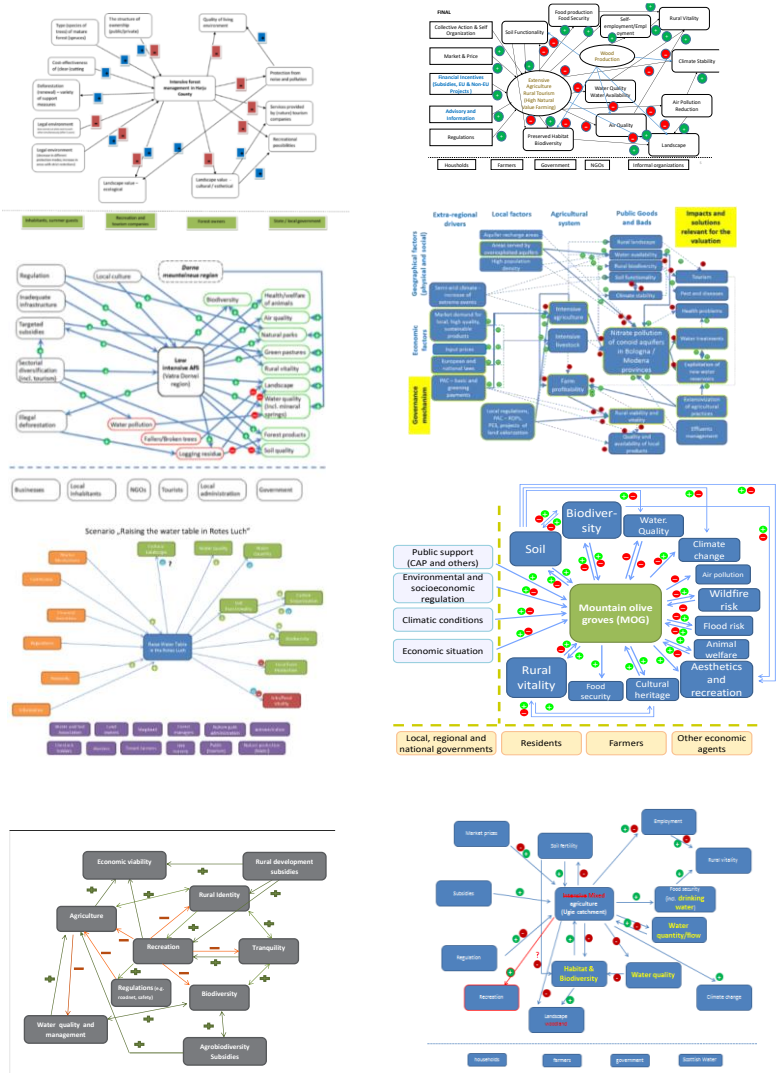
Schaller et al. (2018)

Identifying Mechanisms

Identifying system relationships



Targetti et al. (2021)



Schaller et al. (2018)

Identifying Mechanisms

	Land use system*	CSR Code	Public good groups: biodiv.& habitat	water	soil	scenery & recrea-tion	rural vitality	Mechanisms: regulation	financial incenttives	collaboration and partner-ships	Market mechan-isms	advisory & information awareness-building	Optimisation approach
Financial incentives	RALUS	ES-1	x						x				Optimal design of public AES scheme
	FOR	EE-1				x			x			x	Optimal spatial targeting, optimal management for PG;
	FOR	FI-1				x			x				Optimal design of private PES scheme
	ILUS	I							x				Optimal public payment scheme (collective)
	ILUS	I							x				Optimal public payment scheme (collective)
	RALUS	IT-1			x		x		x				Optimal spatial allocation of land use
	ILUS	NL-1	x						x				Optimal allocation of measures; optimal management for PG;
	RALUS	FR-1	x	x	x				x				Optimal (de-)centralisation of governance
Mechanisms mixes	ELUS	RO-1				x	x		x			x	Optimal design of subsidies, Optimal mix of mechanisms
	ELUS	BG-1		x		x			x		x		Optimal design of subsidies Optimal mix of mechanisms
	ILUS								x	x		x	Optimal mix of mechanisms incl. public and market based fin. Inct.
	ILUS										x	x	Optimal mix of mechanisms
	ILUS	AT-1	x	x	x				x	x	x	x	Optimal mix of mechanisms; optimal mgmt for PG; optimal payment scheme
	ILUS	DE-1	x	x	x				x	x	x		Optimal mix of mechanisms, optimal management for PG;
Collect.Actions	ELUS									x			Optimal design of collective action
	FOR									x			Optimal design of collective action

Improved financial incentives
(targeting, result-based, collective incentives)

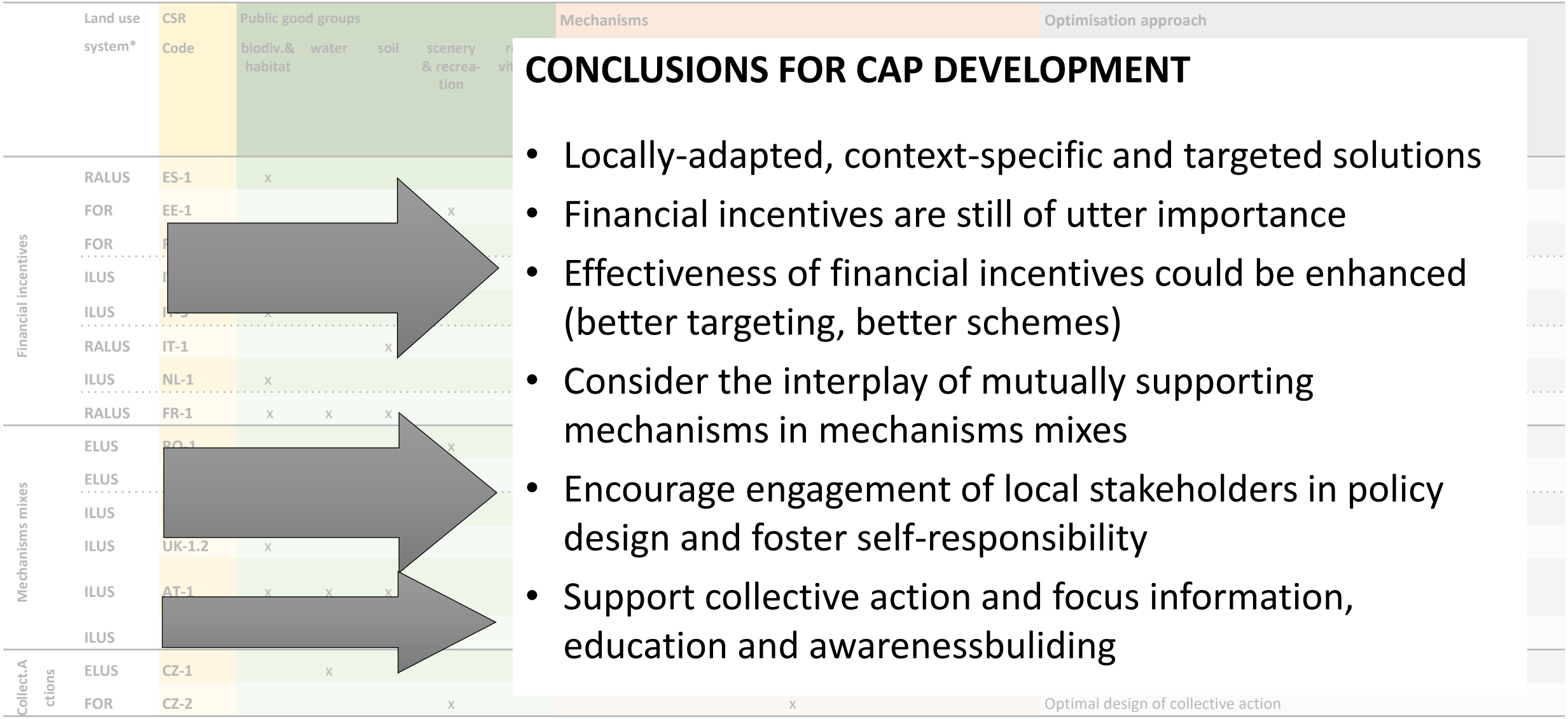
Optimised mixes of mechanisms

Collaboration and partnerships

*Land use system: ILUS: Intensive land use system, ELUS: Extensive land use system: RALUS: Risk of abandonment of land use system, FOR: Forestry

Schaller et al. (2018)

Identifying Mechanisms



CONCLUSIONS FOR CAP DEVELOPMENT

- Locally-adapted, context-specific and targeted solutions
- Financial incentives are still of utter importance
- Effectiveness of financial incentives could be enhanced (better targeting, better schemes)
- Consider the interplay of mutually supporting mechanisms in mechanisms mixes
- Encourage engagement of local stakeholders in policy design and foster self-responsibility
- Support collective action and focus information, education and awarenessbuliding

*Land use system: ILUS: Intensive land use system, ELUS: Extensive land use system: RALUS: Risk of abandonment of land use system, FOR: Forestry

Schaller et al. (2018)

Identifying Mechanisms

Identifying Mechanisms

CONSOLE

CONtract Solutions for Effective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry

Programme: Horizon 2020
Budget: 5 Million Euro
Duration: 1.5.2019-30.10.2022
Coordination: UNIBO
Partners: 24 partners in 13 countries

Sister Projects:

EFFECT
CONTRACTS FOR ENVIRONMENTAL GOODS

contracts2.0
Innovative contracts for farmers and nature

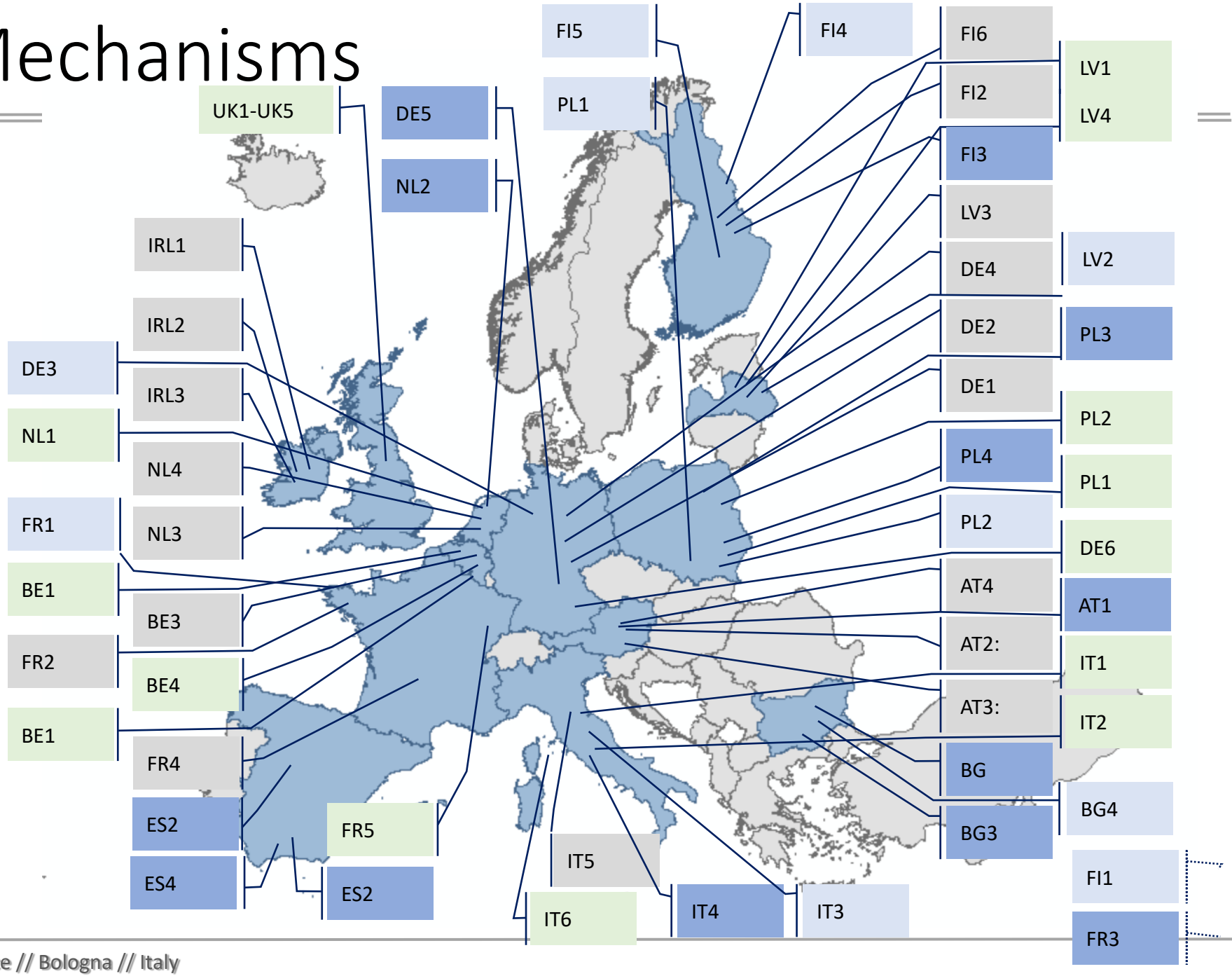
Main objective:
to boost innovation in the lasting delivery of Agri-Environmental-Climatic Public Goods by EU agriculture and forestry

Specific objective:
Inventory and an ex-post qualitative assessment of existing (implemented) contract solutions for the improved delivery of agri-environmental-climate public goods (AECPGs) in the EU and in third countries

Identifying Mechanisms

CONSOLE case studies

- 21 result-based contract solutions
- 18 contract solutions with collective/collaborative implementation
- 13 value chain-based contract solutions
- 10 Land tenure based contract solutions



VC8: "Carta del Mulino" – Barilla

Under the conditions of the contracts of the "Carta del Mulino"-program, farmers supply Barilla with soft wheat by respect ten ISCC rules that affect their way of production.

Involved parties

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

Conditions of participation

10 ISCC 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.**
- **Annual audits by an independent third-party control body to all subscribers to the "Carta del Mulino" project. 30% of total farmers are tested.**
- **There are food safety, quality and environmental standards. Barilla is expected to cover the entire purchase of soft wheat through farms that are in compliance with the ten rules.**

VC10: "Organic wine in Rueda"

Only grapes produced ecologically are bought by the winery Herederos del Marqués de Riscal, S.A., to produce two selected wine varieties. Grape producers are not associated, however, they are integrated into the value chain by complying to the winery standards and have periodic controls on quality and residues, and have a strict protocol of organic production of high standards.

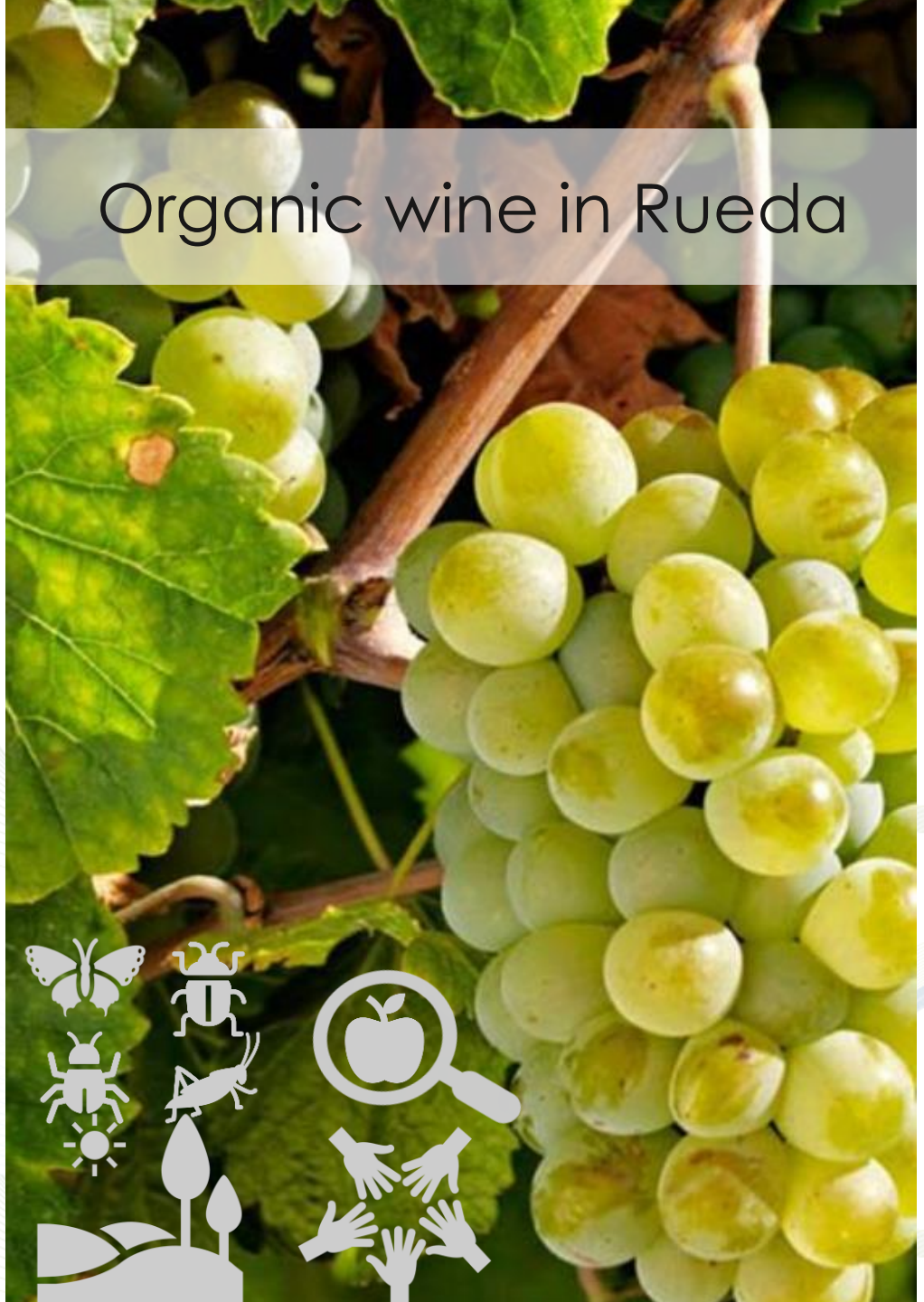
Facts:

- 100 farmers
- 400 ha

Controls/monitoring: strict control by the certification authorities

Product requirements: Organic certification, grapevine quality for premium wines

- **Grapevine producers produce grapes with organic certification and guarantee the selling each year to the Riscal winery.**
- **They receive a fixed price and their product is transformed into wine of two high value labels.**
- **Riscal – They receive a stable amount of organic grapes that transform, bottle and distribute to high end retailers, restaurants and exports.**



VC1: ALMO Alpine oxen

Under the ALMO brand, established originally by a group of 45 farmers, a meat processing company, a foundation for animal welfare, and 400 farmers, organised in an association and managing alpine pastures, work together to produce and market alpine oxen with higher animal welfare standards.

First, oxen meat was marketed by small butcheries. 2001 a strong expansion took place as the meat processing company joined the ALMO-program.

The animal protection association "VIER PFOTEN" developed additional animal welfare criteria to guarantee high animal health and welfare standards on the farms. Since 2014, farms can be certified based on these criteria.

- **Farmers get fixed prices for the oxen, which are on average 23% higher than the market price.**
- **Products are sold using diverse points of sales, including some large companies of the Austrian food chain. Additionally, the meat production company sells the meat products via an online store.**

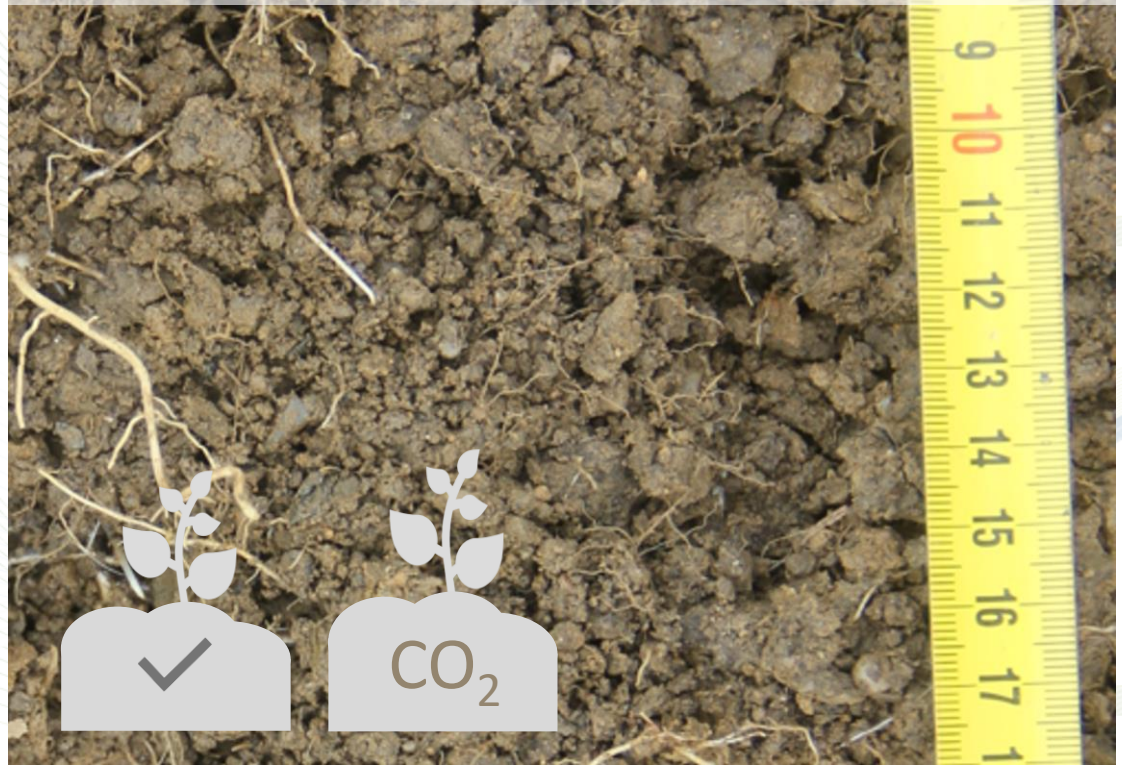
Result-based contract solutions

Farmers follow recommended measures to build up humus in soil. CO2 sequestered is measured by means of soil sampling and soil analysis (3 soil samples incl. validation sample). Farmers receive payments via emission certificate-trading system. CO2 certificates are bought by private sector.

- **Free management decisions (low perceived risk)**
- **Educational measures and humus community**
- **Strict measurements, long contract duration**
- **Further benefits for the farmer (soil fertility)**

ÖkoregionKaindorf

The Humus-Program of the Ökoregion Kaindorf



Collective implementation

The association AFSAL (Farmers and Wild Animals in Alsace) is coordinating the cropping systems of about 140 farmers located in three different static protected areas, to favour the development of populations of the protected European hamster.

- **Farmers willing to participate must join the AFSAL association**
- **Prescribed integration of hamster friendly crops in crop rotation (neighboring fields)**
- **Cost-based payment – opportunity costs**
- **Result-based payment for hamster burrows**

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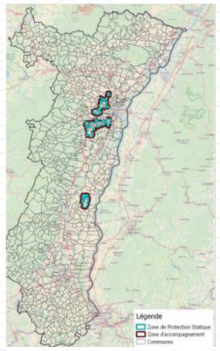


Source: Alsace Chamber of Agriculture, Bas-Rhin DDT, AFSAL, 2020

CONSOLE

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

MINISTÈRE
DE L'AGRICULTURE
DE L'AGROALIMENTAIRE
ET DE LA FORÊT

HAMSTER01 - a collective approach in the RDP framework

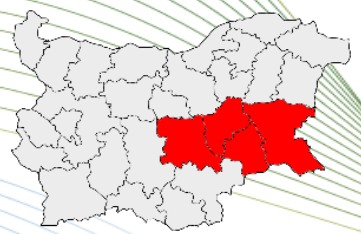
© Philippe MASSIT/ONCFS

Land tenure-based contract solutions

CONSOLE

Under a project financed partially by LIFE+, the Bulgarian Society for Protection of Birds and farmers purchased and leased out over 600 ha land to farmers with requirements to restore and maintain the high nature value pastures to protect the European souslik (restoration of bushland pastures; removing unwanted vegetation to maintain mosaic habitat; sustainable management of grassland through livestock grazing or mowing; sowing native grass species)

- **Farmers rent the land for zero lease → access to land**
- **Farmers benefit from providing grazing space for their animals and for using the hay for fodder**
- **By meeting environmental requirements farmers are eligible for governmental subsidy (practice-based efforts)**



Conservation and restoration of grasslands in Strandzha and Sakar mountains for restoring local biodiversity and endangered bird species

Successful Mechanisms

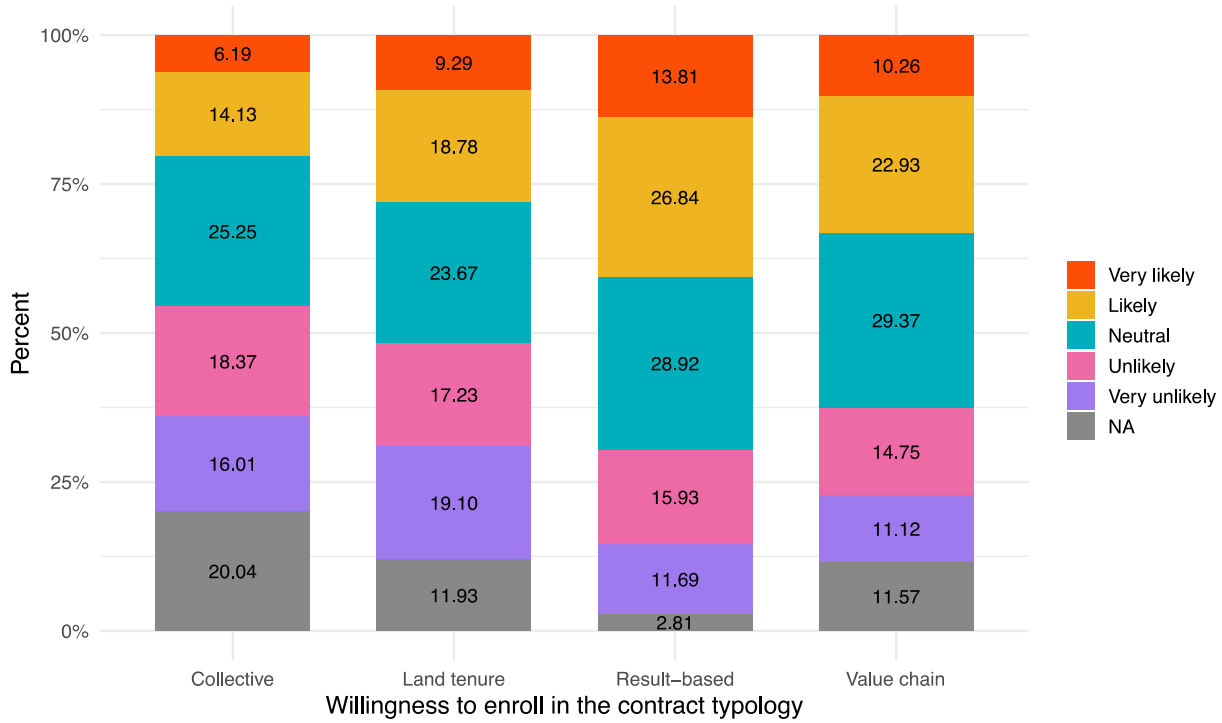
LESSONS LEARNED from existing contract solutions

- Low intensive agriculture, low income - agri-environmental contract solutions represent an important part of income
- Low risk, negligible or positive income effects, easily integratable into the farming system and reacting on social pressure – creating win-win situations
- The environmental option is just economically more feasible – environmental management pays off
- Producing for a company – trust and the chance to market products
- Land seeks land managers - land offered meets demand by farmers

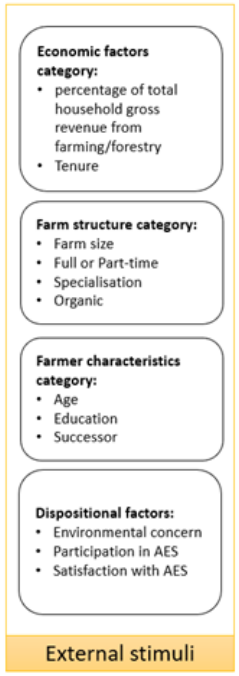
Research perspectives

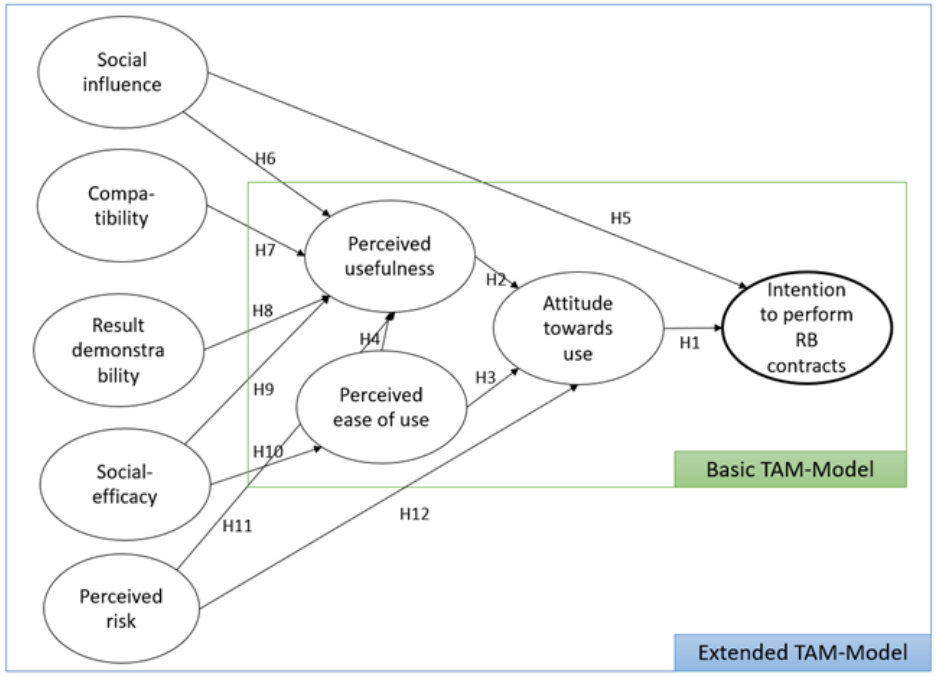
- Inter- (and trans-) disciplinary research
- Farmers attitudes and motivations
- Farmers' willingness to adapt their management
- Farm-level costs of implementation of management changes
- Effectiveness, efficiency and acceptance of incentives
- Frameworks, decision support tools and design guides
- Business models
- Technology for ecologisation?
- …

Research perspectives



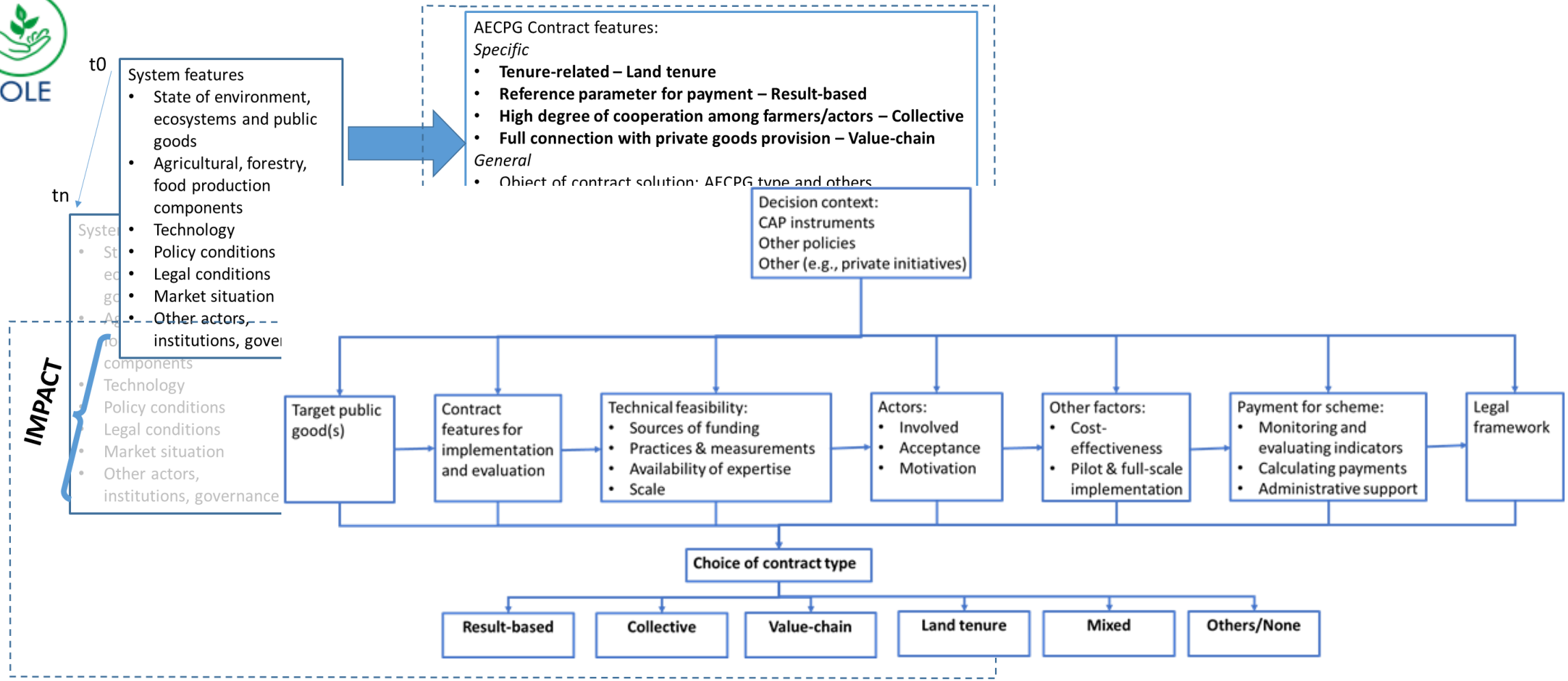
D'Alberto et al. (forthcoming)





Eichhorn, Kantelhardt & Schaller (forthcoming)

Research perspectives

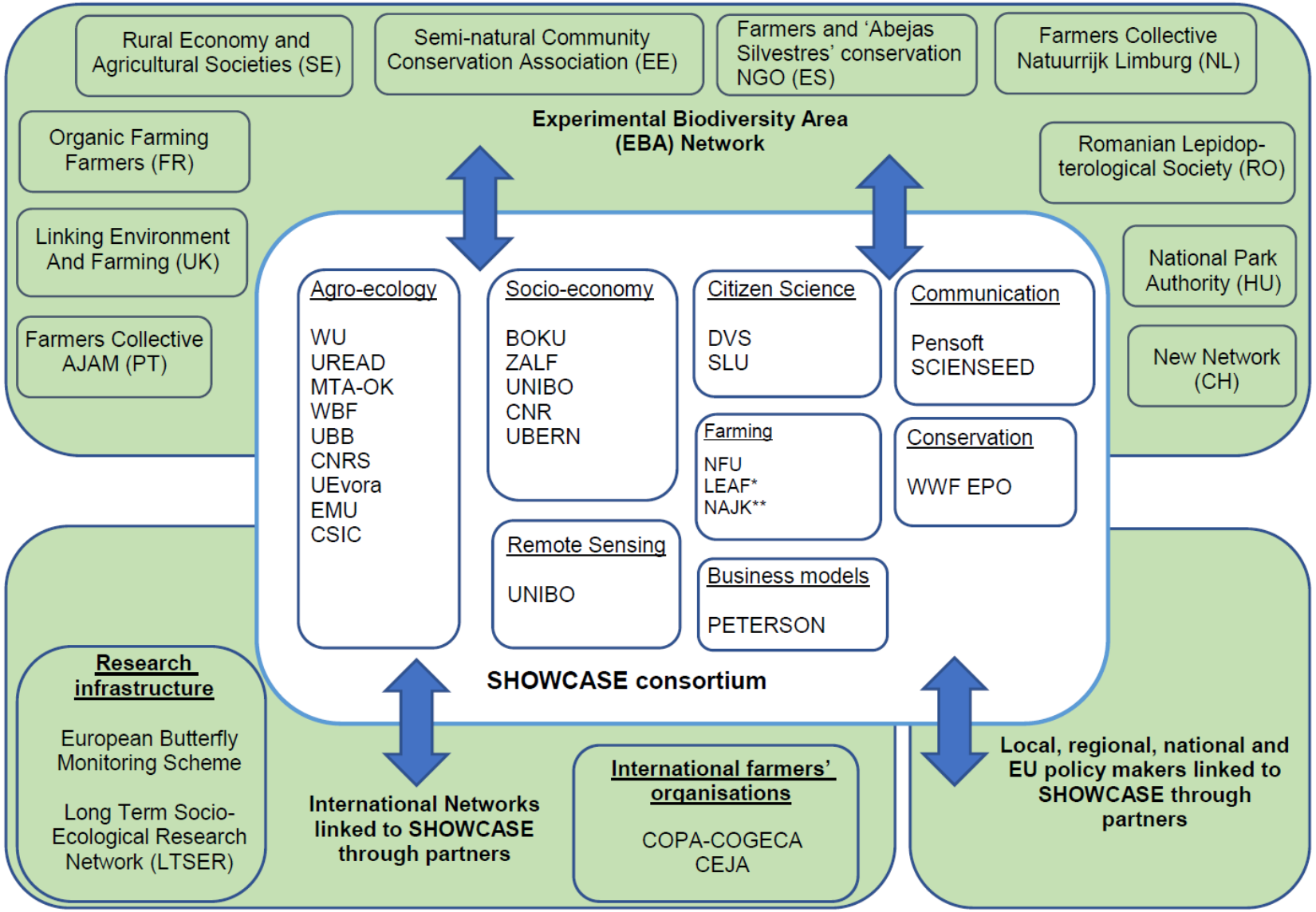


Viaggi et al. (forthcoming)

Identifying Mechanisms

SHOWCASE

SHOWCASing synergies between agriculture, biodiversity and Ecosystem services to help farmers capitalising on native biodiversity



A last thought!

A last thought!

Agrarumweltmaßnahme (ÖPUL) – Betriebe, Flächen und Leistungsabgeltungen im Zeitvergleich Tabelle 5.2.2.6

Jahre	Betriebe (1) im ÖPUL	Alle Betriebe im INVEKOS mit LF	Anteil an allen Betrieben mit LF in %	ÖPUL-Fläche ohne Almfutterfläche in ha (2)	LFoAlm der INVEKOS-Betriebe in ha	Anteil an der LFoAlm in Prozent	EU-Mittel	Bundesmittel	Landesmittel	Leistungs-abgeltungen (3)
							in Mio. Euro			
1995	175.287	197.095	88,9	2.302.968	2.498.183	92,2	247,82	167,88	111,92	527,62
1996	166.357	184.663	90,1	2.326.031	2.494.637	93,2	293,56	180,08	120,06	593,71
1997	163.716	181.634	90,1	2.230.429	2.438.422	91,5	259,35	159,89	106,62	525,86
1998	163.423	176.740	92,5	2.253.994	2.449.113	92,0	269,08	167,70	111,80	548,58
1999	160.944	174.619	92,2	2.214.872	2.413.076	91,8	271,98	168,05	112,03	552,06
2000	145.717	162.719	89,6	2.117.197	2.401.595	88,2	267,86	165,14	110,09	543,08
2001	137.537	156.417	87,9	2.249.617	2.387.903	94,2	289,35	176,78	117,93	584,06
2002	136.381	153.830	88,7	2.257.754	2.387.438	94,6	299,56	183,47	122,36	605,39
2003	135.175	151.129	89,4	2.264.516	2.384.402	95,0	309,81	190,04	126,77	626,61
2004	134.114	149.185	89,9	2.268.831	2.382.604	95,2	316,15	194,26	129,58	639,98
2005	133.096	148.370	89,7	2.271.888	2.382.271	95,4	322,36	198,55	132,39	653,31
2006	126.600	144.095	87,9	2.231.135	2.368.936	94,2	317,22	195,03	129,69	641,94
2007	120.177	139.261	86,3	1.996.355	2.356.607	84,7	252,95	151,03	100,66	504,64
2008	118.270	136.353	86,7	1.968.042	2.351.448	83,7	260,15	152,68	101,79	514,62
2009	117.357	134.102	87,5	1.971.296	2.347.055	84,0	273,87	160,68	107,12	541,67
2010	115.817	132.653	87,3	1.969.700	2.339.299	84,2	278,48	162,25	108,17	548,90
2011	114.421	129.444	88,4	1.965.467	2.323.385	84,6	277,12	161,38	107,59	546,08
2012	111.777	126.762	88,2	1.938.592	2.309.866	83,9	290,43	149,14	99,43	539,00
2013	108.991	124.094	87,8	1.907.825	2.300.379	82,9	285,02	146,35	97,57	528,93
2014	102.260	119.717	85,4	1.848.081	2.284.533	80,9	253,71	149,48	99,66	502,85
2015	90.575	113.482	79,8	1.736.265	2.266.874	76,6	193,73	112,92	75,28	381,93
2016	91.913	112.316	81,8	1.782.767	2.263.022	78,8	205,43	119,67	79,78	404,88
2017	92.566	111.115	83,3	1.802.974	2.258.566	79,8	220,46	126,51	88,62	435,59
2018	91.714	109.968	83,4	1.798.961	2.254.647	79,8	224,22	128,75	90,09	443,06
2019	90.795	108.941	83,3	1.810.580	2.250.631	80,4	228,06	130,87	91,50	450,43

1) Alle Betriebe, die im betreffenden Jahr eine Prämie erhalten haben, jeweils zum Auswertungsstand des betreffenden Jahres.
2) Die ÖPUL-Flächensummen wurden für die Jahre 2007 bis 2019 neu berechnet und aktualisiert, wodurch sich geänderte Zahlen im Vergleich zum Bericht des Vorjahres ergeben.
3) Die Leistungsabgeltungen berücksichtigen alle Rückforderungen und Nachzahlungen auch für die Vorjahre; sie sind daher - soweit notwendig - revidiert; der Wert "Leistungsabgeltungen" in Tabelle 5.2.2.7 ist daher nicht zwingend ident.

Quelle: BMLRT, AMA.

- In 2019, 450.43 million euros were paid out to 90,795 farms under Austrian AES. This is 83.3% of all IACS farms.
- The average subsidy per farm was 4,961 euros.
- Farms participate in an average of 3.1 AES submeasures.
- In 2019, 1,810,580 ha or 80.4 % of Austria's agricultural land (excluding alpine forage areas) were supported under AES.

More than private goods? Identifying mechanisms for agriculture's transition to ecologisation.

THANK YOU!